

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

MATHEMATICS

Class 4



**PUNJAB CURRICULUM AND
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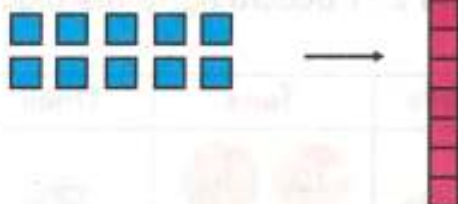
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CHAPTER 1: NUMBERS

1.1 Numbers up to 1 million

■ 1 block = 1 one

Group of 10 blocks = 1 ten



Ahmad has 26 blocks

How many tens and ones are in 26?

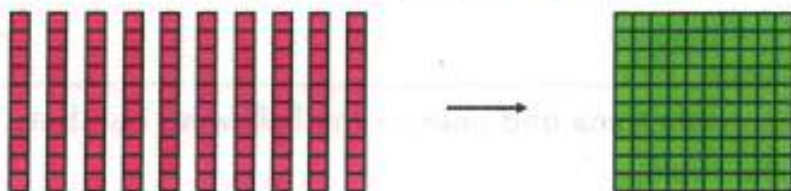


$$26 = 2 \text{ tens } 6 \text{ ones}$$

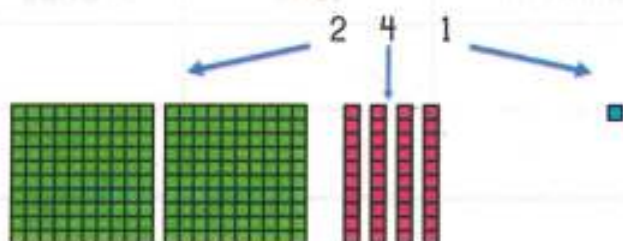
$$26 = 20 + 6$$

In words, we read and write it as **twenty six**.

When we group 10 tens together, we get 1 hundred.



How many hundreds, tens and ones are there in 241?

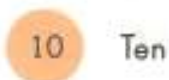


There are **2** hundreds, **4** tens and **1** one in 241.

Look at these coins. The number on each coin shows its value.



One



Ten



Hundred

Let's write 241 according to the place value of its digits.

Hundreds	Tens	Ones
2	4	1

The **place value** of a digit is determined by its position in the number. In 241, **4** is in tens place. It has a value of **40**.

$$241 = 2 \text{ hundreds} + 4 \text{ tens} + 1 \text{ ones}$$

$$= 200 + 40 + 1$$

In words, we read and write it as **two hundred and forty one**.



Identify hundreds, tens and ones in the following numbers and complete the table.

	Hundreds	Tens	Ones
171			
139			
589			

Group of 10 hundreds = 1 thousand = 1 000



While writing numbers, we leave a space between hundreds and thousands.

There are 3 254 students in Ali's school.



There are 3 thousands 2 hundreds 5 tens and 4 ones in the number 3 254.

Thousands	Hundreds	Tens	Ones
1 000 1 000 1 000	100 100	10 10 10 10 10	1 1 1 1
3	2	5	4

Digit 3 is in the **thousands** place

It has a value of **3 000**

Digit 2 is in the **hundreds** place

It has a value of **200**

Digit 5 is in the **tens** place

It has a value of **50**

Digit 4 is in the **ones** place

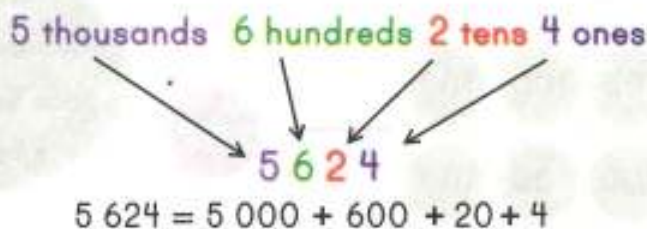
It has a value of **4**

$$3\ 254 = 3\ 000 + 200 + 50 + 4$$

In words, we read and write it as **three thousand, two hundred and fifty four**.

There are three thousand, two hundred and fifty four students in Ali's school.

Can you read and write a number with 5 thousands 6 hundreds 2 tens and 4 ones?



In words: Five thousand, six hundred and twenty four

In figures: 5 624

The school library has 12 635 books.

Look at the place value chart.



Ten Thousands	Thousands	Hundreds	Tens	Ones
10 000	1 000 1 000	100 100 100 100 100 100	10 10 10	1 1 1 1 1
1	2	6	3	5

There are 1 ten thousands, 2 thousands, 6 hundreds, 3 tens and 5 ones.

$$12\ 635 = 10\ 000 + 2\ 000 + 600 + 30 + 5$$

In words: Twelve thousand, six hundred and thirty five

In figures: 12 635

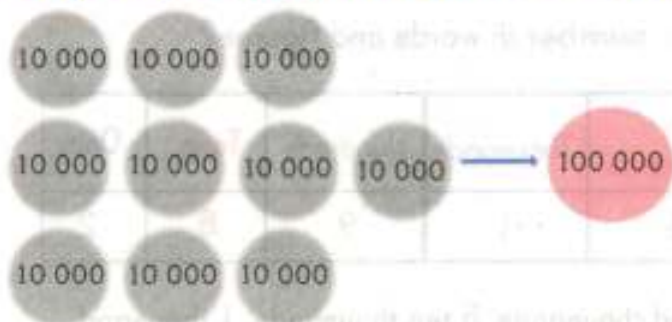
Identify the place value of all digits in 93 465.

There are _____ ten thousands, _____ thousands, _____ hundreds,
_____ tens and _____ ones.

$$93\ 465 = 90\ 000 + \underline{\quad} + 400 + \underline{\quad} + \underline{\quad}$$

Group of 10 ten thousands = 100 000

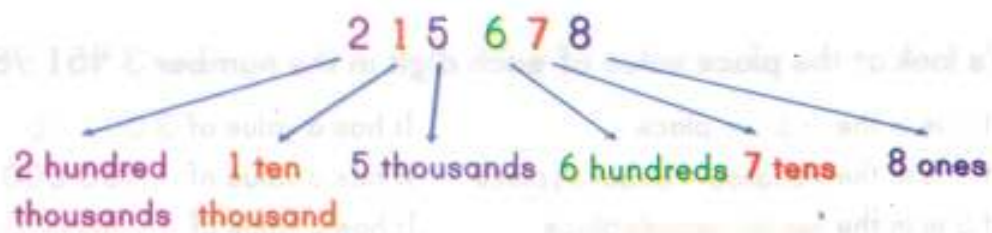
THINK
How many hundreds are in 100 000?



100 000 is written and read as **one hundred thousand**.

Identify the place value of each digit in number 215 678.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
2	1	5	6	7	8

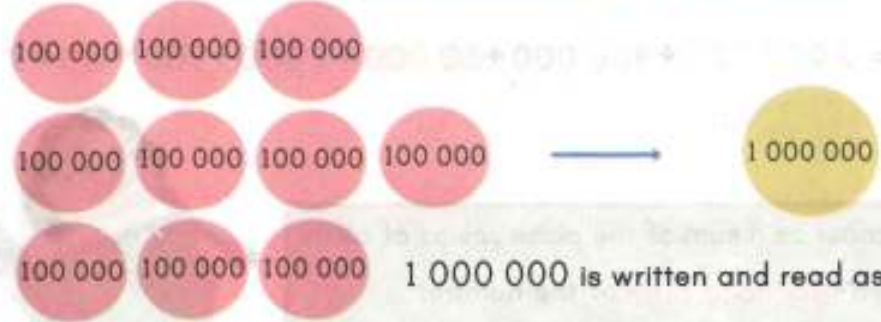


$$215\ 678 = 200\ 000 + 10\ 000 + 5\ 000 + 600 + 70 + 8$$

In words: Two hundred and fifteen thousand, six hundred and seventy eight.

In figures: 215 678.

If we have 10 hundred thousands, we get 1 000 000.



1 000 000 is written and read as **one million**.

We will leave a second space between hundred thousands and millions.

Table shows distance between moon and earth in kilometres.
Can you read and write the number in words and figures?

Millions	Hundred Thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
3	4	5	1	9	8	2

There are 3 millions, 4 hundred thousands, 5 ten thousands, 1 thousand, 9 hundreds, 8 tens and 2 ones in this number.

We read and write it as:

In words: Three million, four hundred fifty one thousand, nine hundred and eighty two.

In figures: 3 451 982.

Let's look at the place value of each digit in the number 3 451 982.

Digit 3 is in the **millions** place It has a value of **3 000 000**

Digit 4 is in the **hundred thousands** place It has a value of **400 000**.

Digit 5 is in the **ten thousands** place It has a value of **50 000**.

Digit 1 is in the **thousands** place It has a value of **1 000**.

Digit 9 is in the **hundreds** place It has a value of **900**.

Digit 8 is in the **tens** place It has a value of **80**.

Digit 2 is in the **ones** place It has a value of **2**.

$$3\ 451\ 982 = 3\ 000\ 000 + 400\ 000 + 50\ 000 + 1\ 000 + 900 + 80 + 2$$

Writing a number as a sum of the place values of all its digits is called **expanded form** of the number.



Identify the place value of all digits in 124 756.

There are _____ hundred thousands, _____ ten thousands, _____ thousands, _____ hundreds, _____ tens and _____ ones.

Complete the place value table for 9 871 203 and write it in expanded form.

Millions	Hundred Thousands	Ten thousands	Thousands	Hundreds	Tens	Ones

9 000 000 + _____ + _____ + _____ + 200 + 0 + _____

Write 935 432 in words.

Write five million, three hundred eighty two thousand, four hundred and thirty three in figures. _____

Group of 10 millions = 10 000 000

There are 25 450 605 people in a city.

Let's write the number according to the place value of its digits.

Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
2	5	4	5	0	6	0	5

$25\,450\,605 = 20\,000\,000 + 5\,000\,000 + 400\,000 + 50\,000 + 0 + 600 + 0 + 5$

In words: Twenty five million, four hundred and fifty thousand, six hundred and five.

Group of 10 ten millions = 100 millions = 100 000 000

Let's identify place value of each digit in the number 523 129 728.

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
5	2	3	1	2	9	7	2	8

There are 5 hundred millions, 2 ten millions, 3 millions, 1 hundred thousands, 2 ten thousands, 9 thousands, 7 hundreds, 2 tens and 8 ones.

$$523\ 129\ 728 = 500\ 000\ 000 + 20\ 000\ 000 + 3\ 000\ 000 + 100\ 000 + 20\ 000 + 9\ 000 + 700 + 20 + 8$$

Let's read and write the number.

In words: Five hundred and twenty three million, one hundred and twenty nine thousand, seven hundred and twenty eight.

In figures: 523 129 728

Complete the place value table for the number 182 246 342.

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
			2			3		

Write 182 246 342 in words.

Exercise 1.1

ACTIVITY

Ahmad has some digit cards.
He can make different 5-digit numbers.
Write down any five numbers he can make.



1. Write the place value of underlined digits.

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
------------------	--------------	----------	-------------------	---------------	-----------	----------	------	------

- a) 72 70 g) 9 91 324 _____
 b) 367 _____ h) 7 036 904 _____
 c) 2 397 _____ i) 50 718 369 _____
 d) 8 910 _____ j) 58 724 098 _____
 e) 47 613 _____ k) 625 391 175 _____
 f) 612 731 _____ l) 709 020 168 _____

REMEMBER

Digit: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are digits.

Place value: The value of a digit is determined by its position in the number.

2. Write each of the following number in words.

- a) 63 Sixty three. _____
 b) 415 _____
 c) 6 314 _____
 d) 19 412 _____
 e) 583 614 _____
 f) 2 444 719 _____

g) 33 690 132 _____

h) 65 498 876 _____

i) 390 790 080 _____

3. Write the following numbers in figures.

a) Five hundred and forty three. _____

b) Nine thousand, two hundred and fifteen. _____

c) Seventy one thousand, two hundred and nine. _____

d) Nine hundred eighty one thousand, five hundred and sixty three. _____

e) One hundred thirty thousand, four hundred and twenty one. _____

f) Five hundred thirty two thousand, one hundred and one. _____

g) Seven million, five hundred seventy six thousand and fifty four. _____

h) Nine million, eight hundred six thousand, five hundred and eighty five. _____

i) Nineteen million, eight hundred seventy three thousand, five hundred and twenty one. _____

j) Thirty one million, two hundred fifty six thousand, seven hundred and twenty one. _____

k) Six hundred and fifty three million, two hundred and seventy two thousand, four hundred and thirteen. _____

4. In the number 845 296 000,

- a) The digit is in the millions place.
b) The place value of the digit 8 is .
c) The place value of the digit 2 is .
d) The digit 9 is in the place.
e) The digit is in the thousands place.

5. Complete the following:

- a) $5\ 814 = 5\ 000 + \underline{\hspace{2cm}} + 10 + 4$
b) $12\ 718 = 10\ 000 + \underline{\hspace{2cm}} + 700 + 10 + 8$
c) $2\ 303\ 820 = \underline{\hspace{2cm}} + 300\ 000 + 3000 + \underline{\hspace{2cm}} + 20$
d) $8\ 517\ 342 = 8\ 000\ 000 + \underline{\hspace{2cm}} + 10\ 000 + \underline{\hspace{2cm}} + 300$
 $\quad\quad\quad + 40 + 2$
e) $6\ 532\ 171 = \underline{\hspace{2cm}} + 500\ 000 + 30\ 000 + \underline{\hspace{2cm}} + 100$
 $\quad\quad\quad + 70 + \underline{\hspace{2cm}}$
f) $25\ 479\ 600 = 20\ 000\ 000 + \underline{\hspace{2cm}} + 400\ 000 + 70\ 000$
 $\quad\quad\quad + \underline{\hspace{2cm}} + 600$
g) $37\ 164\ 563 = 30\ 000\ 000 + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $\quad\quad\quad + 60\ 000 + 4\ 000 + \underline{\hspace{2cm}} + 60 + 3$
h) $354\ 176\ 321 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $\quad\quad\quad + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

1.2 Number line

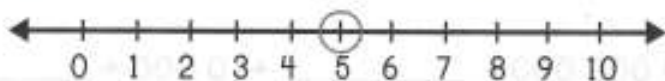


Ali and Sara are holding a banner to show a number line.

The number line shows numbers from left to right \longrightarrow in order from smallest to greatest with equal spaces.

You can see that every number that appears on the right is greater than all numbers on its left.

Let's circle number 5 on the number line.



5 is greater than every number that is on its left and 5 is smaller than every number that is on its right.

Now, look at the number line below. Ahmad skips over 2 spaces to go to 2.

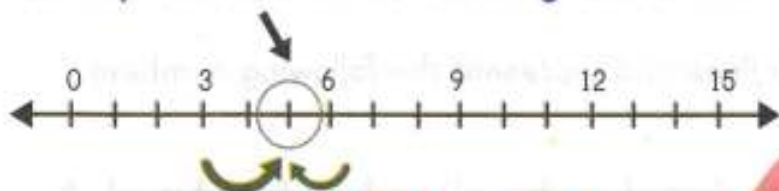


Let's find number 3 on the number line.

Since, number line shows numbers in order with equal spaces in between, the line marked between 2 and 4 shows the number 3.

When we have to go to bigger numbers on the number line, we can always skip over equal spaces.

Identify number 5 on the following number line.



5 is one less than 6.
Count one step backward.

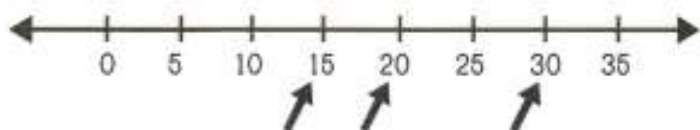
5 is 2 more than 3.

Count on two steps forward.

There are two vertical lines between 0 and 3, representing two more numbers 1 and 2.

Show 15, 20 and 30 on the number line.

To show these numbers we can draw any number line that goes to at least 30. Let's skip count by 5.

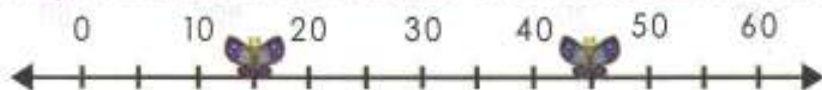


We have represented all three numbers on the number line.

Represent 20, 40 and 50 on the following number line.



Identify the value of the number where the butterflies are sitting.



Since, numbers and the vertical lines on a number line are equally spaced, one line between 0 and 10 means a 5.

The first butterfly is sitting at 15.

The second butterfly is sitting at 45.

Exercise 1.2

1. Draw the number lines and represent the following numbers.

a) 2, 4 and 6



b) 5, 10 and 15

c) 10 and 25

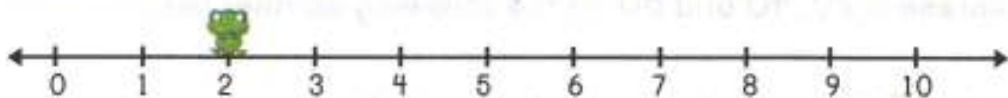
d) 4, 8 and 20

e) 20 and 40

f) 30, 40 and 60

2. Identify the value of the number where the frogs are sitting.

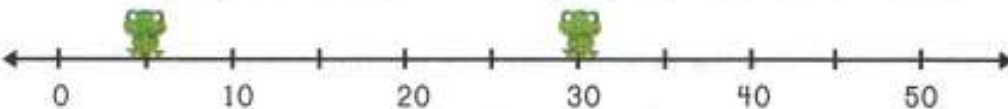
a)



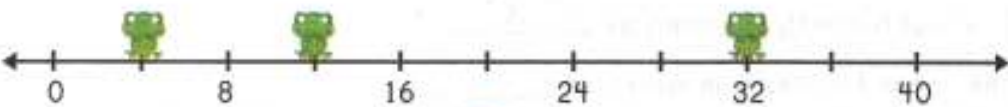
b)



c)



d)



1.3 Comparing and ordering numbers

Ahmad has 22 toffees and Ali has 15 toffees. Who has more?



22



15

22 is greater than 15.

We can also compare numbers by comparing the digits in the highest place value only. 2 is greater than 1. So, 22 is greater number than 15. We can also write it as $22 > 15$. So, Ahmad has more toffees.

When comparing numbers, we compare the digits in the highest place value first. The number with greater digit in the highest place value is the greater number.

Open side of crocodile's mouth faces greater number.



Closed side of crocodile's mouth faces smaller number.



Which number is greater, 198 or 328?

Let's compare the digits in the highest place value.

3 hundreds is greater than 1 hundred.

So, 328 is greater than 198.

We can also write it as $328 > 198$.

Hundreds	Tens	Ones
1	9	8
3	2	8

Which number is smaller, 63 163 or 98 163?

Let's compare the digits in the highest place value.

6 ten thousands is smaller than 9 ten thousands. So, 63 163 is smaller than

98 163. We can also write it as:

Ten Thousands	Thousands	Hundreds	Tens	Ones
6	3	1	6	3
9	8	1	6	3

$63\ 163 < 98\ 163$.

Which number is greater, 47 453 111 or 88 445 622?

Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
4	7	4	5	3	1	1	1
8	8	4	4	5	6	2	2

Let's compare the digits in the highest place value.

8 ten millions $>$ 4 ten millions. So, 88 445 622 $>$ 47 453 111

Compare the numbers and write " $>$ " or " $<$ " in the middle.

4 369 3 863 234 569 613 679 23 187 345 91 207 400

Compare 7 198 and 7 283.

Let's compare the digits in the highest place value.

Both numbers have 7 thousands. So, we move on to next digit and we compare the hundreds. $1 < 2$.

So, 7 198 $<$ 7 283.

Thousands	Hundreds	Tens	Ones
7	1	9	8
7	2	8	3

When comparing numbers, if the digits in the highest place value are same, we continue to compare until one of the digits is greater or smaller.

Which number is greater, 32 984 312 or 32 935 011?

Let's compare the digits in the highest place value. Digits in ten millions place, millions place and hundred thousands place are same in both numbers. So, we compare digits in ten thousands place.

8 ten thousands $>$ 3 ten thousands.

So, 32 984 312 $>$ 32 935 011

Compare the following numbers and write ">" or "<" in the middle.

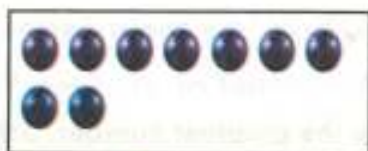
12 432 12 489

87 456 611 87 011 328

Sara has 12 marbles and Anum has 9 marbles. Who has more marbles?



12



9

12 > 9

12 is greater than 9. So, Sara has more number of marbles.

Which number is smaller, 1 219 or 325?

Let's compare digits in the highest place value.

The number 325 has no thousands.

There are 0 thousands in 325.

Thousands	Hundreds	Tens	Ones
1	2	1	9
0	3	2	5

Remember we can write as many zeroes as we want on the left side of a number.

0 thousands is smaller than 1 thousands. So, $325 < 1\ 219$.

Which number is greater, 1 324 660 or 32 100 789 ?

There are 0 ten millions in 1 324 660.

3 ten million > 0 ten million.

So, $32\ 100\ 789 > 1\ 324\ 660$.

Compare the numbers and write ">" or "<" in the middle.

6 110 112

29 776 650 117

41 880 241 721

21 876 988 200 701

Ordering numbers

There are four schools in a city with different number of students.

School A

School B

School C

School D

9 000

7 500

2 800

3 000

Which school has the most number of students? Which school has the least number of students?

9 000 is the greatest number. School A has the most number of students.

2 800 is the smallest number. School C has the least number of students.

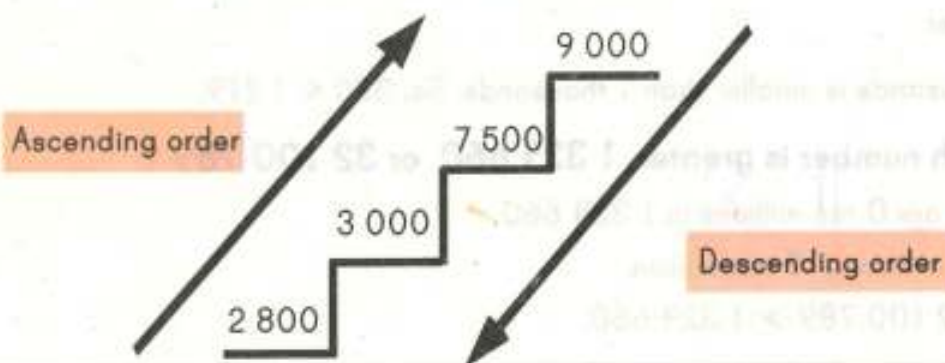
Can you order these numbers?

Let's arrange the numbers from smallest to greatest.

Write smallest number first and greatest number at the end.

2 800 3 000 7 500 9 000

If we write the smallest number first and the greatest number at the end, it is called **increasing order or ascending order**.



We can also arrange the numbers from greatest to smallest.

Write the greatest number first and the smallest number at the end.

9 000 7 500 3 000 2 800

If we write the greatest number first and the smallest number at the end, it is called **decreasing order or descending order**.

Can you arrange the following numbers in ascending order?

56 248 910, 9 286 344 and 56 382 193

Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
5	6	2	4	8	9	1	0
0	9	2	8	6	3	4	4
5	6	3	8	2	1	9	3

Let's start from the highest place value. 5 Ten millions $>$ 0 ten millions. So, 9 286 344 is the smallest number.

Now, we compare 56 248 910 and 56 382 193.

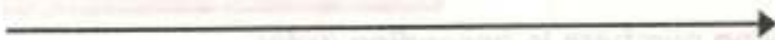
Ten millions place is same and one millions place is also the same. So, we move to hundred thousands place. 3 hundred thousands is greater than 2 hundred thousands.

So, 56 382 193 $>$ 56 248 910

Let's arrange these numbers in ascending order.

Write the smallest number first and the greatest number at the end.

9 286 344 56 248 910 56 382 193



Arrange these numbers in ascending order.

246 989 435 123 289 909

Arrange these numbers in descending order.

24 653 900 78 542 121 12 432 677

THINK

What is the greatest 8-digit number?



Exercise 1.3

ACTIVITY

Ali has these cards.



What is the greatest number he can make?



1. Compare the numbers and write " $>$ " or " $<$ " in the middle.

- a) 345 1806
b) 6890 6017
c) 23765 12789
d) 11345 13345
e) 132302 432411
f) 2645789 3942000
k) 99654323 99894121
l) 321654213 321654379

REMEMBER

Ascending order:

If we write the smallest number first and the greatest number at the end, it is called ascending order.

Descending Order:

If we write the greatest number first and the smallest number at the end, it is called descending order.

2. Arrange the following numbers in ascending order.

- | | | | |
|----|--------|--------|--------|
| a) | 238 | 141 | 634 |
| b) | 6157 | 3164 | 2157 |
| c) | 53231 | 23451 | 99864 |
| d) | 846123 | 914675 | 871452 |

e) 1 423 431 6 153 540 6 879 892

f) 235 211 999 111 232 000 321 342 121

g) 25 432 419 999 123 156 100 234 456

3. Arrange the following numbers in descending order.

a) 238 141 634

b) 6 157 3 164 2 157

c) 85 205 12 285 99 000

d) 816 816 110 819 962 321

e) 3 171 623 5 000 701 3 762 189

f) 11 235 686 22 544 000 34 343 765

g) 34 125 131 99 123 200 248 156 000

CHAPTER 2: ADDITION AND SUBTRACTION

2.1 Simple addition

Ahmad has 15 marbles. Sara has 12 marbles. How many marbles do they have in total?

To know the total, we will add 15 marbles and 12 marbles.



You can count the total marbles. There are 27 marbles in total.

We add numbers by writing them according to the place value of their digits.

STEP 1 First, we add ones of the numbers.

1

$$5 + 2 = 7$$

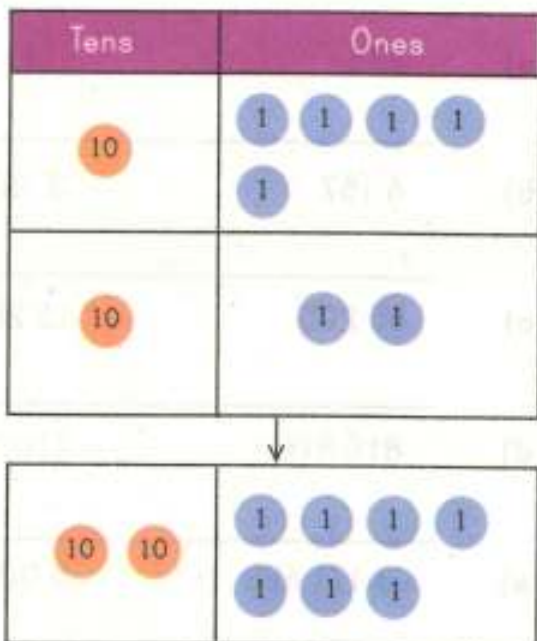
Tens	Ones
1	5
+	1 2
<hr/>	
	7

STEP 2 Next, we add tens of the number.

2

$$1 + 1 = 2$$

Tens	Ones
1	5
+	1 2
<hr/>	
2	7



The sum of 15 and 12 is 27.

Add the following numbers:

$$\begin{array}{r} 1 \quad 2 \\ + 3 \quad 1 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 3 \quad 3 \\ + 4 \quad 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 4 \quad 6 \\ + 2 \quad 1 \\ \hline \\ \hline \end{array}$$

Ali spent Rs. 321 on Eid. Sara spent Rs. 54 on Eid. How much money did both spent on Eid?

To know the total, we will add 321 and 54.

Recall that we can always put a zero on the left side of a number without changing its value.

STEP

1

First, we add ones.

$$1 + 4 = 5.$$

Hundreds	Tens	Ones
3	2	1
+ 0	5	4
		5

STEP

2

Next, we add tens.

$$2 + 5 = 7.$$

Hundreds	Tens	Ones
3	2	1
+ 0	5	4
7		5

STEP

3

Next, we add hundreds.

$$3 + 0 = 3.$$

Hundreds	Tens	Ones
3	2	1
+ 0	5	4
3	7	5

Ali and Sara spent Rs. 375 in total.

Add the following numbers:

$$\begin{array}{r} 83 \\ + 3 \\ \hline 86 \end{array}$$

$$\begin{array}{r} 132 \\ + 53 \\ \hline \end{array}$$

$$\begin{array}{r} 61 \\ + 423 \\ \hline \end{array}$$

Let's add 6 137 and 2 622.

We will write both numbers according to the place value of their digits and follow the following steps.

Thousands	Hundreds	Tens	Ones
6	1	3	7
+ 2	6	2	2
			9

STEP 1

Add the ones.
 $7 + 2 = 9$.

Thousands	Hundreds	Tens	Ones
6	1	3	7
+ 2	6	2	2
		5	9

STEP 2

Add the tens.
 $3 + 2 = 5$.

Thousands	Hundreds	Tens	Ones
6	1	3	7
+ 2	6	2	2
7		5	9

STEP 3

Add the hundreds.
 $1 + 6 = 7$.

Thousands	Hundreds	Tens	Ones
6	1	3	7
+ 2	6	2	2
8	7	5	9

STEP 4

Add the thousands.
 $6 + 2 = 8$.

The answer is 8 759.

Add the following numbers:

$$\begin{array}{r} 4\ 3\ 7\ 1 \\ + 2\ 3\ 1\ 8 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 5\ 6\ 6\ 2 \\ + 4\ 2\ 3\ 4 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 2\ 1\ 2\ 3 \\ + 2\ 4\ 4\ 2 \\ \hline \\ \hline \end{array}$$

What is $43\ 152 + 12\ 446$?

Let's write both numbers according to the place values of their digits and follow the same steps to add them.

Ten Thousands	Thousands	Hundreds	Tens	Ones
---------------	-----------	----------	------	------

4	3	1	5	2
+	1	2	4	6
<hr/>				
5	5	5	9	8



Step 1
Add ones. $2\ \text{ones} + 6\ \text{ones} = 8\ \text{ones}$.

Step 2
Add tens. $5\ \text{tens} + 4\ \text{tens} = 9\ \text{tens}$.

Step 3
Add hundreds. $1\ \text{hundred} + 4\ \text{hundreds} = 5\ \text{hundreds}$.

Step 4
Add thousands. $3\ \text{thousands} + 2\ \text{thousands} = 5\ \text{thousands}$.

Step 5
Add ten thousands. $4\ \text{ten thousands} + 1\ \text{ten thousands} = 5\ \text{ten thousands}$.

Add the following numbers:

$$\begin{array}{r} 1\ 3\ 6\ 7\ 4 \\ +\ 6\ 4\ 2\ 2\ 1 \\ \hline \end{array}$$

$$\begin{array}{r} 3\ 2\ 8\ 8\ 1 \\ +\ 2\ 7\ 1\ 1\ 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6\ 7\ 1\ 0\ 0 \\ +\ 2\ 2\ 1\ 9\ 0 \\ \hline \end{array}$$

Follow the same steps you have learnt and add the following numbers. Remember we start adding from the right side.

$$\begin{array}{r} 6\ 1\ 3\ 4\ 5\ 1 \\ +\ 2\ 6\ 2\ 1\ 3\ 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2\ 3\ 1\ 8\ 7\ 1 \\ +\ 5\ 6\ 1\ 2\ 1 \\ \hline \end{array}$$

$$\begin{array}{r} 3\ 1\ 2\ 1\ 1 \\ +\ 7\ 1\ 2\ 7\ 0\ 4 \\ \hline \end{array}$$

Exercise 2.1

Write the numbers in the boxes.

ACTIVITY

Choose any four numbers from the given numbers and find their sum. Write any five different answers that you can get.



1. Add the given numbers.

a)

$$\begin{array}{r} 30 \\ + 16 \\ \hline \end{array}$$

b)

$$\begin{array}{r} 611 \\ + 237 \\ \hline \end{array}$$

c)

$$\begin{array}{r} 142 \\ + 834 \\ \hline \end{array}$$

REMEMBER

Some words that we use for addition: add, addition, plus, altogether, total, sum.

d) $\begin{array}{r} 6112 \\ + 3660 \\ \hline \end{array}$

e) $\begin{array}{r} 75191 \\ + 13606 \\ \hline \end{array}$

f) $\begin{array}{r} 1202 \\ + 63173 \\ \hline \end{array}$

$$\begin{array}{r} 3660 \\ \hline \end{array}$$

$$\begin{array}{r} 13606 \\ \hline \end{array}$$

$$\begin{array}{r} 63173 \\ \hline \end{array}$$

g) $\begin{array}{r} 12194 \\ + 61404 \\ \hline \end{array}$

h) $\begin{array}{r} 25032 \\ + 64135 \\ \hline \end{array}$

i) $\begin{array}{r} 607121 \\ + 372464 \\ \hline \end{array}$

$$\begin{array}{r} 61404 \\ \hline \end{array}$$

$$\begin{array}{r} 64135 \\ \hline \end{array}$$

$$\begin{array}{r} 372464 \\ \hline \end{array}$$

2. Line up the following numbers according to the place value of their digits and add them.

a) $16 + 22 =$

b) $617 + 140 =$

c) $2236 + 6763 =$

d) $41618 + 14160 =$

e) $13617 + 10141 =$

2.2 Addition with regrouping

There are 16 red flowers and 8 yellow flowers in a garden. What is the total number of flowers?



You can count total number of flowers. There are 24 flowers in total. Let's write both numbers according to the place value of their digits and add them.

STEP 1 First, we add ones.

Tens	Ones
1	6
+	8
<hr/>	
	4

$$8 + 6 = 14$$

We will regroup 14 into 10 and 4.

14 ones = 1 ten 4 ones.

Let's carry 1 ten to the tens column.

STEP 2 Next, we add tens.

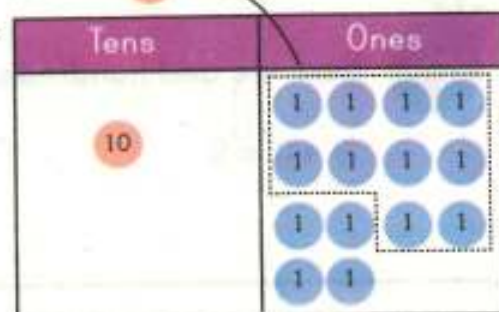
Tens	Ones
1	6
+	8
<hr/>	
2	4

$$1 + 1 = 2$$

The total number of flowers is 24.



10



Can you now add 937 and 23?

Let's write both numbers according to the place value of their digits.

Recall that we can always put a zero on the left side of a number without changing its value.

STEP

1 First, we add ones.

$$7 + 3 = 10$$

We will regroup 10 into 1 ten and 0.

$$10 \text{ ones} = 1 \text{ ten } 0 \text{ ones}$$

Let's take 1 ten to the tens column.

STEP

2 Next, we add tens.

We have 1 more ten now.

$$3 + 2 + 1 = 6$$

STEP

3 Next, we add hundreds.

$$9 + 0 = 9$$

Hundreds	Tens	Ones
9	3	7
+ 0	2	3
		0

①

Hundreds	Tens	Ones
9	3	7
+ 0	2	3
6		0

①

Hundreds	Tens	Ones
9	3	7
+ 0	2	3
9	6	0

The answer is 960.

Add the following numbers:

$$\begin{array}{r} 18 \\ + 3 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 616 \\ + 602 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 95 \\ + 608 \\ \hline \\ \hline \end{array}$$

A toy shop has 4 255 different toys in one section and 4 360 toys in another section. How many toys are there in total?

To know the total, we will add both numbers.

Thousands	Hundreds	Tens	Ones
4	2	5	5
+ 4	3	6	0
			5

Thousands	Hundreds	Tens	Ones
4	2	5	5
+ 4	3	6	0
		1	5

STEP 1 Add the ones.
 $5 + 0 = 5$

STEP 2 Add the tens. $5 + 6 = 11$
 11 tens = 1 hundred and 1 ten.
 Carry 1 hundred to the hundreds column.

Thousands	Hundreds	Tens	Ones
4	2	5	5
+ 4	3	6	0
6		1	5

Thousands	Hundreds	Tens	Ones
4	2	5	5
+ 4	3	6	0
8	6	1	5

STEP 3 Add the hundreds. Don't forget the carried hundred
 $3 + 2 + 1 = 6$

STEP 4 Add the thousands.
 $4 + 4 = 8$

There are 8 615 toys in total.

Find the sum of the following numbers:

$\begin{array}{r} 4\ 9\ 8\ 7 \\ + 6\ 3\ 6\ 1 \\ \hline \\ \hline \end{array}$	$\begin{array}{r} 3\ 0\ 9\ 0 \\ + 1\ 9\ 3\ 1 \\ \hline \\ \hline \end{array}$	$\begin{array}{r} 6\ 4\ 0\ 0 \\ + 4\ 6\ 9\ 9 \\ \hline \\ \hline \end{array}$
---	---	---

Let's now add 91 819 and 33 276.

	①	①	①			
	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
		9	1	8	1	9
+		3	3	2	7	6
	1	2	5	0	9	5



Step 1
Add ones. $9 + 6 = 15$.
15 ones = 1 tens and 5 ones.

Step 2
Add tens. $1 + 7 + 1 = 9$ tens.

Step 3
Add hundreds. $8 + 2 = 10$.
10 hundreds = 1 thousand and 0 hundreds

Step 4
Add thousands. $1 + 3 + 1 = 5$.

Step 5
Add ten thousands. $9 + 3 = 12$.
12 ten thousands = 1 hundred thousand + 2 ten thousands.

Step 6
Add hundred thousands. $1 + 0 = 1$.

Find the sum of the following numbers:

$13\ 649$	$32\ 081$	$71\ 541$
$+ 64\ 421$	$+ 56\ 884$	$+ 54\ 772$
<hr/>	<hr/>	<hr/>

Follow the same steps you have learnt and add these numbers.

$673\ 338$	$752\ 176$	$956\ 819$
$+ 112\ 047$	$+ 218\ 315$	$+ 341\ 270$
<hr/>	<hr/>	<hr/>

Exercise 2.2

1. Add the given numbers.

a)
$$\begin{array}{r} 35 \\ + 79 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 55 \\ + 16 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 182 \\ + 139 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 853 \\ + 118 \\ \hline \end{array}$$

e)
$$\begin{array}{r} 8009 \\ + 7269 \\ \hline \end{array}$$

f)
$$\begin{array}{r} 6381 \\ + 1531 \\ \hline \end{array}$$

2. Find the sum of the following numbers.

a)
$$\begin{array}{r} 6734 \\ + 601 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 17316 \\ + 4176 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 75190 \\ + 1635 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 63174 \\ + 20935 \\ \hline \end{array}$$

3. Line up the following numbers according to the place value of their digits and add them.

a) $55 + 29 =$

b) $91 + 52 =$

c) $250 + 150 =$

d) $5158 + 1409 =$

e) $41850 + 20311 =$

2.3 Addition problems in daily life

- a) Sara has 32 blue toffees. Ali has 18 red toffees. How many toffees are there in total?



32



18

32	+	18	=	50
----	---	----	---	----

①	3	2
+	1	8
	5	0

- b) Pakistan scored 350 runs on the first day of a cricket test match and 215 on the second day. How many runs were scored in total?

- c) The shopkeeper sold 450 oranges in the morning and 375 oranges in the evening. How many oranges did he sell altogether?



- d) Anam scored 8 789 in level 1 of her computer game. She scored 7 480 in level 2. What is her total score?

- e) There are two schools in a town. 2 450 children go to one school and 8 910 children go to the other school. How many children go to both schools?



2.4 Mental addition

Let's find the sum of 22 and 56.

Split the numbers according to the place value of their digits.

$$22 = 20 + 2$$

$$56 = 50 + 6$$

Step

1

Add the tens.

$$20 + 50 = 70$$

Step

2

Add the ones.

$$2 + 6 = 8$$

Step

3

Add both answers.

$$70 + 8 = 78$$

$$\text{Hence, } 22 + 56 = 78$$

Let's find the sum of 350 and 415.

Split the numbers according to the place value of their digits.

$$350 = 300 + 50$$

$$415 = 400 + 10 + 5$$

Step

1

Add the hundreds.

$$300 + 400 = 700$$

Step

2

Add the tens.

$$50 + 10 = 60$$

Step

3

Add the ones.

$$5 + 0 = 5$$

Step

4

Add all answers.

$$700 + 60 + 5 = 765$$

Mental Addition is to solve mentally without using a paper, pen or calculator.



Add the following numbers:

$45 + 5 =$

$70 + 41 =$

$38 + 10 =$

$50 + 18 =$

$70 + 40 =$

$280 + 10 =$

$30 + 36 =$

$350 + 400 =$

2.5 Simple subtraction

Sara bought 23 biscuits. She ate 11 of them. How many does she have left?



There are 12 biscuits left.

We find the difference between two numbers by writing them according to the place value of their digits.

STEP 1

First, we subtract ones.

$$3 - 1 = 2$$

Tens	Ones
2	3
-	1
	2



STEP 2

Next, we subtract tens.

$$2 - 1 = 1$$

Tens	Ones
2	3
-	1
1	2



The difference between 23 and 11 is 12.

Find the difference of the following numbers:

$$\begin{array}{r} 4 \quad 9 \\ - 1 \quad 5 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 9 \quad 1 \\ - 7 \quad 0 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 8 \quad 4 \\ - 6 \quad 1 \\ \hline \\ \hline \end{array}$$

Asad has 125 coins. He gave away 13 coins. How many coins are left?

To find out number of coins left, we will subtract 13 from 125.

Recall that we can always put a zero on the left side of a number without changing its value.

STEP 1 First, we subtract ones.

$$5 - 3 = 2$$

Hundreds	Tens	Ones
1	2	5
- 0	1	3
		2

STEP 2 Next, we subtract tens.

$$2 - 1 = 1$$

Hundreds	Tens	Ones
1	2	5
- 0	1	3
		2

STEP 3 Next, we subtract hundreds.

$$1 - 0 = 1$$

Hundreds	Tens	Ones
1	2	5
- 0	1	3
1	1	2

Asad has 112 coins.

Find the difference of the following numbers:

$\begin{array}{r} 93 \\ - \quad 2 \\ \hline \end{array}$	$\begin{array}{r} 430 \\ - \quad 10 \\ \hline \end{array}$	$\begin{array}{r} 372 \\ - \quad 61 \\ \hline \end{array}$
--	--	--

A worker packed 2 317 shirts. If he has to pack 7 348 shirts in total, how many shirts are still left to pack?

To know that, we will subtract 2 317 from 7 348.

Thousands	Hundreds	Tens	Ones
7	3	4	8
- 2	3	1	7
			1

STEP 1

Subtract the ones.
 $8 - 7 = 1$

Thousands	Hundreds	Tens	Ones
7	3	4	8
- 2	3	1	7
		3	1

STEP 2

Subtract the tens.
 $4 - 1 = 3$

Thousands	Hundreds	Tens	Ones
7	3	4	8
- 2	3	1	7
0		3	1

STEP 3

Subtract the hundreds.
 $3 - 3 = 0$

Thousands	Hundreds	Tens	Ones
7	3	4	8
- 2	3	1	7
5	0	3	1

STEP 4

Subtract the thousands.
 $7 - 2 = 5$

The answer is 5 031 shirts.

Find the difference of the following numbers:

$$\begin{array}{r} 5487 \\ - 1007 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 8175 \\ - 6124 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 2451 \\ - 2320 \\ \hline \\ \hline \end{array}$$

What is $79\,562 - 72\,540$?

Let's line up both numbers in vertical columns and follow the same steps.

Ten Thousands	Thousands	Hundreds	Tens	Ones
7	9	5	6	2
- 7	2	5	4	0
<hr/>				
0	7	0	2	2

Step 1
Subtract ones.
 $2 \text{ ones} - 0 \text{ ones} = 2 \text{ ones.}$

Step 2
Subtract tens. $6 \text{ tens} - 4 \text{ tens} = 2 \text{ tens.}$

Step 3
Subtract hundreds.
 $5 \text{ hundreds} - 5 \text{ hundreds} = 0 \text{ hundreds.}$

Step 4
Subtract thousands. $9 \text{ thousands} - 2 \text{ thousands} = 7 \text{ thousands.}$

Step 5
Subtract ten thousands. $7 \text{ ten thousands} - 7 \text{ ten thousands} = 0 \text{ ten thousands.}$

The answer is 7 022.

Find the difference between the following numbers:

$$\begin{array}{r} 93\,638 \\ - 21\,216 \\ \hline \end{array}$$

$$\begin{array}{r} 54\,651 \\ - 22\,400 \\ \hline \end{array}$$

$$\begin{array}{r} 76\,329 \\ - 12\,207 \\ \hline \end{array}$$

Follow the same steps and find the difference between the following numbers.

$$\begin{array}{r} 413\,487 \\ - 112\,261 \\ \hline \end{array}$$

$$\begin{array}{r} 651\,251 \\ - 210\,140 \\ \hline \end{array}$$

$$\begin{array}{r} 935\,430 \\ - 721\,000 \\ \hline \end{array}$$

Exercise 2.5

Write in 15 min

ACTIVITY

Complete the following.

$$\boxed{6} - \boxed{} = \boxed{4}$$



1. Subtract the given numbers.

$$\begin{array}{r} 84 \\ - 73 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 845 \\ - 04 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 712 \\ - 201 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 263 \\ - 21 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 836 \\ - 515 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 599 \\ - 543 \\ \hline \\ \hline \end{array}$$

2. Calculate the difference between the given numbers.

$$\begin{array}{r} 4634 \\ - 3001 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 43435 \\ - 40123 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 76148 \\ - 65135 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 13876 \\ - 1413 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 81760 \\ - 61700 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 989001 \\ - 975000 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 25846 \\ - 1202 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 58764 \\ - 21702 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 760901 \\ - 50400 \\ \hline \\ \hline \end{array}$$

2.6 Subtraction with regrouping

Let's find the difference between 23 and 6.

STEP 1 First, we subtract ones.

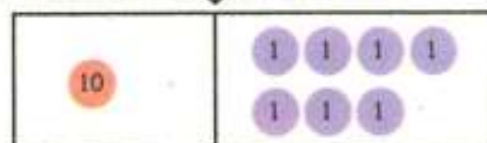
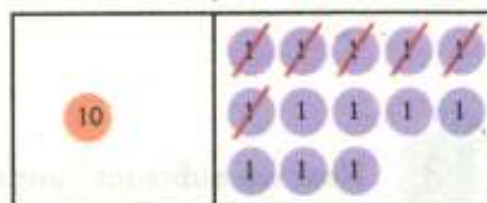
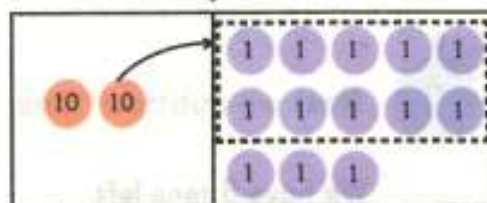
Tens	Ones
1 2	① 3
-	6
<hr/>	
	7

We cannot subtract 6 from 3. So, we will borrow 1 ten from the tens side. Now, we have 13 ones. $13 - 6 = 7$

STEP 2 Then, we subtract tens.

Tens	Ones
1 2	① 3
-	6
<hr/>	
1	7

After borrowing, we are left with 1 tens. $1 - 0 = 1$



Subtract the following numbers:

$$\begin{array}{r} 54 \\ - 17 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 15 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 43 \\ - 16 \\ \hline \\ \hline \end{array}$$

Find the difference between 292 and 165.

Let's write both numbers according to the place value of their digits.

STEP

1

First we subtract ones.

We cannot subtract 5 from 2.

So, we will borrow 1 ten from the tens side. $12 - 5 = 7$

Hundreds	Tens	Ones
2	8	^① 2
- 1	6	5
<hr/>		7

STEP

2

Next we subtract tens.

We have 8 tens left.

$$8 - 6 = 2$$

Hundreds	Tens	Ones
2	8	^① 2
- 1	6	5
<hr/>		7
2		

STEP

3

Next we subtract hundreds.

2 hundreds - 1 hundred = 1 hundred

Hundreds	Tens	Ones
^② 2	8	^① 2
- 1	6	5
<hr/>		7
1	2	

Solve the following:

$$\begin{array}{r} 185 \\ - 47 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 231 \\ - 150 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 650 \\ - 165 \\ \hline \\ \hline \end{array}$$

Ali is writing an essay of 6 525 words. He wrote 4 280 words. How many more words does he have to write?

Let's subtract 4 280 from 6 525.

Thousands	Hundreds	Tens	Ones
6	5	2	5
- 4	2	8	0
			5

STEP 1 Subtract the ones.
 $5 - 0 = 5$

Thousands	Hundreds	Tens	Ones
6	5 ⁴	^① 2	5
- 4	2	8	0
		4	5

STEP 2 Subtract the tens. We cannot subtract 8 from 2. So, we will borrow 1 hundred from the hundreds side. $12 - 8 = 4$

Thousands	Hundreds	Tens	Ones
6	4 ^①	2 ^①	5
- 4	2	8	0
		2	4
			5

STEP 3 Subtract hundreds. After borrowing 1 hundred, 4 hundreds are left. $4 - 2 = 2$.

Thousands	Hundreds	Tens	Ones
6 ^①	4 ^①	2 ^①	5
- 4	2	8	0
2	2	4	5

STEP 4 Subtract the thousands.
 $6 - 4 = 2$

Ali has to write 2 245 more words.

Find the difference of the following numbers:

6	1	4	5
- 5	6	3	2
<hr/>			
<hr/>			

5	6	1	1
- 3	2	4	0
<hr/>			
<hr/>			

9	3	0	8
- 7	2	2	4
<hr/>			
<hr/>			

Now, let's find the difference between 63 158 and 57 462.

Ten Thousands	Thousands	Hundreds	Tens	Ones
5 6	12 7	10 4	15	8
- 5	7	4	6	2
<hr/>				
0	5	6	9	6
<hr/>				

Step 1
Subtract ones. $8 - 2 = 6$.

Step 2
Subtract tens. We will borrow 1 hundred from hundreds side. $15 - 6 = 9$.

Step 3
Subtract hundreds. We will borrow 1 thousand from thousands side. $10 - 4 = 6$.

Step 4
Subtract thousands. We will borrow 1 ten thousand from ten thousands side. $12 - 7 = 5$.

Step 5
Subtract ten thousands. After borrowing, we have 5 ten thousands left. $5 - 5 = 0$.

The answer is 5 696.

Find the difference of the following numbers:

$$\begin{array}{r} 71254 \\ - 50641 \\ \hline \end{array}$$

$$\begin{array}{r} 85361 \\ - 67420 \\ \hline \end{array}$$

$$\begin{array}{r} 53168 \\ - 48093 \\ \hline \end{array}$$

Follow the same steps and subtract the following numbers.

$$\begin{array}{r} 784859 \\ - 629379 \\ \hline \end{array}$$

$$\begin{array}{r} 620705 \\ - 191402 \\ \hline \end{array}$$

$$\begin{array}{r} 635529 \\ - 382717 \\ \hline \end{array}$$

Exercise 2.6

1. Subtract the following numbers:

$$\begin{array}{r} 441 \\ - 350 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 824 \\ - 659 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 675 \\ - 395 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 2887 \\ - 1578 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 4761 \\ - 2687 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 5462 \\ - 1375 \\ \hline \\ \hline \end{array}$$

2. Find the difference of the following numbers:

$$\begin{array}{r} 98467 \\ - 15827 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 37510 \\ - 13881 \\ \hline \\ \hline \end{array}$$

3. Line up the given numbers and find their difference:

a) $958 - 682 =$

b) $4698 - 3400 =$

c) $5183 - 2561 =$

d) $6897 - 4910 =$

e) $45125 - 1003 =$

f) $70800 - 14783 =$

2.7 Subtraction problems in daily life

- a) There were 54 marbles in a jar. Sara took 32 marbles out. How many marbles are left in the jar?



Tens	Ones
5	4
- 3	2
<hr/>	
2	2

54

32

- b) Ali is reading a book that has 423 pages. He has read 167 pages. How many pages are left to read?



- c) Asad got 1 050 rupees from his father. He spent 312 rupees. How much money does he have left?

- d) There were 680 books in a school library. 250 were borrowed by the students. How many books are left?



- e) A factory made 9 450 footballs and sold 8 750 of them. How many footballs are left?

2.8 Mental subtraction

Let's find the difference between 28 and 44.

Count on from 28 to 30. Hold the 2 in your head.

30 to 44 is $10 + 4 = 14$.

Add the 2 in 14. $14 + 2 = 16$ is the answer.

Mental subtraction is to subtract mentally without using a paper, pen or calculator.

Find the difference between 130 and 50.

Count from 5 to 13. $13 - 5 = 8$. So, $130 - 50 = 80$

Subtract the following numbers:

$67 - 10 =$

$24 - 8 =$

$23 - 12 =$

$78 - 25 =$

$44 - 32 =$

$87 - 27 =$

$350 - 270 =$

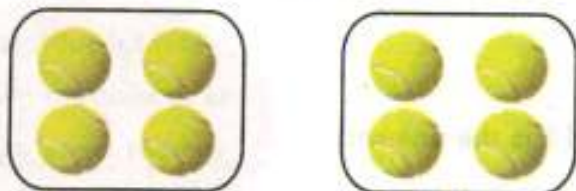
$820 - 580 =$



CHAPTER 3: MULTIPLICATION AND DIVISION

3.1 Multiplication

There are two groups of 4 balls each. How many balls are there in total?



$$4 + 4 = 8$$

There are 2 groups. Each group has 4 balls.

$$2 \times 4 = 8$$

We say 2 times 4 equals 8.

We can also write it as.

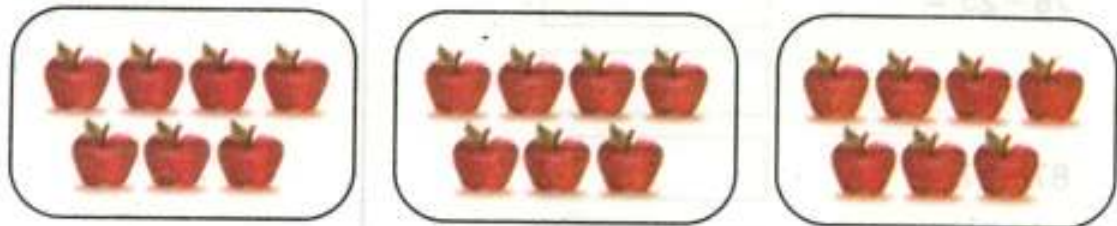
$$\begin{array}{r} 2 \longrightarrow \text{Multiplier} \\ \times 4 \longrightarrow \text{Multiplicand} \\ \hline 8 \longrightarrow \text{Multiple} \end{array}$$

X is read as times.
It means to multiply.
Multiplication is repeated addition.



We say that the product of 2 and 4 is 8.

There are 3 boxes with 7 apples in each box. How many apples are there in total?



$$7 + 7 + 7 = 21$$

There are 3 boxes. Each box has 7 apples.

3 times 7 equals 21.

The product of 7 and 3 is 21.

Tens	Ones
	3
x	7
<hr/>	
2	1



Let's quickly revise tables of 7, 8 and 9.

Table of 7

$7 \times 1 = 7$
$7 \times 2 = 14$
$7 \times 3 = 21$
$7 \times 4 = 28$
$7 \times 5 = 35$
$7 \times 6 = 42$
$7 \times 7 = 49$
$7 \times 8 = 56$
$7 \times 9 = 63$
$7 \times 10 = 70$

Table of 8

$8 \times 1 = 8$
$8 \times 2 = 16$
$8 \times 3 = 24$
$8 \times 4 = 32$
$8 \times 5 = 40$
$8 \times 6 = 48$
$8 \times 7 = 56$
$8 \times 8 = 64$
$8 \times 9 = 72$
$8 \times 10 = 80$

Table of 9

$9 \times 1 = 9$
$9 \times 2 = 18$
$9 \times 3 = 27$
$9 \times 4 = 36$
$9 \times 5 = 45$
$9 \times 6 = 54$
$9 \times 7 = 63$
$9 \times 8 = 72$
$9 \times 9 = 81$
$9 \times 10 = 90$

Recall that if we multiply anything with 0, the answer is always 0.

$5 \times 0 = 0$, $3 \times 0 = 0$ etc.

Recall the tables and write the correct answers.

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 0 \\ \hline \end{array}$$

Ali, Sara and Ahmad have 12 coloured pencils each. How many coloured pencils do they have altogether?

There are 3 children. Each one of them has 12 coloured pencils.

Let's find what 12 times 3 is.

$$12 \times 3 = ?$$



Tens	Ones
1	2
x	3
<hr/>	
	6
<hr/>	

Step 1

Multiply 2 ones by 3.
 $2 \times 3 = 6$.

Tens	Ones
10	1 1
10	1 1
10	1 1

Tens	Ones
1	2
x	3
<hr/>	
3	6
<hr/>	

Step 2

Multiply 1 ten by 3.
 $1 \times 3 = 3$.

Tens	Ones
10 10	1 1
10	1 1
	1 1

The product of 12 and 3 is 36.

There are 36 coloured pencils altogether.

Multiply the following numbers:

$$\begin{array}{r} 43 \\ \times 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ \times 6 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 23 \\ \times 3 \\ \hline \\ \hline \end{array}$$

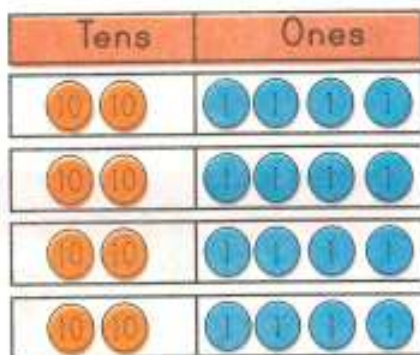
Fatima reads 4 pages of a book every day. How many pages will she read in 24 days?

Let's multiply 24 by 4.

Tens	Ones
① 2	4
x	4
<hr/>	
	6
<hr/>	

Step 1

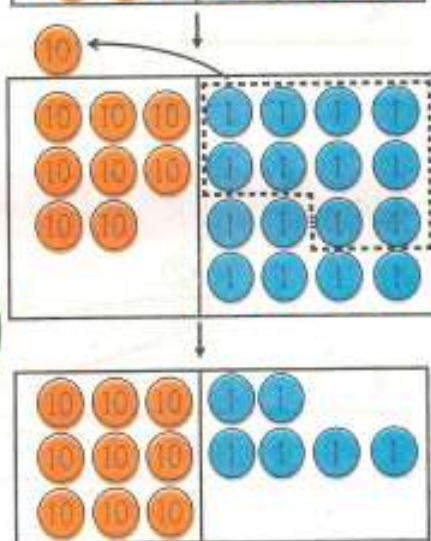
Multiply 4 ones by 4.
 $4 \times 4 = 16$
 Carry 1 ten to the tens side.



Tens	Ones
① 2	4
x	4
<hr/>	
9	6
<hr/>	

Step 2

Multiply 2 tens by 4.
 $2 \times 4 = 8$
 Add 1 ten that you carried over.
 $8 + 1 = 9$



Fatima will read 96 pages.

Find the product of the following numbers:

$$\begin{array}{r} 14 \\ \times 5 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 37 \\ \times 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 32 \\ \times 4 \\ \hline \\ \hline \end{array}$$

Let's multiply 452 by 4.

Thousands	Hundreds	Tens	Ones
	4	5	2
x			4
			8

Step 1

Multiply 2 ones by 4.
 $2 \times 4 = 8$

Thousands	Hundreds	Tens	Ones
	② 4	5	2
x			4
		0	8

Step 2

Multiply 5 tens by 4.
 $5 \times 4 = 20$.
 20 tens = 2 hundreds 0 tens.
 Carry 2 hundreds to the hundreds side.

Thousands	Hundreds	Tens	Ones
	② 4	5	2
x			4
1	8	0	8

Step 3

Multiply 4 hundreds by 4. $4 \times 4 = 16$. Add the carried hundreds. $16 + 2 = 18$. Regroup 18 hundreds into 8 hundreds and 1 thousand.

The answer is 1 808.

Multiply the following numbers:

$$\begin{array}{r} 613 \\ \times \quad 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 183 \\ \times \quad 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 114 \\ \times \quad 5 \\ \hline \\ \hline \end{array}$$

Exercise 3.1

1. Complete the following:



2. Calculate the product of the given numbers.

a)
$$\begin{array}{r} 13 \\ \times 2 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 20 \\ \times 4 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 10 \\ \times 8 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 11 \\ \times 7 \\ \hline \end{array}$$

e)
$$\begin{array}{r} 15 \\ \times 5 \\ \hline \end{array}$$

f)
$$\begin{array}{r} 36 \\ \times 2 \\ \hline \end{array}$$

g)
$$\begin{array}{r} 59 \\ \times 3 \\ \hline \end{array}$$

h)
$$\begin{array}{r} 82 \\ \times 3 \\ \hline \end{array}$$

i)
$$\begin{array}{r} 222 \\ \times 3 \\ \hline \end{array}$$

j)
$$\begin{array}{r} 234 \\ \times 2 \\ \hline \end{array}$$

k)
$$\begin{array}{r} 671 \\ \times 1 \\ \hline \end{array}$$

l)
$$\begin{array}{r} 111 \\ \times 5 \\ \hline \end{array}$$

m)
$$\begin{array}{r} 680 \\ \times 2 \\ \hline \end{array}$$

n)
$$\begin{array}{r} 841 \\ \times 6 \\ \hline \end{array}$$

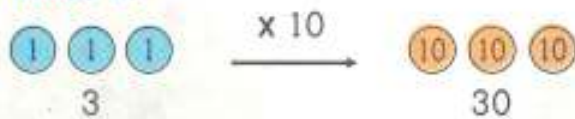
o)
$$\begin{array}{r} 178 \\ \times 2 \\ \hline \end{array}$$

p)
$$\begin{array}{r} 230 \\ \times 3 \\ \hline \end{array}$$

3.2 More about multiplication

Recall that 10 times 1 is 10.

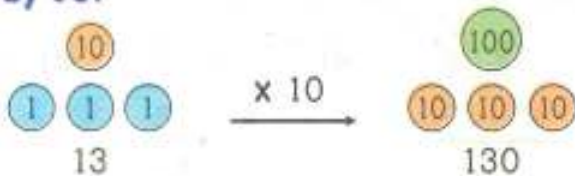
What is 10 times 3?



10 times 3 is 30.

When a whole number is multiplied by 10, we can write 1 zero at the end of the original whole number.

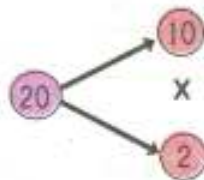
Multiply 13 by 10.



Let's multiply 3 by 20.

We will break 20 into 2 and 10.

$$\begin{aligned} 3 \times 20 &= \underbrace{3 \times 2} \times 10 \\ &= 6 \times 10 \\ &= 60 \end{aligned}$$



So, $3 \times 20 = 60$

Complete the following:

$17 \times 10 = \underline{\hspace{2cm}}$

$13 \times 10 = \underline{\hspace{2cm}}$

$4 \times 30 = \underline{\hspace{2cm}}$

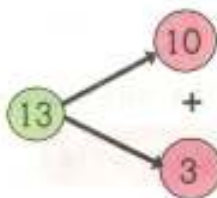
$2 \times 40 = \underline{\hspace{2cm}}$

shopkeeper has 12 boxes. Each box has 13 books. How many books are there in total?

Let's find the product of 12 and 13.

$$\begin{array}{r} 12 \\ \times 13 \\ \hline \end{array}$$

3 can be split into 3 and 10.



We will multiply 12 by 3 first and then by 10 and add our products.

Recall the multiplication rules.

$$\begin{array}{r} 12 \\ \times 3 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 12 \\ \times 10 \\ \hline 120 \end{array}$$

Step 1

Multiply 2 ones by 3.

$$2 \times 3 = 6$$

Multiply 1 ten by 3

$$1 \times 3 = 3$$

Step 2

Multiply 12 by 10.

$$12 \times 10 = 120$$

$$\begin{array}{r} 36 \\ + 120 \\ \hline 156 \end{array}$$

Step 3

Write results of both products and add them.

$$12 \times 13 = 156$$

Let's multiply 26 by 14.

Multiply the first number by ones place of second number.

Hundreds	Tens	Ones
	② 2	6
x	1	4
<hr/>		
1	0	4

Step 1

Multiply 26 by 4.
 $26 \times 4 = 104$

Multiply the first number by the tens place of the second number.

Hundreds	Tens	Ones
	② 2	6
x	1	4
<hr/>		
1	0	4
2	6	0

Step 2

Multiply 26 by 10.
 $26 \times 10 = 260$
 So, $26 \times 10 = 260$

Add the products from step 1 and step 2.

Hundreds	Tens	Ones
	② 2	6
x	1	4
<hr/>		
1	0	4
+ 2	6	0
<hr/>		
3	6	4

Step 3

Add 104 and 260.
 $104 + 260 = 364$

Multiply the following numbers:

$$\begin{array}{r} 13 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} 32 \\ \times 41 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ \times 26 \\ \hline \end{array}$$

A book costs 31 rupees. What is the cost of 127 such books?

Let's multiply 127 by 31

$$127 \times 31 = ?$$

	Thousands	Hundreds	Tens	Ones
		1	2	7
x			3	1
<hr/>				
		1	2	7

STEP

1

Multiply first number by the ones place of the second number.

$$127 \times 1 = 127$$

	Thousands	Hundreds	Tens	Ones
			② 2	7
x			3	1
<hr/>				
		1	2	7
3	8	1	0	

STEP

2

Multiply first number by the tens place of the second number.

$$127 \times 3 = 381$$

So, $127 \times 30 = 3810$

	Thousands	Hundreds	Tens	Ones
			② 2	7
x			3	1
<hr/>				
		1	2	7
3	8	1	0	
<hr/>				
3	9	3	7	

STEP

3

Add the products from step 1 and step 2.

$$127 + 3810 = 3937$$

Exercise 3.2

1. Multiply the given numbers.

$$\begin{array}{r} 23 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} 32 \\ \times 22 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 26 \\ \times 31 \\ \hline \end{array}$$

$$\begin{array}{r} 35 \\ \times 55 \\ \hline \end{array}$$

$$\begin{array}{r} 21 \\ \times 62 \\ \hline \end{array}$$

$$\begin{array}{r} 31 \\ \times 46 \\ \hline \end{array}$$

2. Find the product of the following numbers.

$$\begin{array}{r} 639 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 548 \\ \times 20 \\ \hline \end{array}$$

$$\begin{array}{r} 312 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} 423 \\ \times 31 \\ \hline \end{array}$$

3. Find the product of the following numbers.

$$\begin{array}{r} 211 \\ \times 32 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 321 \\ \times 42 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 614 \\ \times 31 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 1103 \\ \times 21 \\ \hline \\ \hline \end{array}$$

Challenge



Let's try 4132×123 .

	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones						
			4	1	3	2						
\times				①	②	③						
				①								
				①	3	9	6 → Multiply first number by ones place of second number.					
					①	2	6 → Multiply first number by tens place of second number.					
①				①	8	2	6 → Multiply first number by hundreds place of second number.					
					①	4	0					
					①	1	3	2	0	0		
					①	4	1	3	2	0	0	
					①	5	0	8	2	3	6	→ Add the products.

3.3 Multiplication problems in daily life

- a) Sara bought four books to read. If each book has 32 pages, how many pages will Sara read in total?

$$32 \times 4 = ?$$

$$\begin{array}{r} 32 \\ \times 4 \\ \hline 128 \end{array}$$



- b) There are 9 mangoes in a box. How many mangoes are there in 32 boxes?

- c) Ahmad and Ali eat 11 toffees every day. How many toffees will they eat in 7 days?



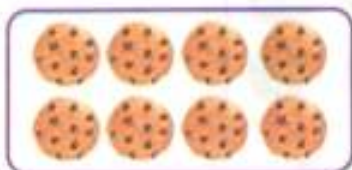
- d) There are 1 272 children in a school. If every child has 7 books, how many books are there in total?



- e) A man sold some packets of balloons with 25 balloons in each packet. If he sold 13 packets, how many balloons did he sell altogether?

3.4 Division

There are 8 biscuits in a box.



Ahmad takes 2 biscuits out.

There are 6 biscuits left.

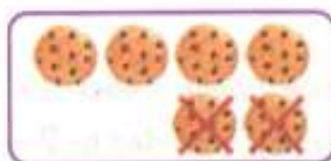
$$8 - 2 = 6$$



Sara takes 2 biscuits out.

There are 4 biscuits left.

$$6 - 2 = 4$$



Ali also takes 2 biscuits out.

There are 2 biscuits left.

$$4 - 2 = 2$$



Anam also takes 2 biscuits out.

There are 0 biscuits left.

$$2 - 2 = 0$$



We can subtract 2 four times till we are left with 0.

This is called **repeated subtraction**.

Count the mangoes. Subtract 2 till you are left with 0.



$$10 - 2 = \underline{\quad}$$

$$8 - 2 = \underline{\quad}$$

$$\underline{\quad} - 2 = \underline{\quad}$$

$$\underline{\quad} - 2 = \underline{\quad}$$

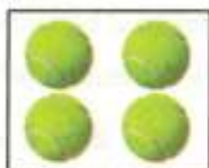
$$\underline{\quad} - 2 = \underline{\quad}$$

We can subtract 2 times.

Ali has 8 balls.



He wants to put them in 2 boxes with equal balls.



$$8 \div 2 = 4$$

There are 4 balls in each box.

We say that 8 divided by 2 is equal to 4.

There are 12 oranges in a box.

We want to divide them equally in 3 boxes.



$$12 \div 3 = 4$$



12 divided by 3 is equal to 4.

There are 4 oranges in each box.

Write the correct answers.



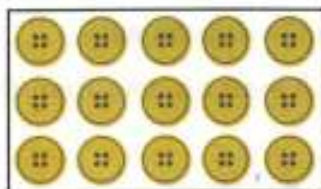
$$9 \div 3 = \square$$



$$15 \div 5 = \square$$

Sara's mother bought 15 buttons. She wants to put them in 3 boxes.
How many buttons will she put in each box?

Let's find out $15 \div 3$



Recall the table of 3.

$$3 \times 1 = 3$$

$$3 \times 2 = 6$$

$$3 \times 3 = 9$$

$$3 \times 4 = 12$$

$$3 \times 5 = 15$$

5 times 3 is equal to 15.

So, 15 divided by 3 is equal to 5.

$$15 \div 3 = 5$$

Sara's mother can put 5 buttons in each box.



Divide these numbers.

$$6 \div 2 = \square$$

$$10 \div 5 = \square$$

$$21 \div 3 = \square$$

$$28 \div 4 = \square$$

$$64 \div 8 = \square$$

$$18 \div 6 = \square$$

$$21 \div 7 = \square$$

$$45 \div 9 = \square$$

$$90 \div 9 = \square$$

Can you put 26 marbles in 2 groups?

Let's divide 26 by 2.

Write the division sum.

We will start dividing from the highest place value.



$$\begin{array}{r} 1 \\ 2 \overline{) 26} \\ - 2 \\ \hline 0 \end{array}$$

Step 1

Divide 2 by 2

$$2 \times 1 = 2. \text{ So,}$$

$$2 \div 2 = 1$$

You can see that we put 1 in the tens column. Which means 10 times 2 is 20.

Let's bring the next digit down.

$$\begin{array}{r} 13 \\ 2 \overline{) 26} \\ - 2 \\ \hline 06 \\ - 6 \\ \hline 0 \end{array}$$

Step 2

Divide 6 by 2

$$2 \times 3 = 6. \text{ So,}$$

$$6 \div 2 = 3$$

There is nothing left.

So, $26 \div 2 = 13$.

We can also check if this is

the right answer

Let's find 13×2 .

$$\begin{array}{r} 13 \\ \times 2 \\ \hline 26 \end{array}$$

We get 26. 13 times 2 is 26.

Solve.

$$3 \overline{) 69}$$

$$4 \overline{) 48}$$

Ahmad has 13 balls.



He wants to put them in 2 boxes with equal balls.

He can put 6 balls each in 2 boxes and he will still be left with 1 ball.



1 is the remainder. So, 13 is not completely divisible by 2.

A number is completely divisible by another number if the remainder is 0.

Let's find out $23 \div 4$.

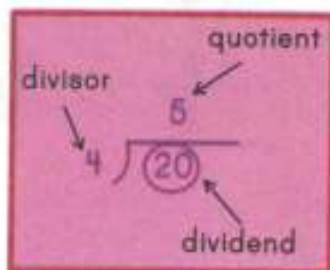
Recall the table of 4.

$$4 \times 5 = 20$$

5 times 4 is 20 and we will be left with 3 as a remainder.

We can also write it as $23 \div 4 = 5$ Remainder 3

Remember, remainder is always smaller than divisor. Here, $3 < 4$.



Recall your tables and divide these numbers.

$21 \div 2 = \square$ Remainder \square

$13 \div 3 = \square$ Remainder \square

$11 \div 5 = \square$ Remainder \square

$23 \div 7 = \square$ Remainder \square

$30 \div 8 = \square$ Remainder \square

$84 \div 9 = \square$ Remainder \square

Divide 47 by 3.

Write the division sum and start dividing from the highest place value.

$$\begin{array}{r} 1 \\ 3 \overline{) 47} \\ - 3 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 15 \\ 3 \overline{) 47} \\ - 3 \\ \hline 17 \\ - 15 \\ \hline 2 \end{array}$$

Step 1

Divide 4 by 3. Recall

$$3 \times 1 = 3 \text{ and } 3 \times 2 = 6.$$

So, 4 is not completely divisible by 3.

$$4 - 3 = 1. \text{ We will be left with 1.}$$

Step 2

Bring next digit down.

Divide 17 by 3.

$$3 \times 5 = 15 \text{ and } 3 \times 6 = 18.$$

So, 17 is not completely divisible by 3.

$$17 - 15 = 2. \text{ 2 is the remainder.}$$

We keep dividing until the remainder is less than the divisor, $2 < 3$.

$$47 \div 3 = 15 \text{ Remainder } 2.$$

Can you check if 15 is the right answer?

$$\text{What is } 15 \times 3 + 2?$$

Solve.

$$4 \overline{) 85}$$

$$5 \overline{) 87}$$

$$7 \overline{) 86}$$

Can you divide 96 by 6?

$$96 \div 6 = ?$$

Write the division sum and start dividing from the highest place value.

$$\begin{array}{r} 1 \\ 6 \overline{) 96} \\ \underline{- 6} \\ 3 \end{array}$$

$$\begin{array}{r} 16 \\ 6 \overline{) 96} \\ \underline{- 6} \quad | \\ 36 \\ \underline{- 36} \\ 0 \end{array}$$

Step 1

Divide 9 by 6.

9 is not completely divisible by 6.

$$6 \times 1 = 6 \text{ and } 9 - 6 = 3.$$

So, we are left with 3.

Step 2

Bring next digit down,

Divide 36 by 6.

$$6 \times 6 = 36.$$

Remainder is 0. So, 96 is completely divisible by 6.

$$96 \div 6 = 16.$$

Divide these numbers.

$$7 \overline{) 84}$$

$$5 \overline{) 90}$$

Exercise 3.4

1. Recall your tables and complete the following:

a) $16 \div 4 = \square$

b) $36 \div 6 = \square$

c) $28 \div 7 = \square$

d) $56 \div 8 = \square$

e) $18 \div 9 = \square$

f) $72 \div 9 = \square$

g) $15 \div 2 = \square$ Remainder \square

h) $25 \div 5 = \square$ Remainder \square

i) $20 \div 3 = \square$ Remainder \square

j) $28 \div 8 = \square$ Remainder \square

2. Find the quotient in each of the following:

a) $4 \overline{)44}$

b) $2 \overline{)92}$

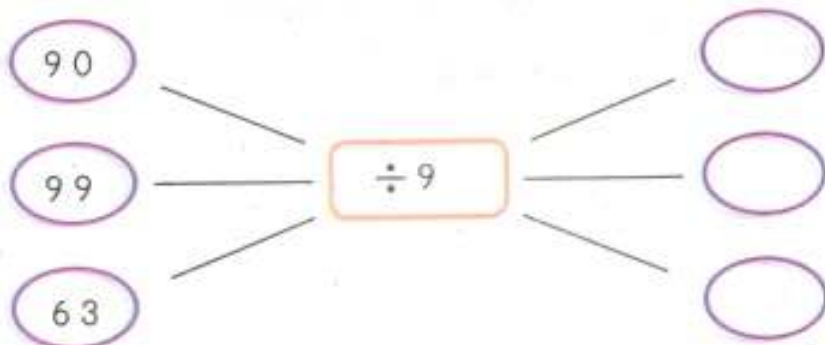
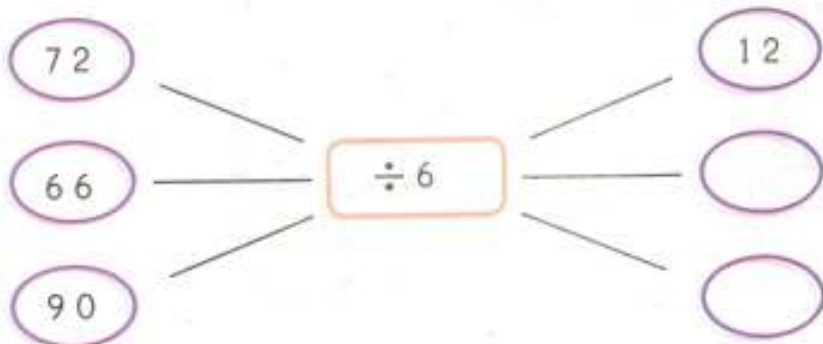
c) $6 \overline{)84}$

$$d) 5 \overline{) 64}$$

$$e) 3 \overline{) 67}$$

$$f) 8 \overline{) 89}$$

3. Work out the outputs in each of the following.



3.5 More about division

Let's divide 189 by 9.

Write the division sum and start dividing from the highest place value.

1 is smaller than 9. We cannot divide 1 by 9.

So, we will take one more place value and divide 18 by 9.

$$\begin{array}{r} 2 \\ 9 \overline{) 189} \\ \underline{- 18} \\ 0 \end{array}$$

Step 1

Divide 18 by 9.
 $9 \times 2 = 18$. So,
 $18 \div 9 = 2$

You can see that we put 2 in the tens column. Which means 20 times 9 is 180.

Let's bring the next digit down.

$$\begin{array}{r} 21 \\ 9 \overline{) 189} \\ \underline{- 18} \\ 09 \\ \underline{- 9} \\ 0 \end{array}$$

Step 2

Divide 9 by 9.
 $9 \div 9 = 1$

$$189 \div 9 = 21$$

Solve the following:

$$6 \overline{) 468}$$

$$4 \overline{) 304}$$

Zara wants to put 335 books in two shelves. How many books will she put in each shelf if she wants equal numbers of books in each shelf?

$$335 \div 2 = ?$$

Write the division sum and start dividing from the highest place value of the dividend.



$$\begin{array}{r} 1 \\ 2 \overline{) 335} \\ \underline{- 2} \\ 1 \end{array}$$

Step 1

Divide 3 by 2.
 $2 \times 1 = 2$ and $3 - 2 = 1$

$$\begin{array}{r} 16 \\ 2 \overline{) 335} \\ \underline{- 2} \\ 13 \\ \underline{- 12} \\ 1 \end{array}$$

Step 2

Bring next digit down.
 Divide 13 by 2.
 $2 \times 6 = 12$ and $13 - 12 = 1$

$$\begin{array}{r} 167 \\ 2 \overline{) 335} \\ \underline{- 2} \\ 13 \\ \underline{- 12} \\ 15 \\ \underline{- 14} \\ 1 \end{array}$$

Step 3

Bring next digit down.
 Divide 15 by 2.
 $2 \times 7 = 14$ and $15 - 14 = 1$

← Remainder

There will be 167 books on both shelves. And 1 book will be left.

Let's divide 18348 by 4.

Write the division sum and start dividing from the highest place value. We will keep dividing until the remainder is less than the divisor.

$$\begin{array}{r} 4 \overline{) 18348} \\ \underline{- 16} \\ 23 \\ \underline{- 20} \\ 34 \\ \underline{- 32} \\ 28 \\ \underline{- 28} \\ 0 \end{array}$$

Remainder is 0. We can see that 18348 is completely divisible by 4.

$$18348 \div 4 = 4587$$

Solve the following:

$$4 \overline{) 5544}$$

$$6 \overline{) 385}$$

$$7 \overline{) 3147}$$

Let's divide 195 by 13.

$$195 \div 13 = ?$$

Division by 2-digit numbers is similar to division by 1-digit numbers.

Write the division sum and start dividing from the left side of the dividend.

We cannot divide 1 by 13. So, we will take one more place value and divide 19 by 13.

$$\begin{array}{r} 1 \\ 13 \overline{) 195} \\ \underline{- 13} \\ 65 \end{array}$$

Step 1

Divide 19 by 13.

$$13 \times 1 = 13 \text{ and } 13 \times 2 = 26.$$

Since, $26 > 19$. So, we will go with $13 \times 1 = 13$ and $19 - 13 = 6$

Recall the multiplication rules.

$$\begin{array}{r} 13 \\ \times 2 \\ \hline 26 \end{array}$$

$$\begin{array}{r} 15 \\ 13 \overline{) 195} \\ \underline{- 13} \\ 65 \\ \underline{- 65} \\ 0 \end{array}$$

Step 2

Bring the next digit down. Divide 65 by 13

We can try multiplying 13 with different numbers until we find that 13 times 5 is exactly 65.

$$13 \times 5 = 65$$

$$\begin{array}{r} 13 \\ \times 4 \\ \hline 52 \end{array} \quad \begin{array}{r} 13 \\ \times 5 \\ \hline 65 \end{array}$$

Hence, $195 \div 13 = 15$

Solve the following:

$$11 \overline{) 231}$$

$$15 \overline{) 255}$$

Exercise 3.5

1. Solve the following:

a) $4 \overline{)848}$ b) $5 \overline{)2585}$ c) $7 \overline{)798}$ d) $3 \overline{)9856}$

e) $2 \overline{)1458}$ f) $6 \overline{)936}$ g) $13 \overline{)221}$ h) $11 \overline{)671}$

2. Find the remainder in each of the following:

a) $6 \overline{)848}$ b) $5 \overline{)1654}$ c) $3 \overline{)698}$ d) $8 \overline{)897}$

3.6 Division problems in daily life

- a) Sara has 32 toffees and she wants to share them equally among her 4 friends. How many toffees will each friend get?

To know that, we will divide 32 by 4

$$32 \div 4 = ?$$

$$\begin{array}{r} 8 \\ 4 \overline{) 32} \\ \underline{- 32} \\ 0 \end{array}$$

Each friend will get 8 toffees.



- b) Rs. 360 is distributed equally among 6 people. How much money will each person get?

- c) Ali's uncle makes a glass of mango juice using 5 mangoes. If he has 35 mangoes how many glasses of mango juice can he make?

- d) Miss Amna brought 320 balloons and distributed them among 8 students. How many balloons did each of them get?

CHAPTER 4: FACTORS AND MULTIPLES

4.1 Divisibility rules

A number is completely divisible by another number if remainder is 0.

A whole number is divisible by

2 if the last digit is 0 or divisible by 2 (even). For example, 54, 98, 22 and 20

3 if the sum of its digits is divisible by 3. For example, 291 ($2+9+1=12$)

5 if the last digit is 0 or 5. For example 590, 6815

Is 81 divisible by 3?

Yes, because $8 + 1 = 9$ and 9 is divisible by 3.
Recall $3 \times 3 = 9$.

Is 250 divisible by 5?

Yes, because the last digit is 0.

Let's check

$$\begin{array}{r} 27 \\ 3 \overline{) 81} \\ \underline{- 6} \\ 21 \\ \underline{- 21} \\ 0 \end{array}$$

Circle the numbers divisible by 2. (24) 32 51 761 882 1000

Circle the numbers divisible by 3. (24) 33 81 100 1101 1211

Is 341 divisible by 2? _____

Is 2555 divisible by 5? _____

A whole number is divisible by

4

if the number formed from the last two digits is divisible by 4.
For example, 112, 1308, 2520

6

if the number is divisible by both 2 and 3. For example, 12, 24,
114, 3312

10

if the last digit is 0. For example, 110, 28900

Is 1124 divisible by 4?

Yes, because the number formed from
the last two digits is divisible by 4.

Recall $4 \times 6 = 24$.

Is 1550 divisible by 10?

Yes, because the last digit is 0.

Let's check

$$\begin{array}{r} 281 \\ 4 \overline{) 1124} \\ \underline{- 8} \\ 32 \\ \underline{- 32} \\ 4 \\ \underline{- 4} \\ 0 \end{array}$$

Circle the numbers divisible by 4. 12 35 344 748 4112

Circle the numbers divisible by 6. 12 33 312 902 3114

Is 2516 divisible by 4? _____

Is 33 divisible by 6? _____

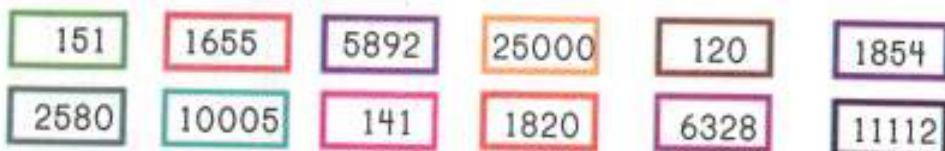
Is 10005 divisible by 10? _____

Exercise 4.1

1. Which of the following numbers are divisible by both 2 and 3?



2. Look at the following numbers:



Which of the above numbers are

- a) divisible by 2?
- b) divisible by 3?
- c) divisible by 4?
- d) divisible by 5?
- e) divisible by 6?
- f) divisible by 10?
- g) divisible by both 2 and 4?
- h) divisible by 2, 5 and 10?

4.2 Prime and composite numbers

Prime number is a number that can only be divided exactly by 1 and itself.

Think about number 3.

It can only be divided by 1 and 3, without leaving a remainder.

3 is a prime number.

Some other prime numbers are 2, 5, 7, 11 and 13 etc.

Composite number is a number that can also be divided exactly by any number other than 1 and itself.

Think about number 4.

It can be divided by 1, 2 and 4 without leaving a remainder.

4 is a composite number.

Some other composite numbers are 6, 8, 9, 10 and 12 etc.

0 and 1 are neither prime nor composite.



Exercise 4.2

Identify prime and composite numbers and put them in correct boxes given below.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

Prime Numbers

2 3

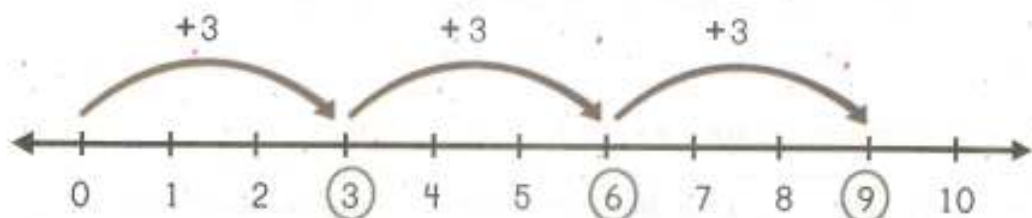
Composite Numbers

4

4.3 Multiples

A number that is completely divisible by another number is a multiple of that number.

Let's find multiples of 3 using a number line.



Start from 0 and count on in 3 equal steps. You will find multiples of 3.

Below we have first three multiples of 3 biscuits.



$$3 \times 1 = 3$$



$$3 \times 2 = 6$$



$$3 \times 3 = 9$$

$3 \times 1 = 3$
$3 \times 2 = 6$
$3 \times 3 = 9$
$3 \times 4 = 12$
$3 \times 5 = 15$
$3 \times 6 = 18$
$3 \times 7 = 21$
$3 \times 8 = 24$
$3 \times 9 = 27$
$3 \times 10 = 30$

Is 21 a multiple of 3?

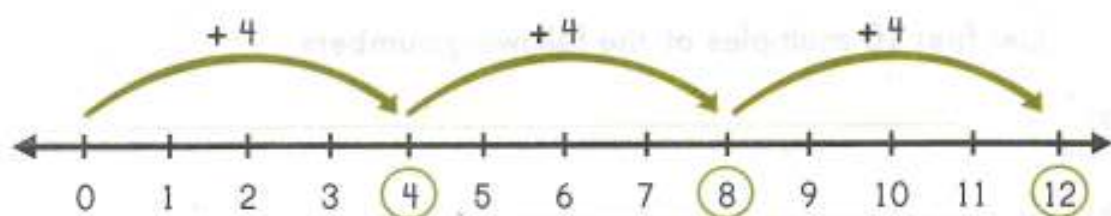


Yes, 21 is completely divisible by 3. Recall $7 \times 3 = 21$. So, 21 is a multiple of 3.



3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 are first ten multiples of 3.

Let's find multiples of 4.



Recall the multiplication table of 4

$4 \times 1 = 4$
$4 \times 2 = 8$
$4 \times 3 = 12$
$4 \times 4 = 16$
$4 \times 5 = 20$
$4 \times 6 = 24$
$4 \times 7 = 28$
$4 \times 8 = 32$
$4 \times 9 = 36$
$4 \times 10 = 40$

→ 4, 8, 12, 16, 20, 24, 28, 32, 36 and 40 are the first ten multiples of 4.

Table of 10

$10 \times 1 = 10$
$10 \times 2 = 20$
$10 \times 3 = 30$
$10 \times 4 = 40$
$10 \times 5 = 50$
$10 \times 6 = 60$
$10 \times 7 = 70$
$10 \times 8 = 80$
$10 \times 9 = 90$
$10 \times 10 = 100$

Let's find multiples of 10.

10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 are the first ten multiples of 10.

Is 75 a multiple of 10?

75 is not a multiple of 10 because it is not divisible by 10. Recall divisibility rule of 10.

Complete the following:

a) multiples of 2

2	4								
---	---	--	--	--	--	--	--	--	--

b) multiples of 6

6	12								
---	----	--	--	--	--	--	--	--	--

Exercise 4.3

1. List first 10 multiples of the following numbers:

a) 2 _____

b) 3 _____

c) 4 _____

d) 5 _____

e) 6 _____

f) 7 _____

g) 8 _____

h) 9 _____

2. Circle the multiples of the numbers shown on the card.

a) **3**

8	24	
12	11	19
27	5	18

b) **8**

32	11	
6	41	38
40	16	8

c) **6**

6	24	
12	9	19
25	15	18

d) **9**

41	10	
12	71	13
36	18	81

4.4 Factors

Let's arrange 8 balls in equal groups.

There is more than one way to do this.



1 group with 8 balls in it.
 $1 \times 8 = 8$



2 groups with 4 balls in each group.
 $2 \times 4 = 8$



4 groups with 2 balls in each group.
 $4 \times 2 = 8$



8 groups with 1 ball in each group.
 $8 \times 1 = 8$

The number 8 can be divided by 1, 2, 4 and 8 without leaving a remainder.

1, 2, 4 and 8 are called factors of 8.

Factors of any number are the numbers which divide the given number exactly. When we divide a number by its factors, the remainder is 0.

List the factors of 40.

Start with the smallest number and find all the numbers that divide 40 completely without leaving a remainder.

$$40 = 1 \times 40$$

$$40 = 2 \times 20$$

$$40 = 4 \times 10$$

$$40 = 5 \times 8$$

$$40 = 8 \times 5$$



Stop listing when numbers start to repeat.

THINK

What number is a factor of all numbers?



The factors of 40 are 1, 2, 4, 5, 8, 10, 20 and 40.

Is 3 a factor of 25?

25 cannot be exactly divided by 3

It leaves 1 as a remainder.

So, 3 is not a factor of 25.

$$\begin{array}{r} 8 \\ 3 \overline{) 25} \\ \underline{- 24} \\ 1 \end{array}$$

Exercise 4.4

1. Write factors for each of the following numbers:

a) 12

$$\underline{1} \times \underline{12}$$


$$\underline{\quad} \times \underline{\quad}$$


$$\underline{\quad} \times \underline{\quad}$$


The factors of 12 are 1, , , and 12.

b) 20

$$\underline{\quad} \times \underline{\quad}$$


$$\underline{\quad} \times \underline{\quad}$$


$$\underline{\quad} \times \underline{\quad}$$


The factors of 20 are , , , and .

2. Fill in the missing factors below.

- a) $8 = 1, 2, \square, \square$
b) $15 = 1, 3, \square, \square$
c) $18 = 1, 2, \square, \square, \square, 18$
d) $32 = 1, \square, 4, \square, 16, 32$
e) $50 = 1, 2, \square, \square, \square, 50$



3. Write all the factors for the numbers given below.

- a) 3 _____
b) 9 _____
c) 11 _____
d) 21 _____
e) 24 _____
f) 28 _____
g) 36 _____
h) 42 _____

4. Answer the following questions:

- a) Is 5 a factor of 35? Explain. _____
b) Is 8 a factor of 41? Explain. _____

4.5 Prime Factorization

We can express a number as a product of its prime factors.

Factor Tree Method

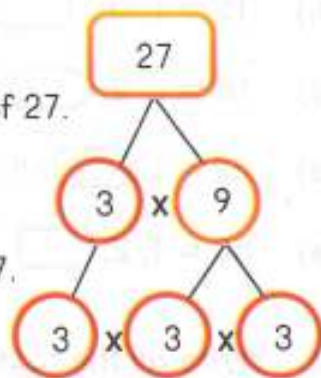
Find prime factors of 27.

Start with the smallest prime number that is a factor of 27.

27 is not divisible by 2. It is divisible by 3.

So, we divide 27 by 3.

Recall $3 \times 9 = 27$. Write 3 and 9 as two branches of 27.



3 is a prime number. So, we have one prime factor.

9 is not a prime number. So, we further factorize it.

Recall $3 \times 3 = 9$. Write 3 and 3 as two branches of 9.

We get two more factors as 3×3

$$3 \times 3 \times 3 = 27$$

So, $27 = 3 \times 3 \times 3$.

Writing a number as a product of its prime factors is called **prime factorization**.

Find the prime factors of the following numbers.

Three factor trees are shown for the numbers 16, 75, and 36. Each tree starts with the number in a square box at the top, which branches into two circles. The tree for 16 shows 2 and 8, then 2 and 2, and finally four 2s. The tree for 75 shows two empty circles, then three empty circles. The tree for 36 shows two empty circles, then three empty circles, and finally four empty circles. Below each tree is a partial equation with blanks for the prime factors.

$2 \times 2 \times _ \times _ = 16$

$_ \times _ \times _ = 75$

$_ \times _ \times _ \times _ = 36$

Division Method

We can also find prime factors using division method.

Find prime factors of 18.

Start with the smallest prime number that divides 18 completely.

2 is the smallest prime number that divides 18 without leaving a remainder.

Recall $18 \div 2 = 9$

So, we write 2 on the left side of 18 separating them with

a line. 2 is a prime factor of 18.

9 is not a prime number.

$$\begin{array}{r|l} 2 & 18 \\ 3 & 9 \\ \hline & 3 \\ \hline \end{array}$$
$$2 \times 3 \times 3 = 18$$

So, we divide it again with the smallest prime number that divides it completely.

Recall $9 \div 3 = 3$.

3 is a prime number.

We keep dividing until we get all prime numbers.

So, prime factors of $18 = 2 \times 3 \times 3$

Find prime factors of the following numbers using division method.

$$\begin{array}{r|l} 3 & 27 \\ & 9 \\ \hline & \\ \hline \end{array}$$

$$3 \times _ \times _ = 27$$

$$\begin{array}{r|l} & 48 \\ \hline & \\ \hline & \\ \hline & \\ \hline \end{array}$$

$$_ \times _ \times _ \times _ \times _ = 48$$

$$\begin{array}{r|l} & 99 \\ \hline & \\ \hline & \\ \hline \end{array}$$

$$_ \times _ \times _ = 99$$

Exercise 4.5

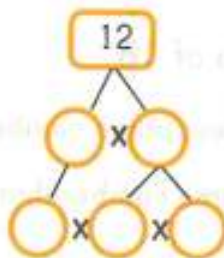
1. Find the prime factors of the following numbers using the factor tree method.

a)



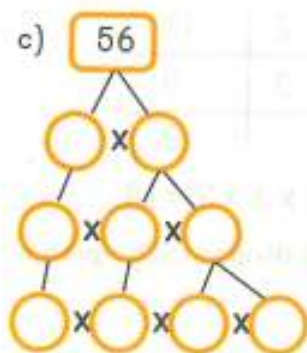
$$_ \times _ = 33$$

b)



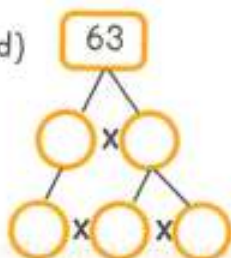
$$_ \times _ \times _ = 12$$

c)



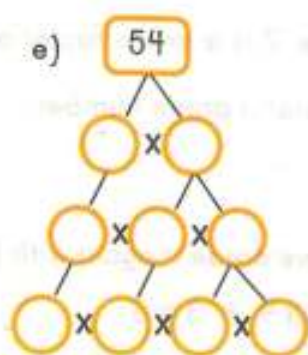
$$_ \times _ \times _ \times _ = 56$$

d)



$$_ \times _ \times _ = 63$$

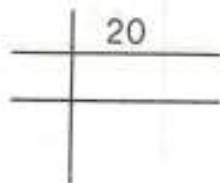
e)



$$_ \times _ \times _ \times _ = 54$$

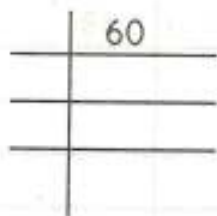
2. Find the prime factors of the following numbers using division method.

a)



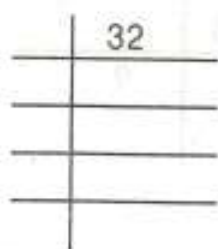
$$_ \times _ \times _ = 20$$

b)



$$_ \times _ \times _ \times _ = 60$$

c)



$$_ \times _ \times _ \times _ \times _ = 32$$

4.6 Common multiples and Least Common Multiple (LCM)

Can you find common multiples of 2 and 3?

Let's write first ten multiples of 2.

2 4 6 8 10 12 14 16 18 20

Let's write first ten multiples of 3.

3 6 9 12 15 18 21 24 27 30

You can see that some numbers are multiples of both 2 and 3. We call them **common multiples**. Let's circle common multiples of 2 and 3.

Multiples of 2: 2 4 **6** 8 10 **12** 14 16 **18** 20

Multiples of 3: 3 **6** 9 **12** 15 **18** 21 24 27 30

Common multiples of 2 and 3 are 6, 12 and 18.

6 is the smallest number which is a common multiple of both 2 and 3.

It is called the **lowest (or least) common multiple (LCM)**.

To find LCM, we follow the following steps.

- Step 1** Find multiples of all numbers.
- Step 2** Circle the common multiples.
- Step 3** Find the lowest common multiple or LCM.



Find the first two common multiples of 4 and 5. Identify the LCM.

Multiples of 4:

Multiples of 5:

First two common multiples of 4 and 5 are and .

The LCM of 4 and 5 is .

Exercise 4.6

1. Write the multiples for each number given below. Circle the common multiples and find the least common multiple (LCM) for each pair of numbers.

a) $\boxed{2}$ $\boxed{6}$

Multiples of 2 _____

Multiples of 6 _____

LCM _____

b) $\boxed{4}$ $\boxed{6}$

Multiples of 4 _____

Multiples of 6 _____

LCM _____

c) $\boxed{5}$ $\boxed{7}$

Multiples of 5 _____

Multiples of 7 _____

LCM _____

d) $\boxed{6}$ $\boxed{8}$

Multiples of 6 _____

Multiples of 8 _____

LCM _____

e) $\boxed{2}$ $\boxed{8}$

Multiples of 2 _____

Multiples of 8 _____

LCM _____

f) $\boxed{3}$ $\boxed{9}$

Multiples of 3 _____

Multiples of 9 _____

LCM _____

4.7 Finding LCM using prime factorization

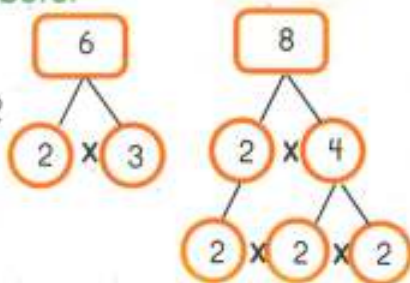
We can also find LCM using prime factorization method.

Let's find LCM of 6 and 8 using prime factorization method.

step 1 Write prime factors of both numbers.

Prime factors of 6 = 2 × 3

Prime factors of 8 = 2 × 2 × 2



step 2 Find the common factors.

Common factors = 2

step 3 Write the factors, which are not common.

Remaining factors = 3, 2, 2

step 4 Multiply factors from step 2 and step 3 to find LCM.

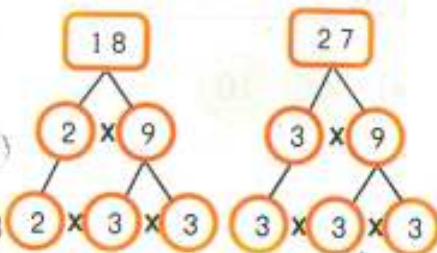
LCM = 2 × 3 × 2 × 2 = 24

Find LCM of 18 and 27.

Let's follow the steps we have learnt.

Prime factors of 18 = 2 × 3 × 3

Prime factors of 27 = 3 × 3 × 3



Common factors = 3, 3 (Write all occurrences)

Remaining factors = 2, 3

LCM = 3 × 3 × 2 × 3 = 54

Exercise 4.7

1. Find Least Common Multiple (LCM) of the following pair of numbers using prime factorization method.

a) 6 10



LCM _____

b) 16 24



LCM _____

c) 16 28

LCM _____

d) 14 18

LCM _____

e) 60 10

LCM _____

f) 30 15

LCM _____

4.8 Common factors and Highest Common Factor (HCF)

Can you find common factors of 12 and 18?

Let's write factors of 12.

1 2 3 4 6 12

Let's write factors of 18.

1 2 3 6 9 18

Factors of 12

$1 \times 12 = 12$
 $2 \times 6 = 12$
 $3 \times 4 = 12$
 $4 \times 3 = 12$

Factors of 18

$1 \times 18 = 18$
 $2 \times 9 = 18$
 $3 \times 6 = 18$
 $6 \times 3 = 18$

You can see that some numbers are factors of both 12 and 18. We call them **common factors**. Let's circle common factors of 12 and 18.

Factors of 12: ① ② ③ 4 ⑥ 12
 Factors of 18: ① ② ③ ⑥ 9 18

Common factors = 1, 2, 3, 6.

6 is the greatest number which is the common factor of both 12 and 18.

It is called the **highest common factor (HCF)**.

To find HCF, we follow the following steps.

- Step 1** Find factors of all numbers.
- Step 2** Circle the common factors.
- Step 3** Find the highest common factor or HCF.



Find the common factors of 32 and 40. Identify the HCF.

Factors of 32: 1 32

Factors of 40:

Common factors are and

The HCF of 32 and 40 is .

Factors of 32

$1 \times 32 = 32$
 $2 \times 16 = 32$
 $4 \times 8 = 32$
 $8 \times 4 = 32$

Factors of 40

Exercise 4.8

1. Write the factors for each number given below. Circle the common factors and find highest common factor (HCF) for each pair of numbers.

a) $\boxed{3}$ $\boxed{9}$

Factors of 3 _____

Factors of 9 _____

HCF _____

b) $\boxed{16}$ $\boxed{28}$

Factors of 16 _____

Factors of 28 _____

HCF _____

c) $\boxed{18}$ $\boxed{36}$

Factors of 18 _____

Factors of 36 _____

HCF _____

d) $\boxed{33}$ $\boxed{27}$

Factors of 33 _____

Factors of 27 _____

HCF _____

e) $\boxed{6}$ $\boxed{24}$

Factors of 6 _____

Factors of 24 _____

HCF _____

f) $\boxed{11}$ $\boxed{22}$

Factors of 11 _____

Factors of 22 _____

HCF _____

4.9 Finding HCF using prime factorization

We can also find HCF using prime factorization method.

Let's find HCF of 6 and 24 using prime factorization method.

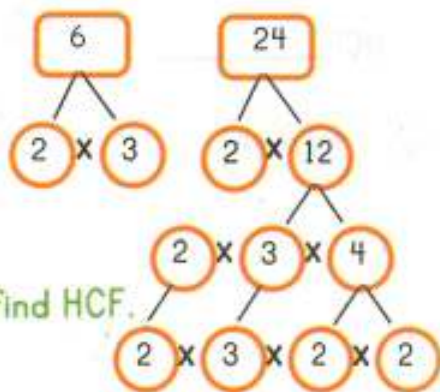
Step 1 Find prime factors of both numbers.

Prime factors of 6: 2×3

Prime factors of 24: $2 \times 3 \times 2 \times 2$

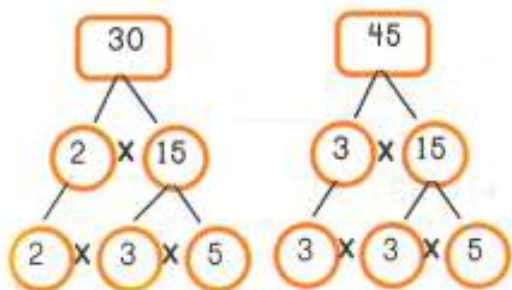
Step 2 Find the common factors.
Common factors are 2 and 3.

Step 3 Multiply the common factors to find HCF.
 $HCF = 2 \times 3 = 6$



Find HCF of 30 and 45.

Let's follow the steps we have learnt.



Prime factors of 30 = $2 \times 3 \times 5$

Prime factors of 45 = $3 \times 3 \times 5$

Common factors = 3, 5

$HCF = 3 \times 5 = 15$

Exercise 4.9

1. Find Highest Common Factor (HCF) of the following numbers using prime factorization method.

a) 25 35

HCF _____

b) 66 11

HCF _____

c) 24 44

HCF _____

d) 36 42

HCF _____

e) 28 32

HCF _____

f) 12 36

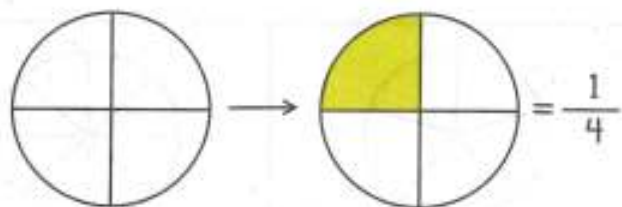
HCF _____

CHAPTER 5: FRACTIONS

5.1 Understanding fractions

Look at the circle.

It is divided into 4 equal parts.
1 part out of the 4 is coloured.

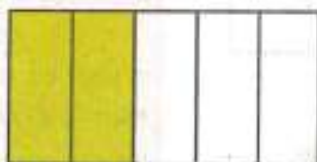


We say that $\frac{1}{4}$ of the circle is coloured.

$\frac{1}{4}$ is an example of a fraction.

A fraction represents a part of a whole that is divided into equal parts.

Look at the rectangle.



2 parts out of 5 are coloured.

$\frac{2}{5}$ of the rectangle is coloured.

A fraction has two parts.

Numerator
 $\frac{2}{5}$
Denominator

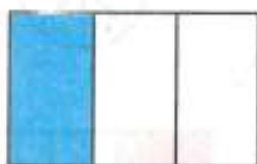
Numerator shows the number of equal parts of a whole that are taken.

Denominator shows the number of equal parts the whole is divided into.

Look at the total number of parts and the coloured parts of the following shapes and write the correct fraction under each shape.


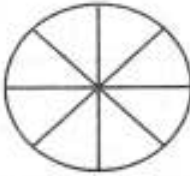
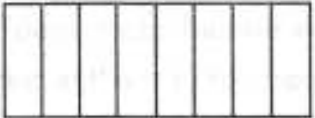


$\frac{3}{4}$



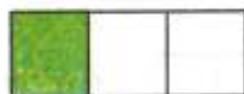
Exercise 5.1

1. Colour the shapes according to the given fractions.

		
$\frac{2}{5}$	$\frac{5}{8}$	$\frac{3}{8}$

2. Match the fraction with the related shape.

$$\frac{3}{8}$$



$$\frac{1}{3}$$



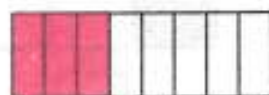
$$\frac{2}{8}$$



$$\frac{4}{5}$$



$$\frac{1}{2}$$



REMEMBER

Fraction: represents a part of a whole that is divided into equal parts.

Numerator: the top number in a fraction that shows the number of equal parts of a whole that are taken.

Denominator: the bottom number in a fraction that shows the number of equal parts the whole is divided into.

5.2 Like and unlike fractions

Ahmad's mother bought two similar cakes.

She cut first cake in 8 equal pieces and took 1 piece out.

She took $\frac{1}{8}$ of the first cake.



She cut second cake in 8 equal pieces and took 3 pieces out.

She took $\frac{3}{8}$ of the second cake.



Since, both cakes were cut into equal sized pieces,

denominator is same for both fractions. We call such fractions like fractions.

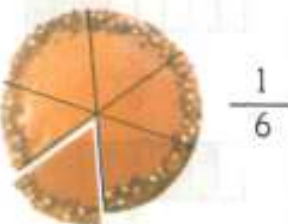
$\frac{1}{8}$ and $\frac{3}{8}$ are like fractions.

Like fractions result in equal sized pieces of the whole. Like fractions are the fractions which have **same denominators**.

Anam's mother bought two similar cakes.

She cut first cake in 6 equal pieces and took 1 piece out.

She took $\frac{1}{6}$ of the first cake.



She cut second cake in 8 equal pieces and took 1 piece out.

She took $\frac{1}{8}$ of the second cake.



Since, both cakes were cut into different sized pieces,

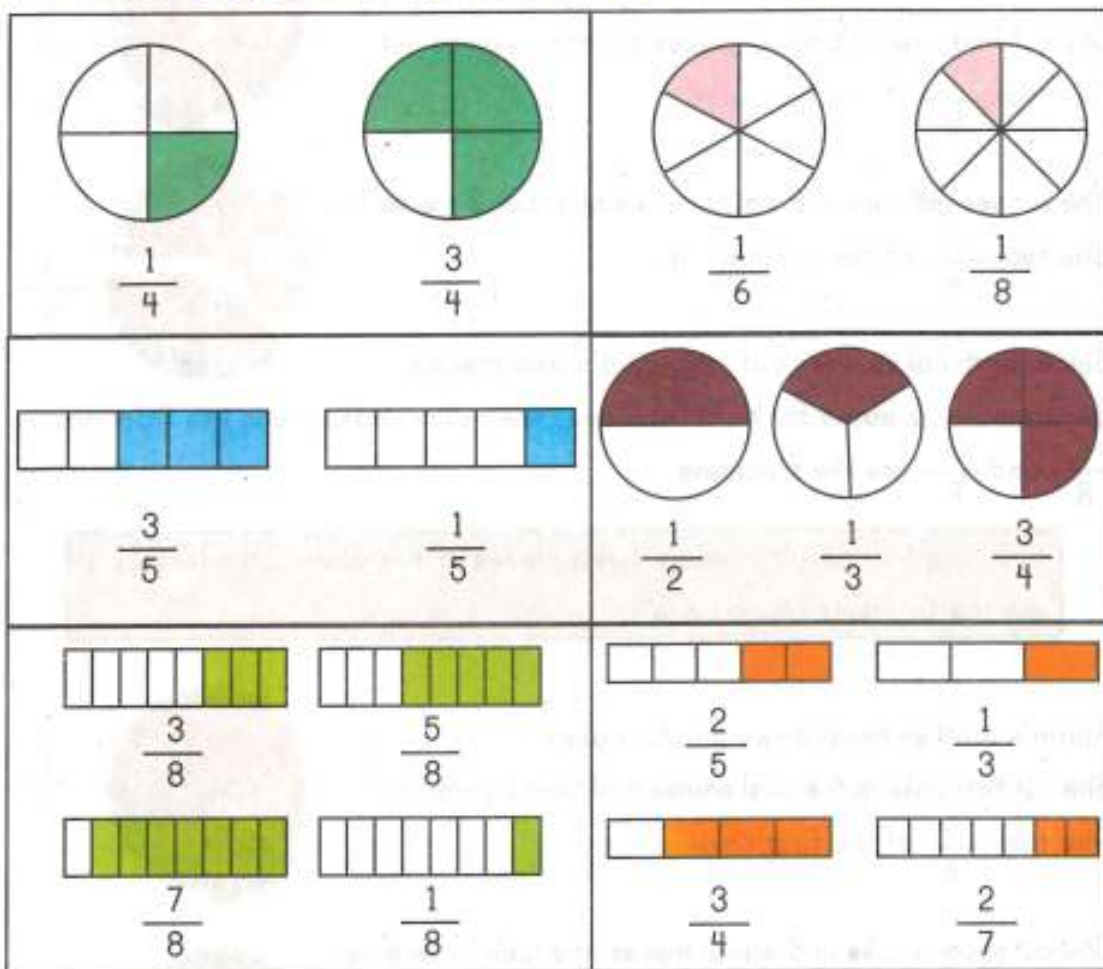
denominator is different for both fractions.

We call such fractions unlike fractions. $\frac{1}{6}$ and $\frac{1}{8}$ are unlike fractions.

Unlike fractions result in unequal sized pieces of the whole. Unlike fractions are the fractions which have **different denominators**.

Exercise 5.2

1. Which of the following sets show like fractions?



2. Circle like fractions in each of the following sets.

a) $\frac{1}{4}$ $\frac{3}{4}$ $\frac{5}{7}$ $\frac{8}{9}$

b) $\frac{1}{3}$ $\frac{2}{3}$ $\frac{3}{7}$ $\frac{1}{9}$

c) $\frac{7}{8}$ $\frac{2}{3}$ $\frac{5}{8}$ $\frac{1}{4}$

d) $\frac{1}{9}$ $\frac{5}{6}$ $\frac{4}{9}$ $\frac{2}{9}$

e) $\frac{5}{7}$ $\frac{1}{7}$ $\frac{2}{9}$ $\frac{3}{7}$

f) $\frac{1}{6}$ $\frac{3}{5}$ $\frac{4}{7}$ $\frac{5}{6}$

5.3 Comparing and ordering like fractions

Comparing like fractions

Look at the circle.

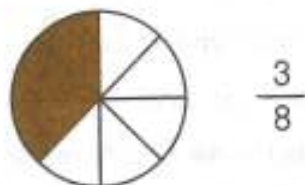
Sara colours 1 part out of 8.

She colours $\frac{1}{8}$ of the circle.



Ahmed colours 3 parts out of 8.

He colours $\frac{3}{8}$ of the circle.



Each part is of the same size. So, 3 parts out of 8 is greater than 1 part out of 8.



$\frac{3}{8}$

>



$\frac{1}{8}$



$\frac{3}{8}$ is greater than $\frac{1}{8}$.

When comparing fractions with the same denominators, fraction with the greater numerator is the greater fraction.

Compare the fractions using symbols of "<" or ">".

$\frac{1}{5} \square \frac{4}{5}$

$\frac{5}{7} \square \frac{1}{7}$

$\frac{1}{3} \square \frac{2}{3}$

Ordering like fractions

Ali, Ahmad and Sara bought a cake. Ali ate $\frac{1}{8}$ of the cake, Ahmad ate $\frac{5}{8}$ of it and Sara ate $\frac{2}{8}$ of it. Who ate the most cake?

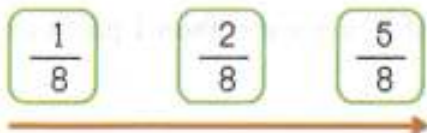


Denominators are same for all fractions. So, we will compare the numerators. 5 is greater than 1 and 2. So, $\frac{5}{8}$ is the greatest fraction.

Ahmed ate the most cake.

Let's arrange these fractions in ascending order.

Write the smallest fraction first and the greatest fraction at the end.



Recall if you write the smallest number first and the greatest number at the end, it is called **ascending order**.

Arrange $\frac{1}{7}$, $\frac{3}{7}$ and $\frac{2}{7}$ in descending order.

$\frac{3}{7}$ is the greatest fraction. We will write it first. $\frac{1}{7}$ is the smallest fraction. We will write it at the end.



Recall if you write the greatest number first and the smallest number at the end, it is called **descending order**.

Arrange the following fractions in ascending order:

$$\frac{1}{5} \quad \frac{4}{5} \quad \frac{3}{5}$$

Arrange the following fractions in descending order:

$$\frac{1}{9} \quad \frac{7}{9} \quad \frac{4}{9}$$

Exercise 5.3

1. Compare the fractions using symbols of "<" or ">".

a) $\frac{1}{8}$ $\frac{5}{8}$

b) $\frac{5}{9}$ $\frac{2}{9}$

c) $\frac{2}{7}$ $\frac{3}{7}$

d) $\frac{7}{8}$ $\frac{3}{8}$

e) $\frac{1}{5}$ $\frac{2}{5}$

f) $\frac{6}{7}$ $\frac{4}{7}$

2. Arrange the following fractions in ascending order:

a) $\frac{3}{5}$ $\frac{1}{5}$ $\frac{2}{5}$ _____

b) $\frac{2}{7}$ $\frac{4}{7}$ $\frac{3}{7}$ _____

c) $\frac{5}{9}$ $\frac{2}{9}$ $\frac{1}{9}$ _____

3. Arrange the following fractions in descending order:

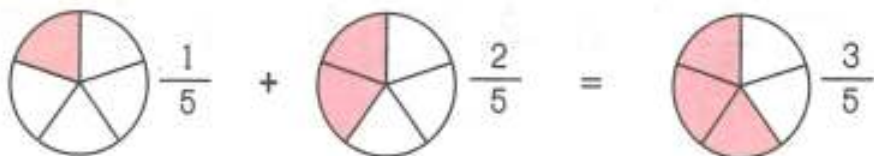
a) $\frac{1}{8}$ $\frac{5}{8}$ $\frac{3}{8}$ _____

b) $\frac{2}{5}$ $\frac{4}{5}$ $\frac{1}{5}$ _____

c) $\frac{7}{13}$ $\frac{5}{13}$ $\frac{3}{13}$ _____

5.4 Addition and subtraction of like fractions

Ahmed ate $\frac{1}{5}$ of a cake. Sara ate $\frac{2}{5}$ of a cake. How much did they eat altogether?



Both fractions show that the cakes are divided into same number of equal sized pieces. So, we can simply add 2 and 1.

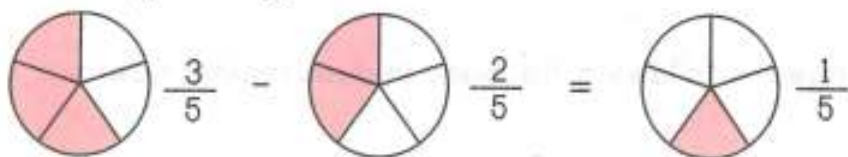
To add the fractions with same denominators, we simply add the numerators and put it over the same denominator.

$$\text{So, } \frac{1}{5} + \frac{2}{5} = \frac{1+2}{5} = \frac{3}{5}$$

Ahmed and Sara ate $\frac{3}{5}$ of the cake.

Ali colours $\frac{3}{5}$ of a circle. He then erases $\frac{2}{5}$ of it. How much fraction of the circle is left coloured?

Let's subtract $\frac{2}{5}$ from $\frac{3}{5}$



Both fractions show that the circles are divided into same number of equal sized parts. So, we can simply subtract 2 from 3.

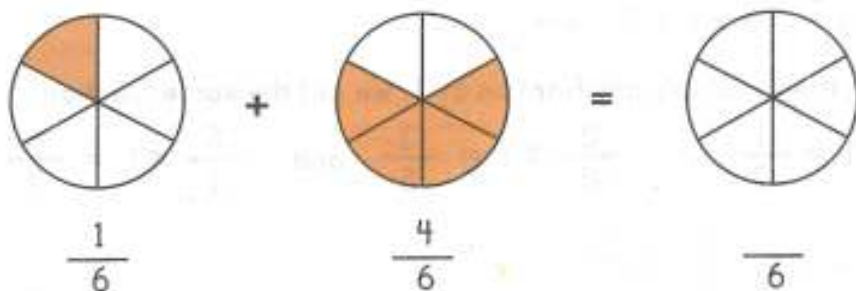
To subtract the fractions with same denominators, we simply subtract the numerators and put it over the same denominator.

$$\text{So, } \frac{3}{5} - \frac{2}{5} = \frac{3-2}{5} = \frac{1}{5}$$

$\frac{1}{5}$ of the circle is left coloured.

Exercise 5.4

1. Add the fractions and colour the figure.



2. Find sum of the following fractions:

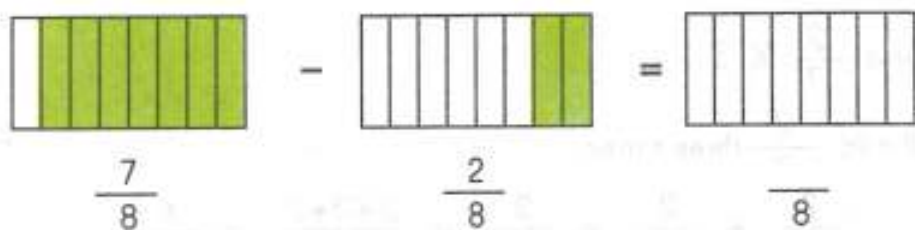
a) $\frac{3}{5} + \frac{1}{5} = \square$

b) $\frac{2}{4} + \frac{1}{4} = \square$

c) $\frac{2}{9} + \frac{5}{9} = \square$

d) $\frac{3}{8} + \frac{4}{8} = \square$

3. Subtract the fractions and colour the figure:



4. Find the difference between the following fractions.

a) $\frac{2}{3} - \frac{1}{3} = \square$

b) $\frac{2}{6} - \frac{1}{6} = \square$

c) $\frac{4}{7} - \frac{2}{7} = \square$

d) $\frac{5}{8} - \frac{4}{8} = \square$

5.5 Multiplying whole number with fraction

Recall that if we multiply any number by 1, we get the same number.

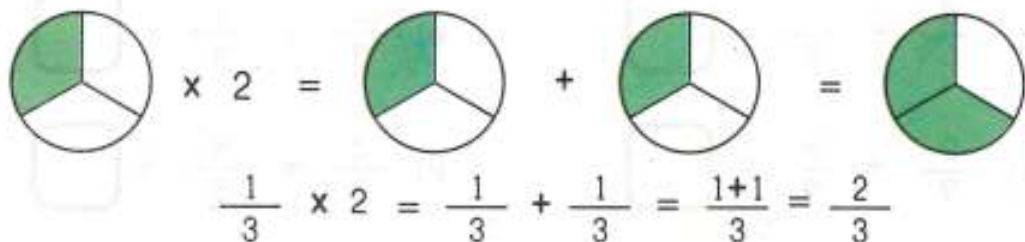
$$1 \times 3 = 3, \quad 5 \times 1 = 5 \quad \text{etc.}$$

Similarly, if we multiply any fraction by 1, we get the same fraction.

$$\frac{1}{2} \times 1 = \frac{1}{2}, \quad \frac{3}{5} \times 1 = \frac{3}{5} \quad \text{and} \quad \frac{5}{7} \times 1 = \frac{5}{7}$$

Let's multiply $\frac{1}{3}$ by 2.

We know that multiplication is repeated addition. So, we will add $\frac{1}{3}$ two times.



$$\text{So, } \frac{1}{3} \times 2 = \frac{2}{3}$$

Let's find $\frac{2}{7} \times 3$.

We will add $\frac{2}{7}$ three times.

$$\frac{2}{7} + \frac{2}{7} + \frac{2}{7} = \frac{2+2+2}{7} = \frac{6}{7}$$

Complete the following:

$$\frac{1}{5} \times 3 = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \boxed{}$$

$$\frac{2}{11} \times 5 = \boxed{} + \boxed{} + \boxed{} + \boxed{} + \boxed{} = \boxed{}$$

We have learnt to calculate the product using repeated addition.

$$\frac{2}{7} \times 3 = \frac{2}{7} + \frac{2}{7} + \frac{2}{7} = \frac{2+2+2}{7} = \frac{6}{7}$$

Let's also calculate this product expressing whole number as a fraction.

3 is same as $\frac{3}{1}$

Let's find $\frac{2}{7} \times \frac{3}{1}$

Any whole number
can be written as a fraction
by putting 1 as a denominator.
 $3 = \frac{3}{1}$. If we divide 3 by 1,
we get 3.

To multiply fractions, we multiply numerator
of one fraction with the numerator of other
fraction and denominator of one fraction
with the denominator of other fraction.

$$\frac{2}{7} \times \frac{3}{1} = \frac{2 \times 3}{7 \times 1} = \frac{6}{7}$$

Find $3 \times \frac{3}{7}$.

$$\frac{3}{1} \times \frac{3}{7} = \frac{3 \times 3}{1 \times 7} = \frac{9}{7}$$








Find the product of the following:

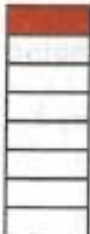






$$5 \times \frac{1}{3} =$$

$$2 \times \frac{4}{9} =$$

Exercise 5.5

1. Multiply the fractions by the given whole number and colour the figures.

a)  $\times 3 =$  $+$  $+$  $=$ 

b)  $\times 5 =$  $+$  $+$  $+$  $+$  $=$ 

2. Multiply the following using repeated addition.

a) $2 \times \frac{1}{7} =$ $=$

b) $5 \times \frac{2}{11} =$ $=$

c) $3 \times \frac{3}{10} =$ $=$

d) $6 \times \frac{1}{2} =$ $=$

e) $2 \times \frac{4}{9} =$ $=$

f) $7 \times \frac{1}{8} =$ $=$

3. Convert the whole numbers into fractions and find the required products.

a) $2 \times \frac{1}{3} = \frac{2}{1} \times \frac{1}{3} = \frac{2 \times 1}{1 \times 3} = \frac{2}{3}$

b) $5 \times \frac{1}{7} =$

c) $7 \times \frac{2}{15} =$

d) $5 \times \frac{1}{7} =$

e) $3 \times \frac{1}{11} =$

4. Solve and match the product with correct answer.

a) $2 \times \frac{1}{3}$

$\frac{6}{7}$

b) $5 \times \frac{1}{6}$

$\frac{2}{3}$

c) $3 \times \frac{2}{7}$

$\frac{9}{13}$

d) $5 \times \frac{1}{11}$

$\frac{5}{6}$

e) $3 \times \frac{3}{13}$

$\frac{5}{11}$

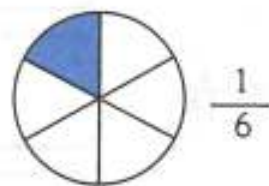
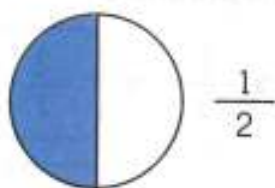


5.6 Division of a fraction by a whole number

Divide $\frac{1}{2}$ by 3.

We have to divide $\frac{1}{2}$ by 3.

Let's split $\frac{1}{2}$ into 3 equal groups.



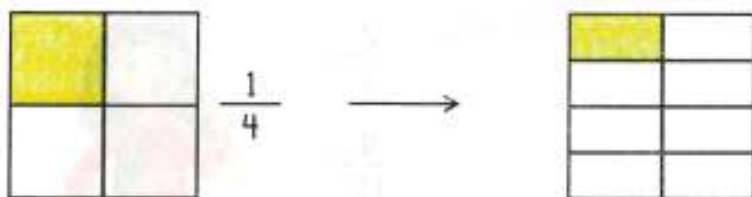
Each $\frac{1}{2}$ is now divided into 3 equal parts.

Now, the total parts are 6 and one part out of 6 is $\frac{1}{6}$.

$$\text{So, } \frac{1}{2} \div 3 = \frac{1}{6}$$

Which means if $\frac{1}{2}$ of a cake is divided into 3 children, each child will get $\frac{1}{6}$ of the whole cake.

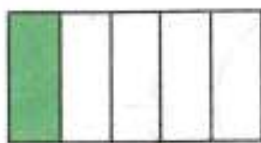
Divide $\frac{1}{4}$ by 2.



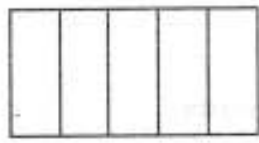
Divide each $\frac{1}{4}$ into two equal parts.
Each part now is $\frac{1}{8}$ of the whole.

$$\frac{1}{4} \div 2 = \frac{1}{8}$$

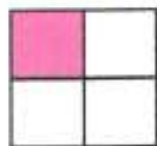
Divide the fractions by the whole number and colour the figures.



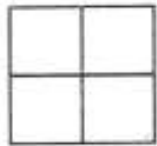
$$\div 2 \rightarrow$$



$$\frac{1}{5} \div 2 = \square$$



$$\div 3 \rightarrow$$



$$\frac{1}{4} \div 3 = \square$$

We saw that: $\frac{1}{2} \div 3 = \frac{1}{6}$

If you multiply $\frac{1}{2}$ by $\frac{1}{3}$, you get $\frac{1}{6}$. This means dividing a number by another number is same as multiplying by the reciprocal of that number.

We can also say that multiplication is the inverse of division.

To divide $\frac{1}{2}$ by 3, we will take reciprocal of 3 and multiply the fractions.

Step 1 Take reciprocal of the whole number.

Reciprocal of 3 is $\frac{1}{3}$

The reciprocal of a number is 1 divided by the number.

Number	Its reciprocal
5	$\frac{1}{5}$

Step 2 Multiply the fraction with the reciprocal of the whole number.

$$\frac{1}{2} \div 3 = \frac{1}{2} \times \frac{1}{3} = \frac{1 \times 1}{2 \times 3} = \frac{1}{6}$$

Solve the following:

$$\frac{1}{5} \div 4 = \text{---} \times \text{---} = \text{---}$$

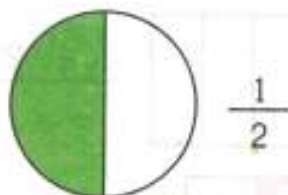
$$\frac{1}{7} \div 2 = \text{---} \times \text{---} = \text{---}$$

5.7 Equivalent fractions

Look at the circle.

It is divided into 2 equal parts.

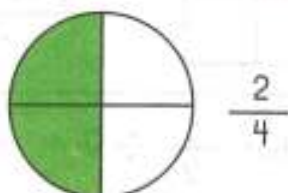
$\frac{1}{2}$ of the circle is coloured.



Now look at this circle.

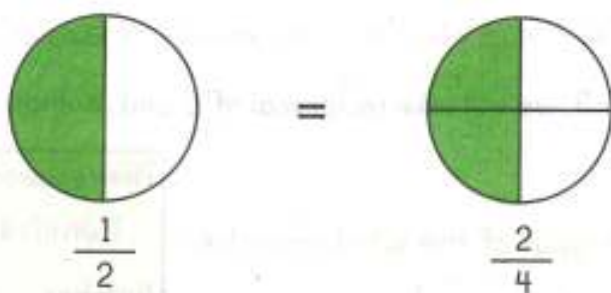
It is divided into 4 equal parts.

$\frac{2}{4}$ of the circle is coloured.



You can see that the area coloured in both circles is same.

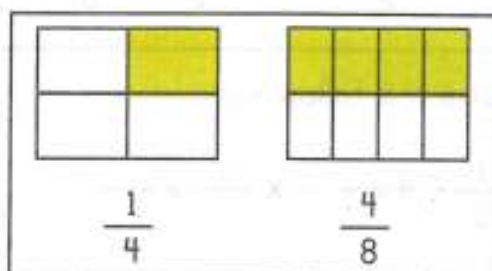
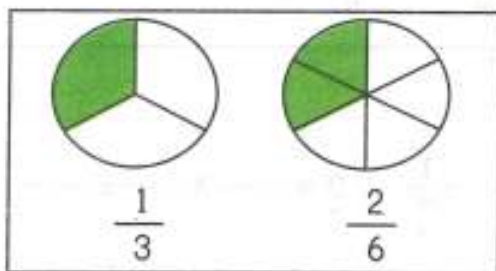
This means $\frac{1}{2}$ and $\frac{2}{4}$ are equal.



We call such fractions **equivalent fractions**.

Equivalent fractions are fractions which have different numerators and denominators but have same value.

Which of these pairs show equivalent fractions?

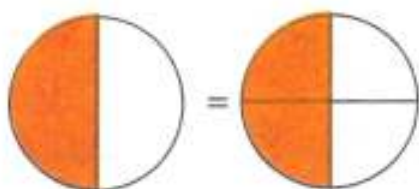


Look again at these fractions.

$$\frac{1}{2} \quad \frac{2}{4}$$

You can see that to go from $\frac{1}{2}$ to $\frac{2}{4}$, we just doubled the numerator and the denominator.

$$\begin{array}{ccc} & \times 2 & \\ \uparrow & & \downarrow \\ \frac{1}{2} & = & \frac{2}{4} \\ \downarrow & & \uparrow \\ & \times 2 & \end{array}$$



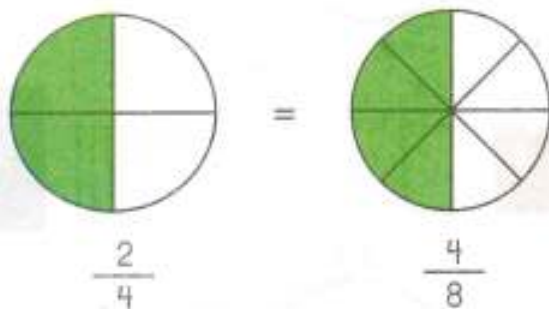
If you multiply $\frac{1}{2}$ by $\frac{2}{2}$, you get $\frac{2}{4}$, which is equivalent to $\frac{1}{2}$.

When you divide your circle in twice number of parts, you have to take twice number of parts out to get the same fraction.

This means we can multiply numerator and denominator of a fraction with same number and we will get an equivalent fraction.

Let's multiply $\frac{2}{4}$ by $\frac{2}{2}$.

$$\begin{array}{ccc} & \times 2 & \\ \uparrow & & \downarrow \\ \frac{2}{4} & = & \frac{4}{8} \\ \downarrow & & \uparrow \\ & \times 2 & \end{array}$$



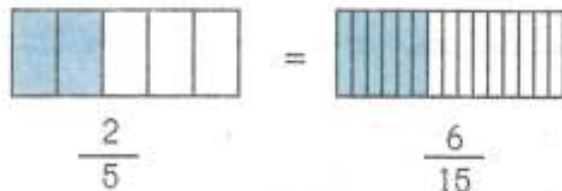
You can see that $\frac{2}{4}$ and $\frac{4}{8}$ also represent same fraction.

$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$$

Find equivalent fraction of $\frac{2}{5}$.

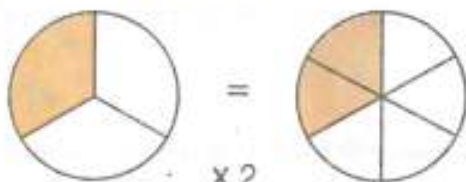
Let's multiply $\frac{2}{5}$ by $\frac{3}{3}$.

$$\frac{2}{5} \begin{matrix} \xrightarrow{\times 3} \\ = \\ \xrightarrow{\times 3} \end{matrix} \frac{6}{15}$$



You can see that $\frac{2}{5}$ and $\frac{6}{15}$ represent equivalent fraction.

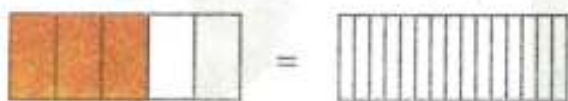
Find the equivalent fractions for the fractions given below and colour the figures.



$$\frac{1}{3} \begin{matrix} \xrightarrow{\times 2} \\ = \\ \xrightarrow{\times 2} \end{matrix} \frac{\square}{6}$$



$$\frac{1}{4} \begin{matrix} \xrightarrow{\times 2} \\ = \\ \xrightarrow{\times 2} \end{matrix} \frac{\square}{\square}$$



$$\frac{3}{5} \begin{matrix} \xrightarrow{\times 2} \\ = \\ \xrightarrow{\times 2} \end{matrix} \frac{\square}{\square}$$



$$\frac{3}{4} \begin{matrix} \xrightarrow{\times 2} \\ = \\ \xrightarrow{\times 2} \end{matrix} \frac{\square}{\square}$$

Let's find equivalent fraction of $\frac{4}{6}$.



We know that we can multiply the numerator and the denominator of a fraction by the same number and get an equivalent fraction.

Let's multiply $\frac{4}{6}$ by $\frac{2}{2}$.

$$\frac{4}{6} \overset{\times 2}{=} \frac{8}{12}$$

The diagram shows the fraction $\frac{4}{6}$ on the left, an equals sign in the middle, and the fraction $\frac{8}{12}$ on the right. A green curved arrow points from the numerator 4 to the numerator 8, labeled with $\times 2$. Another green curved arrow points from the denominator 6 to the denominator 12, also labeled with $\times 2$.



Now, we have 12 parts and 8 out of them are coloured.

You can see that the coloured part in $\frac{4}{6}$ and $\frac{8}{12}$ is exactly the same.

We can also divide the numerator and denominator of a fraction by the same number and get an equivalent fraction.

$$\frac{4}{6} \overset{\div 2}{=} \frac{2}{3}$$

The diagram shows the fraction $\frac{4}{6}$ on the left, an equals sign in the middle, and the fraction $\frac{2}{3}$ on the right. A green curved arrow points from the numerator 4 to the numerator 2, labeled with $\div 2$. Another green curved arrow points from the denominator 6 to the denominator 3, also labeled with $\div 2$.



Now, we have 3 parts and 2 of them are coloured.

You can see that the coloured part is the same.

$$\frac{2}{3} = \frac{4}{6} = \frac{8}{12}$$


Look at this equivalent fraction pair. Can you find the missing number?

$$\frac{1}{3} = \frac{\square}{6}$$

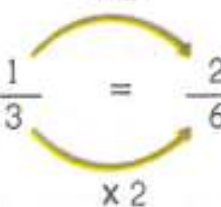
We know that to find equivalent fractions, we multiply or divide numerator and denominator of a fraction by the same number.

Recall your tables. To get 6 from 3, we will multiply 3 by 2.

3 times 2 is 6.

$$\frac{1}{3} = \frac{\square}{6}$$


Which means we will have to multiply numerator of the fraction by 2 as well.

$$\frac{1}{3} = \frac{2}{6}$$


1 times 2 is 2.

$\frac{2}{6}$ is the required equivalent fraction.

Find the missing number in each pair of the following fractions:

$$\frac{1}{3} = \frac{\square}{9}$$

$$\frac{2}{5} = \frac{\square}{10}$$

$$\frac{1}{4} = \frac{3}{\square}$$

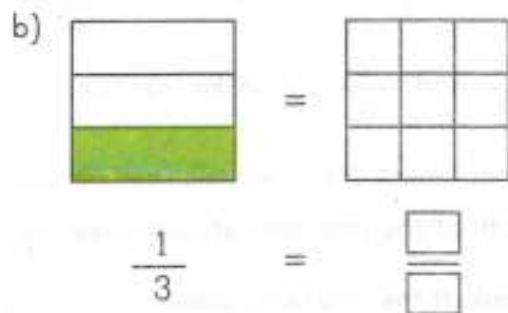
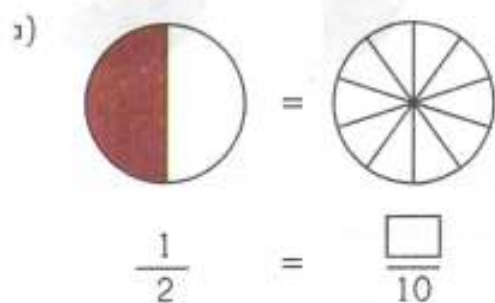
$$\frac{2}{5} = \frac{6}{\square}$$

$$\frac{2}{7} = \frac{\square}{14}$$

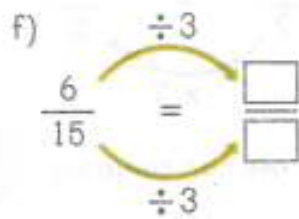
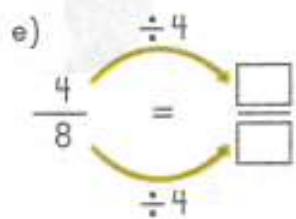
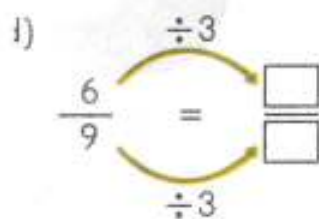
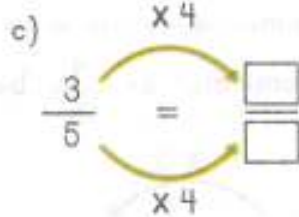
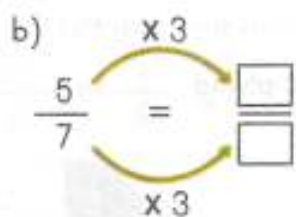
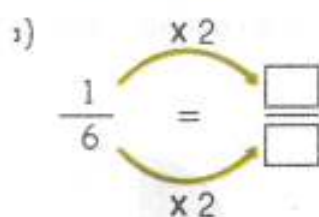
$$\frac{1}{2} = \frac{\square}{6}$$

Exercise 5.7

1. Find equivalent fractions of the following and colour the figures:



2. Find equivalent fractions for each of the following by multiplying or dividing the numbers given:



3. Find the missing numbers in the following pairs of equivalent fractions:

a) $\frac{1}{5} = \frac{5}{\square}$

b) $\frac{2}{8} = \frac{\square}{16}$

c) $\frac{1}{3} = \frac{10}{\square}$

d) $\frac{6}{9} = \frac{36}{\square}$

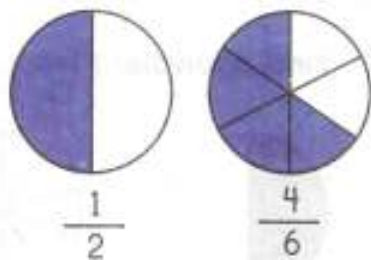
e) $\frac{8}{9} = \frac{32}{\square}$

f) $\frac{6}{7} = \frac{\square}{35}$

5.8 Comparing unlike fractions

Which fraction is greater, $\frac{1}{2}$ or $\frac{4}{6}$?

$\frac{1}{2}$ and $\frac{4}{6}$ are unlike fractions.



To compare them, we will first convert them to like fractions, which means both of the fractions should have the same denominator.

Look at the fractions again.

$$\frac{1}{2} \qquad \frac{4}{6}$$

2 is a multiple of 6.

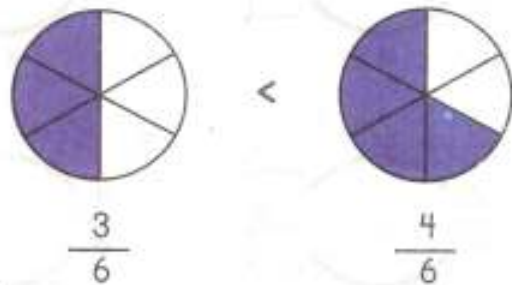
Recall that 2 times 3 is 6.

This means we can write an equivalent fraction of $\frac{1}{2}$ which has the same denominator as $\frac{4}{6}$, by multiplying $\frac{1}{2}$ by $\frac{3}{3}$.

$$\frac{1}{2} \xrightarrow{\times 3} \frac{3}{6}$$

=

$$\frac{3}{6} \xrightarrow{\times 3}$$



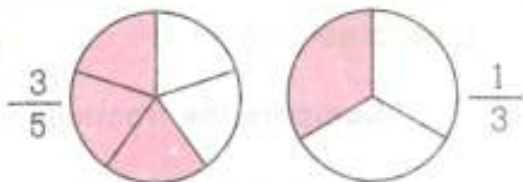
Now, we can compare $\frac{3}{6}$ and $\frac{4}{6}$.

$3 < 4$. So, $\frac{3}{6} < \frac{4}{6}$.

Therefore, we can say that $\frac{1}{2} < \frac{4}{6}$

Which fraction is greater, $\frac{3}{4}$ or $\frac{5}{8}$?

Which fraction is greater, $\frac{3}{5}$ or $\frac{1}{3}$?



$\frac{3}{5}$ and $\frac{1}{3}$ are unlike fractions.

We have to convert them to like fractions to compare them.

Let's try to find a common denominator for both fractions.

Look at the denominators 5 and 3.

Recall the first few multiples of 5 and 3.

Multiples of 5: 5, 10, 15, 20

Multiples of 3: 3, 6, 9, 12, 15, 18

5 is the Least Common Multiple. LCM will be the common denominator.

$$\frac{3}{5} = \frac{\square}{15} \quad \text{and} \quad \frac{1}{3} = \frac{\square}{15}$$

Let's find the missing numbers now.

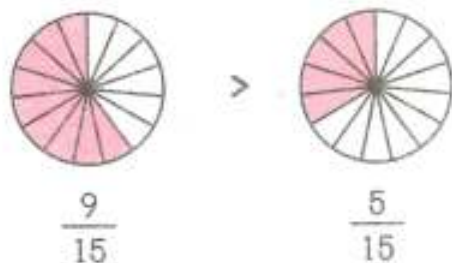
$$\frac{3}{5} \xrightarrow{\times 3} \frac{9}{15} \quad \text{and} \quad \frac{1}{3} \xrightarrow{\times 5} \frac{5}{15}$$

=

Now, we can compare $\frac{9}{15}$ and $\frac{5}{15}$.

$$\frac{9}{15} > \frac{5}{15}$$

$$\text{So, } \frac{3}{5} > \frac{1}{3}$$



Exercise 5.8

1. Compare the fractions using symbols of "<" or ">".

a) $\frac{1}{2}$ $\frac{1}{4}$ b) $\frac{1}{2}$ $\frac{5}{8}$ c) $\frac{2}{9}$ $\frac{1}{3}$

d) $\frac{1}{2}$ $\frac{2}{6}$ e) $\frac{1}{2}$ $\frac{2}{3}$ f) $\frac{2}{3}$ $\frac{3}{4}$

g) $\frac{4}{5}$ $\frac{3}{4}$ h) $\frac{1}{5}$ $\frac{1}{7}$ i) $\frac{2}{7}$ $\frac{3}{5}$

5.9 Addition and subtraction of unlike fractions

What is $\frac{1}{2} + \frac{1}{8}$?



Recall that same sized or like fractions can simply be added by counting the number of parts in the numerators.

Look at the figures. Parts in both shapes are of different sizes.

So, we cannot simply add them. We will first have to convert them to same sized parts or like fractions.

$$\frac{1}{2} \xrightarrow{\times 4} \frac{4}{8} = \frac{4}{8} \xleftarrow{\times 4}$$

LCM of 2 and 8 is 8.

Since, $\frac{1}{2} = \frac{4}{8}$. We can add $\frac{4}{8}$ and $\frac{1}{8}$.

$$\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$$

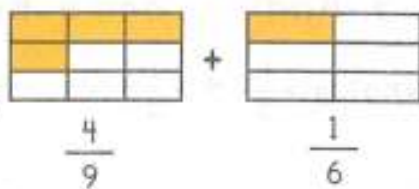
So, $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$



Add $\frac{1}{3}$ and $\frac{2}{15}$.

Let's add $\frac{4}{9}$ and $\frac{1}{6}$.

Since, the fractions are unlike fractions, we will convert them to like fractions.



step 1

Let's find LCM of 9 and 6.

Multiples of 9: 9, 18, 27, 36

Multiples of 6: 6, 12, 18, 24

step 2

18 is the LCM, which will be the common denominator.

$$\frac{4}{9} = \frac{\square}{18} \quad \text{and} \quad \frac{1}{6} = \frac{\square}{18}$$

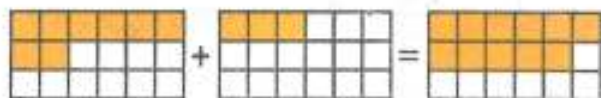
step 3

Let's find the missing numbers.

$$\frac{4}{9} \xrightarrow{\times 2} \frac{8}{18} \quad \frac{1}{6} \xrightarrow{\times 3} \frac{3}{18}$$

$\frac{8}{18}$ and $\frac{3}{18}$ are like fractions.

$$\frac{8}{18} + \frac{3}{18} = \frac{11}{18}$$



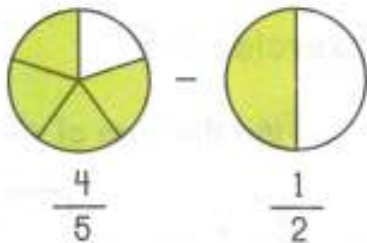
So, $\frac{4}{9} + \frac{1}{6} = \frac{11}{18}$

$$\frac{8}{18} + \frac{3}{18} = \frac{11}{18}$$

Add $\frac{1}{3}$ and $\frac{2}{5}$.

Let's subtract $\frac{1}{2}$ from $\frac{4}{5}$.

The shapes do not have equal sized parts. So, we cannot subtract $\frac{1}{2}$ from $\frac{4}{5}$ directly.



We will first convert them to shapes with equal sized parts or like fractions.

Let's find equivalent fraction for both $\frac{4}{5}$ and $\frac{1}{2}$ such that they have a common denominator.

Multiples of 5: 5, **10**, 15, 20, 25

Multiples of 2: 2, 4, 6, 8, **10**

10 is the LCM. So, 10 will be the common denominator.

$$\frac{4}{5} = \frac{\square}{10} \quad \text{and} \quad \frac{1}{2} = \frac{\square}{10}$$

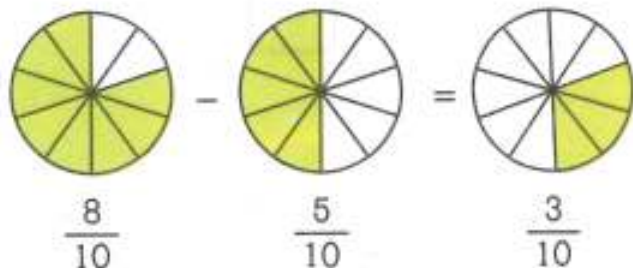
Let's find the missing numbers.

$$\frac{4}{5} \xrightarrow{\times 2} \frac{8}{10} \quad \text{and} \quad \frac{1}{2} \xrightarrow{\times 5} \frac{5}{10}$$

Now, we can subtract $\frac{5}{10}$ from $\frac{8}{10}$ by just subtracting the numerators.

$$\frac{8}{10} - \frac{5}{10} = \frac{3}{10}$$

$$\text{So, } \frac{4}{5} - \frac{1}{2} = \frac{3}{10}$$



Exercise 5.9

1. Find the sum of the following unlike fractions:

a) $\frac{2}{9} + \frac{1}{3} = \square$

b) $\frac{1}{4} + \frac{3}{8} = \square$

c) $\frac{2}{7} + \frac{1}{2} = \square$

d) $\frac{3}{4} + \frac{1}{3} = \square$

2. Find the difference of the following unlike fractions:

a) $\frac{5}{6} - \frac{1}{2} = \square$

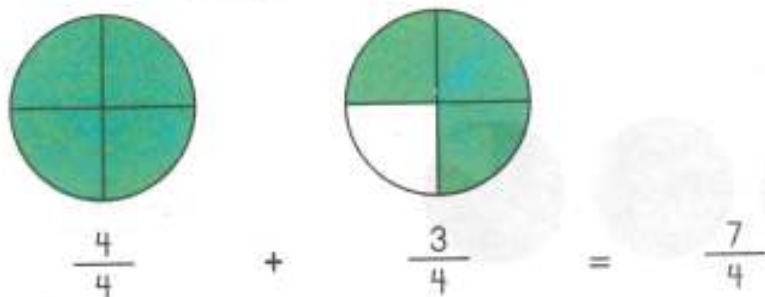
b) $\frac{5}{8} - \frac{1}{4} = \square$

c) $\frac{3}{6} - \frac{1}{2} = \square$

d) $\frac{3}{4} - \frac{2}{5} = \square$

5.10 Improper fractions and mixed numbers

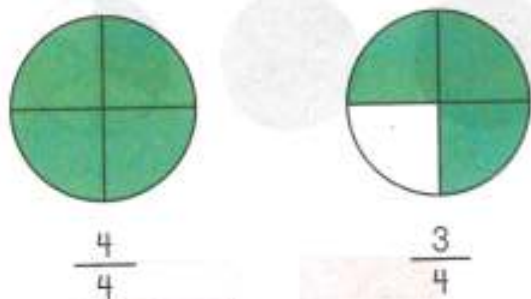
Look at the following shapes.



In fraction $\frac{7}{4}$, numerator is greater than the denominator. Such fractions are called improper fractions. $\frac{7}{4}$ is an improper fraction.

A **proper fraction** has a numerator that is smaller than its denominator.
An **improper fraction** has a numerator that is greater than its denominator.

Look at the shapes again.



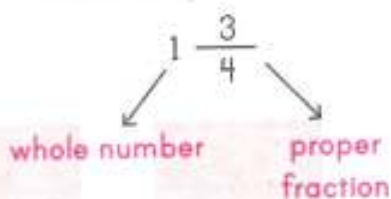
This is 1 whole circle.

$$\frac{4}{4} = 1$$

We can also write it as a mixed number.

There is 1 whole circle and $\frac{3}{4}$ of a circle.

$1 \frac{3}{4}$ is an example of a mixed number.



A **mixed number** is made up of a whole number and a proper fraction.

Exercise 5.10

1. Write the improper fraction and mixed number for each of the following.



$$\frac{17}{6} = 2 \frac{5}{6}$$



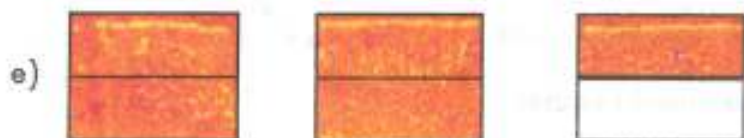
$$\frac{\square}{\square} = \square \frac{\square}{\square}$$



$$\frac{\square}{\square} = \square \frac{\square}{\square}$$



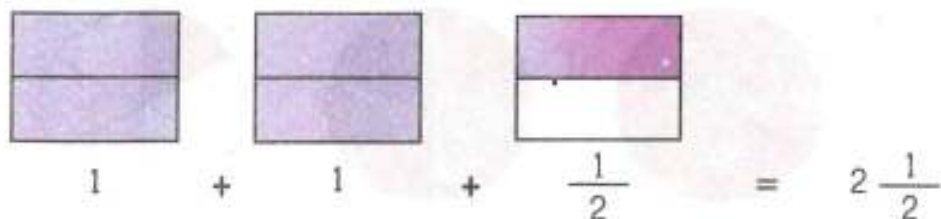
$$\frac{\square}{\square} = \square \frac{\square}{\square}$$



$$\frac{\square}{\square} = \square \frac{\square}{\square}$$

5.11 Converting fractions

Let's convert a mixed number $2\frac{1}{2}$ to an improper fraction directly.



We will convert the whole numbers into fractions with same denominators as that of proper fraction and add all fractions.

$$\frac{2}{2} + \frac{2}{2} + \frac{1}{2} = \frac{5}{2}$$

We can also do it mathematically by following these steps.

Step 1 Multiply the whole number part by the denominator of the fraction.

$$2\frac{1}{2} \longrightarrow 2 \times 2 = 4$$

Step 2 Add the product to the numerator.

$$2\frac{1}{2} \longrightarrow 4 + 1 = 5$$

Step 3 Write the result as a numerator over the same denominator.

$$2\frac{1}{2} = \frac{5}{2}$$

Convert the following mixed numbers into improper fractions:

$$3\frac{1}{4} = \frac{13}{\square}$$

$$5\frac{7}{8} = \frac{\square}{\square}$$

$$4\frac{1}{2} = \frac{\square}{\square}$$

$$2\frac{2}{3} = \frac{\square}{\square}$$

$$3\frac{4}{7} = \frac{\square}{\square}$$

$$4\frac{3}{5} = \frac{\square}{\square}$$

Let's see how we convert improper fraction to mixed number.

Look at the circles below.



$\frac{13}{6}$ of the circles are coloured.

Let's convert this improper fraction to mixed number.

Divide the numerator by the denominator.

$$\frac{13}{6} = 2 \text{ with a remainder of } 1$$

$$\begin{array}{r} 2 \\ 6 \overline{) 13} \\ \underline{- 12} \\ 1 \end{array}$$

Write down the quotient as a whole number.

Write remainder as a numerator over the same denominator.

$$\frac{13}{6} = 2 \frac{1}{6}$$

Convert the following improper fractions into mixed numbers:

$$\frac{13}{2} = 6 \frac{\square}{\square}$$

$$\frac{7}{6} = \square \frac{\square}{\square}$$

$$\frac{5}{2} = \square \frac{\square}{\square}$$

$$\frac{34}{7} = \square \frac{\square}{\square}$$

$$\frac{22}{5} = \square \frac{\square}{\square}$$

$$\frac{23}{4} = \square \frac{\square}{\square}$$

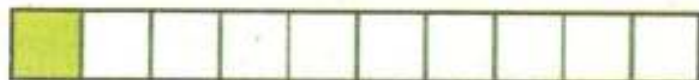
CHAPTER 6: DECIMALS AND FRACTIONS

5.1 Decimals

Understanding tenths

Look at the rectangle below.

Let's divide it in 10 equal parts and colour one of them.



We have coloured one part out of 10. That is $\frac{1}{10}$ or one tenth of the rectangle.

$\frac{1}{10}$ is smaller than 1 whole. You can see that 10 one tenths make 1 whole.

$$\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} = \frac{10}{10} = 1$$

$$10 \times \frac{1}{10} = 1$$

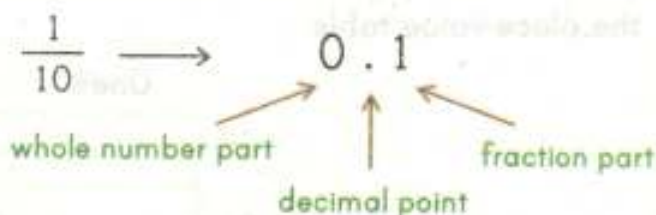
Recall the place value chart.

To show one tenth of a whole, we will add another column of tenths in it.

Since, one tenth is smaller than one, we will add the column on the right side

after a decimal point.

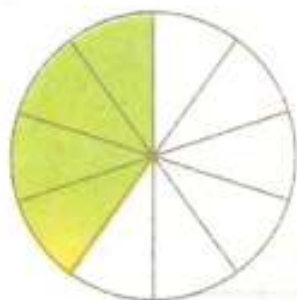
Ones	•	Tenths
	•	$\frac{1}{10}$
0	•	1



The decimal 0.1 has 0 ones and 1 tenth. We read it as **zero point one**.

A decimal has a whole number part and a fraction part that is separated by a decimal point.

4 out of 10 parts of the circle are coloured.



4 one tenths of the circle are coloured.

$$\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} = \frac{4}{10}$$

$$0.1 + 0.1 + 0.1 + 0.1 = 0.4$$

$\frac{4}{10}$ or 0.4 of the circle is coloured.

Let's make a place value table for decimal 0.4.

Ones	.	Tenths
	.	
0	.	4



In the decimal 0.4,

The digit **0** is in the ones place. It has a value of **0**.

The digit **4** is in the tenths place. It has a value of **0.4**.

We read it as **zero point four**.

Identify ones and tenths in the following decimals and complete the place value table.

0.7

0.8

Ones	.	Tenths
	.	
	.	

Write the following as decimals.

$$\frac{2}{10} = \boxed{0.2}$$

$$7 \text{ tenths} = \boxed{}$$

$$\text{zero point 5} = \boxed{}$$

We know that 10 one tenths make a whole.



$$\frac{10}{10} = 1$$

10 tenths = 1 one.

If we have 10 tenths, we can regroup them into 1 ones and 0 tenths.

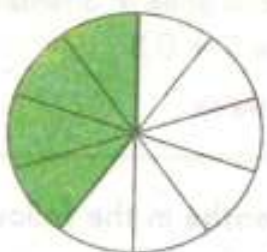
Step 1

Ones	.	Tenths
0		10

Step 2

Ones	.	Tenths
1		0

Look at the parts of circles coloured below.



$$\frac{10}{10} + \frac{4}{10} = \frac{14}{10} = 1\frac{4}{10}$$

We can also say that 14 tenths is equal to 1 one and 4 tenths.

Let's write 14 tenths as a decimal.

We will regroup 14 tenths into 1 ones and 4 tenths.

4 tenths = 1 ones and 4 tenths

$$= 1 + 0.4$$

$$= 1.4$$



We read it as **one point four**.

$$\frac{14}{10} = 1\frac{4}{10} = 1.4$$

Let's write 53 tenths as a decimal.

We will regroup 53 tenths into 5 ones and 3 tenths.

Look at the place value table.

Ones	•	Tenths
	•	
5	•	3

In the decimal 5.3,

The digit **5** is in the ones place. It has a value of **5**.

The digit **3** is in the tenths place. It has a value of **0.3**.

$$53 \text{ tenths} = 5 \text{ ones} + 3 \text{ tenths}$$

$$5.3 = 5 + 0.3$$

We read it as **five point three**.

Identify ones and tenths in the following decimals and complete the place value table.

	Ones	•	Tenths
1.8		•	
7.2		•	
9.5		•	

Write each of the following as a decimal.

$49 \text{ tenths} = \square$

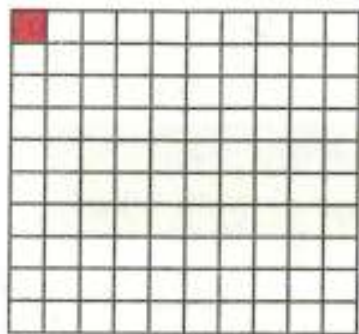
$\frac{17}{10} = \square$

$36 \text{ tenths} = \square$

Understanding hundredths

Look at the square.

It is divided into 100 equal parts.



Each part of the square is one hundredth
or $\frac{1}{100}$ of the whole.

1 tenth = 10 hundredths

$\frac{1}{100}$ can be written as 0.01.

We read it as **zero point zero one**.

Can you write $\frac{3}{100}$ as a decimal?

$$\frac{3}{100} = 0.03$$

Ones	Tenths	Hundredths
		● ● ●
0	0	3

Hundredths is smaller than tenths, so we will add another column of hundredths on the right side in the place value table.

Write $\frac{10}{100}$ as a decimal.

Ones	Tenths	Hundredths
		● ● ● ● ● ● ● ●
0	0	10

→

Ones	Tenths	Hundredths
	●	
0	1	0

10 hundredths = 1 tenth

$$\frac{10}{100} = \frac{1}{10} = 0.1$$

Write 13 hundredths as a decimal.

We will regroup 13 hundredths into 1 tenth and 3 hundredths.

$$\begin{aligned} 13 \text{ hundredths} &= 1 \text{ tenth and } 3 \text{ hundredths} \\ &= 0.1 + 0.03 \\ &= 0.13 \end{aligned}$$

Let's now write $\frac{100}{100}$ as a decimal.

$$\frac{100}{100} = 100 \text{ hundredths} = 1 \text{ one.}$$

10 hundredths = 1 tenth
100 hundredths = 10 tenths = 1 one

Make a place value table for 2.43.

Ones	•	Tenths	Hundredths
1 1	•	● ● ● ●	● ● ●
2	•	4	3

In the decimal 2.43,

The digit 2 is in the ones place. It has a value of 2.

The digit 4 is in the tenths place. It has a value of 0.4.

The digit 3 is in the hundredths place. It has a value of 0.03.

$$2.43 = 2 + 0.4 + 0.03$$

We read it as **two point four three**.

Identify tens, ones, tenths and hundredths in the given decimals.

	Tens	Ones	•	Tenths	Hundredths
14.13			•		
2.35			•		

Write the following as decimals.

$$51 \text{ hundredths} = \square$$

$$\frac{9}{100} = \square$$

$$\frac{23}{100} = \square$$

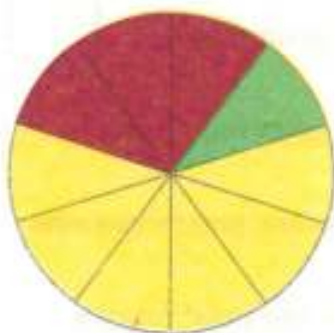
Exercise 6.1

The circle is divided into 10 parts and they are coloured with three colours. Write the fraction and decimal for each colour.

$$\text{Red} = \frac{3}{10} = 0.3$$

$$\text{Green} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$$

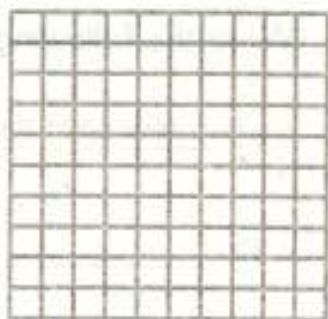
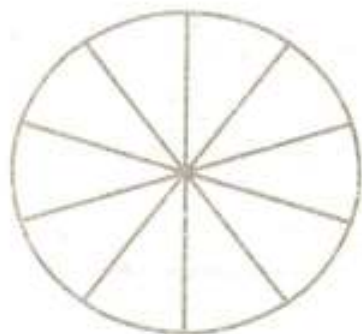
$$\text{Yellow} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$$



Colour

a) 0.4 of the figure.

b) 0.12 of the figure.



Write the following fractions as decimals.

$$\frac{7}{10} = \frac{\quad}{\quad}$$

$$\text{b) } \frac{6}{10} = \frac{\quad}{\quad}$$

$$\text{c) } \frac{9}{10} = \frac{\quad}{\quad}$$

$$\frac{71}{100} = \frac{\quad}{\quad}$$

$$\text{e) } \frac{2}{100} = \frac{\quad}{\quad}$$

$$\text{f) } \frac{43}{100} = \frac{\quad}{\quad}$$

$$\frac{31}{100} = \frac{\quad}{\quad}$$

$$\text{h) } \frac{5}{100} = \frac{\quad}{\quad}$$

$$\text{i) } \frac{11}{100} = \frac{\quad}{\quad}$$

4. Write the following as decimals:

a) Zero point five =

b) Five point three =

c) Two point four three =

d) Sixty nine point three nine =

e) Sixty one point four six =

f) Two hundred and fifty seven point three one =

5. Write the following decimals in words:

a) 0.31 zero point three one.

b) 2.31 _____

c) 4.32 _____

d) 0.9 _____

e) 78.11 _____

f) 19.43 _____

6. Identify place value of the underlined digits.

a) 1.2

b) 25.7

c) 2.62

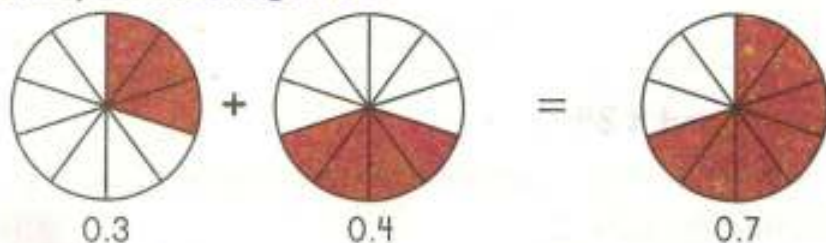
d) 41.4

e) 13.87

f) 36.81

6.2 Adding decimals

Ahmad colours 0.3 of a circle. Sara colours 0.4 of a circle. How much do they colour altogether?



Addition of decimals is similar to addition of whole numbers.

Let's write both decimals according to the place value of their digits and start adding from the right. Remember to put decimal under decimal.

Ones	•	Tenths
0	•	3
+	•	4
	•	7

Step 1 Add the tenths. $3 + 4 = 7$

Ones	•	Tenths
0	•	3
+	•	4
0	•	7

Step 2 Add the ones. $0 + 0 = 0$

Can you now add 1.7 and 6.5?

We will follow the same steps.

①		
Ones	•	Tenths
1	•	7
+	•	5
	•	2

Step 1 Add the tenths. $7 + 5 = 12$
12 tenths = 2 tenths and 1 one.

①		
Ones	•	Tenths
1	•	7
+	•	5
8	•	2

Step 2 Add the ones. Don't forget to add the carried one.
 $1 + 6 + 1 = 8$

The answer is 8.2

Add the following decimals:

$$\begin{array}{r} 3.4 \\ + 2.2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 3.0 \\ + 8.7 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 6.8 \\ + 3.6 \\ \hline \\ \hline \end{array}$$

Let's add 2.85 and 4.34

We will write both decimals according to the place value of their digits and start adding from the right.

①

	Ones	.	Tenths	Hundredths
	2	.	8	5
+	4	.	3	4
	7	.	1	9



Step 1

Add hundredths. $5 + 4 = 9$

Step 2

Add tenths. $8 + 3 = 11$. 11 tenths = 1 tenth and 1 one.

Step 3

Add Ones. $2 + 4 + 1 = 7$.

Can you now add 32.55 and 13.51?

We will write both decimal numbers according to the place value of their digits and follow the same steps.

①

	Tens	Ones	.	Tenths	Hundredths
	3	2	.	5	5
+	1	3	.	5	1
	4	6	.	0	6

The answer is 46.06

Exercise 6.2

1. Add the following decimals:

$$\begin{array}{r} \text{a) } 0.3 \\ + 0.6 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } 3.4 \\ + 5.3 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } 0.34 \\ + 0.53 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } 4.52 \\ + 3.24 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } 2.71 \\ + 1.35 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } 15.35 \\ + 12.60 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } 25.09 \\ + 23.93 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } 14.39 \\ + 23.78 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } 15.37 \\ + 17.32 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{j) } 28.56 \\ + 31.23 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{k) } 23.54 \\ + 15.38 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{l) } 47.56 \\ + 34.23 \\ \hline \\ \hline \end{array}$$

2. Line up the following decimals in vertical columns and find their sum:

a) $0.1 + 0.5 =$

b) $1.2 + 1.7 =$

c) $5.21 + 3.27 =$

d) $14.11 + 21.34 =$

e) $21.35 + 37.41 =$

6.3 Subtracting decimals

Sara colours 0.7 of a circle. She then erases 0.2 of it. How much circle is left coloured?



Subtraction of decimals is similar to subtraction of whole numbers.

We will write both decimals according to the place value of their digits and start subtracting from the right. **Remember to put decimal under decimal.**

Ones	•	Tenths
0	•	7
– 0	•	2
	•	5

Step 1 Subtract the tenths.
 $7 - 2 = 5$

Ones	•	Tenths
0	•	7
– 0	•	2
0	•	5

Step 2 Subtract the ones.
 $0 - 0 = 0$

The answer is 0.5

Can you now subtract 11.91 from 56.34?

We will write both decimals according to the place value of their digits and follow the same steps.

Tens	Ones	•	Tenths	Hundredths
5	5 6	•	3	4
– 1	1	•	9	1
4	4	•	4	3

The answer is 44.43

Exercise 6.3

1. Subtract the given decimals.

$$\begin{array}{r} \text{a) } 0.9 \\ - 0.5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b) } 3.67 \\ - 0.53 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c) } 4.75 \\ - 2.37 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d) } 6.78 \\ - 3.45 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e) } 8.45 \\ - 3.27 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f) } 9.75 \\ - 6.84 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g) } 8.73 \\ - 5.96 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h) } 39.13 \\ - 37.26 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i) } 50.41 \\ - 15.32 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j) } 43.78 \\ - 21.54 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k) } 85.42 \\ - 34.68 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l) } 57.89 \\ - 29.97 \\ \hline \end{array}$$

2. Line up the decimals according to the place value of their digits and find their difference:

$$\text{a) } 0.7 - 0.3 =$$

$$\text{b) } 1.5 - 1.2 =$$

$$\text{c) } 23.5 - 11.1 =$$

$$\text{d) } 91.7 - 52.3 =$$

$$\text{e) } 48.31 - 26.21 =$$

CHAPTER 7: MEASUREMENTS

7.1 Length

Length in metres and centimetres

We use metres to measure length of objects.

Look at the metre ruler. It is 1 metre long.



This board is 1 m tall.



'Centi' in 'centimetres'
means one part out of a
hundred, or $\frac{1}{100}$.
1 centimetre = $\frac{1}{100}$ metre

There are 100 centimetres in 1 metre.

$$1 \text{ m} = 100 \text{ cm}$$

We can also say that the board is 100 cm tall.

A plant is 2 m and 45 cm high.

We can write this height in centimetres as well.

$$\begin{aligned} 2 \text{ m } 45 \text{ cm} &= \underbrace{2 \text{ m}} + 45 \text{ cm} \\ &= 200 \text{ cm} + 45 \text{ cm} \\ &= 245 \text{ cm} \end{aligned}$$

So, the plant is 245 cm high.

1 m = 100 cm
2 m = ?
Count in hundreds.
100, 200
So, 2 m = 200 cm



Can you convert 508 cm to metres and centimetres?

$$\begin{aligned}508 \text{ cm} &= 500 \text{ cm} + 8 \text{ cm} \\ &= 5 \text{ m} + 8 \text{ cm} \\ &= 5 \text{ m } 8 \text{ cm}\end{aligned}$$

$$\begin{aligned}100 \text{ cm} &= 1 \text{ m} \\ \text{So, } 500 \text{ cm} &= 5 \text{ m}\end{aligned}$$

Convert the following lengths.

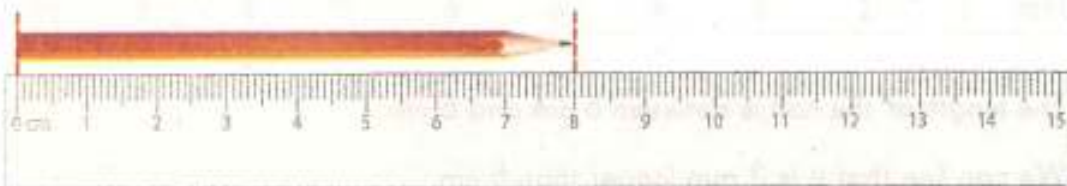
$$\begin{aligned}781 \text{ cm} &= \boxed{} \text{ cm} + \boxed{} \text{ cm} \\ &= \boxed{} \text{ m} + \boxed{} \text{ cm} \\ &= \boxed{} \text{ m } \boxed{} \text{ cm}\end{aligned}$$

$$\begin{aligned}4 \text{ m } 12 \text{ cm} &= \boxed{} \text{ m} + \boxed{} \text{ cm} \\ &= \boxed{} \text{ cm} + \boxed{} \text{ cm} \\ &= \boxed{} \text{ cm}\end{aligned}$$

Length in centimetres and millimetres

For smaller objects, we use centimetres and millimetres to measure the length.

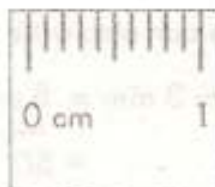
Anam wants to measure the length of her pencil. She can use a ruler to measure the length.



The pencil is 8 centimetre long. We can also write it as 8 cm.

Look at your ruler.

There are 10 equal parts between 0 cm and 1 cm on the ruler. Each part is 1 millimetre long. We can also write it as 1 mm.



So, there are 10 mm in 1 cm.

$$1 \text{ cm} = 10 \text{ mm}$$

Ali measures the length of his eraser.

The eraser is 1 cm long.

We can also say that the eraser is 10 mm long.

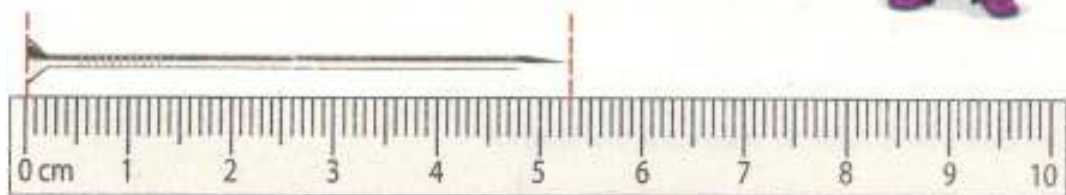


'Milli' in 'millimetres' means one part out of a thousand, or $\frac{1}{1000}$.
1 millimetre = $\frac{1}{1000}$ metre

We also use millimetres to measure objects that are small or not exactly at the centimetre mark on the ruler.



Let's measure the length of this nail.



The length of the nail is between 5 cm and 6 cm.

We can see that it is 3 mm longer than 5 cm.

So, length of the nail is 5 cm 3 mm.

We can also write this length in millimetres.

$$\begin{aligned} 5 \text{ cm } 3 \text{ mm} &= 5 \text{ cm} + 3 \text{ mm} \\ &= \underbrace{50 \text{ mm}} + 3 \text{ mm} \\ &= 53 \text{ mm} \end{aligned}$$

The length of the nail is 53 mm.

1 cm = 10 mm
5 cm = ?
Count in tens.
10, 20, 30, 40, 50.
So, 5 cm = 50 mm

Sara measures the length of a chalk. The chalk is 15 mm long.
Can you write it in centimetres and millimetres?

$$\begin{aligned}15 \text{ mm} &= 10 \text{ mm} + 5 \text{ mm} \\ &= 1 \text{ cm} + 5 \text{ mm} \\ &= 1 \text{ cm } 5 \text{ mm}\end{aligned}$$

We can regroup 15 into 10 and 5.
 $15 = 10 + 5$
And $10 \text{ mm} = 1 \text{ cm}$

The length of the chalk is 1 cm 5 mm.

Convert the following lengths:

$$\begin{aligned}42 \text{ mm} &= \square \text{ mm} + \square \text{ mm} \\ &= \square \text{ cm} + \square \text{ mm} \\ &= \square \text{ cm } \square \text{ mm}\end{aligned}$$

$$\begin{aligned}5 \text{ cm } 2 \text{ mm} &= \square \text{ cm} + \square \text{ mm} \\ &= \square \text{ mm} + \square \text{ mm} \\ &= \square \text{ mm}\end{aligned}$$

Length in metres and kilometres

For lengths, much greater than metres, we use kilometres.

Kilometre is used to measure distances from one place to another.

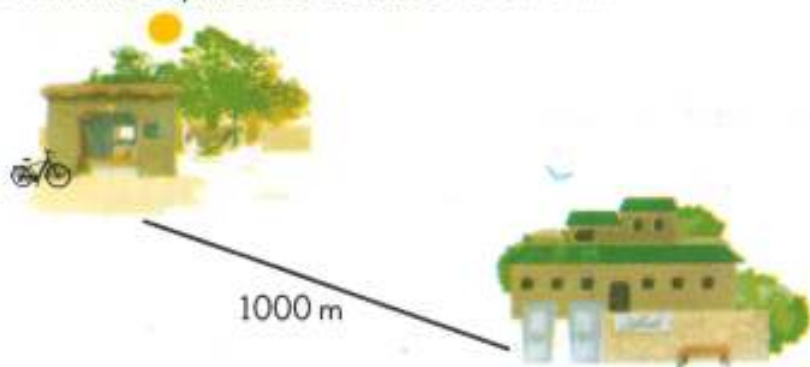
There are one thousand metres in one kilometre.

$$1 \text{ km} = 1000 \text{ m}$$

The distance between Ali's house and his school is 1 km.

We can also say that the distance is 1000 m.

'Kilo' in 'kilometres' means one thousand or 1000.



The distance between school and railway station is 5 km 200 m.



5 km 200 m



Let's convert this distance into metres.

$$\begin{aligned}5 \text{ km } 200 \text{ m} &= \underline{5 \text{ km}} + 200 \text{ m} \\ &= 5\,000 \text{ m} + 200 \text{ m} \\ &= 5\,200 \text{ m}\end{aligned}$$

$$1 \text{ km} = 1000 \text{ m}$$

$$5 \text{ km} = ?$$

Count in thousands.

1000, 2000, 3000, 4000, 5000.

So, 5 km = 5000 m

The distance between two towns is 7 400 m.

Can you convert this distance into kilometres and metres?

$$\begin{aligned}7\,400 \text{ m} &= \underline{7\,000 \text{ m}} + 400 \text{ m} \\ &= 7 \text{ km} + 400 \text{ m} \\ &= 7 \text{ km } 400 \text{ m}\end{aligned}$$

We can regroup 7 400 into 7 000 and 400.

$$7\,400 = 7\,000 + 400$$

$$\text{And } 1\,000 \text{ m} = 1 \text{ km}$$

$$\text{So, } 7\,000 \text{ m} = 7 \text{ km}$$

Convert the following distances:

$$\begin{aligned}3050 \text{ m} &= \boxed{} \text{ m} + \boxed{} \\ &= \boxed{} \text{ km} + \boxed{} \text{ m} \\ &= \boxed{} \text{ km } \boxed{} \text{ m}\end{aligned}$$

$$\begin{aligned}4 \text{ km } 120 \text{ m} &= \boxed{} \text{ km} + \boxed{} \text{ m} \\ &= \boxed{} \text{ m} + \boxed{} \text{ m} \\ &= \boxed{} \text{ m}\end{aligned}$$

Exercise 7.1

ACTIVITY

$$3 \text{ m} = 300 \text{ cm} \text{ Then, } 300 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$$



1. Match with the correct answer.

5 km	17 000 m
12 m	1 200 cm
10 cm	4 400 cm
41 m	40 mm
17 km	100 mm
44 m	5 000 m
4 cm	4 100 cm

2. Colour the matching measurements with the same colour.

3 m	500 cm	9 km	7 m	700 cm
9 000 m	2 km	300 cm	2 000 m	5 m

3. Complete the following:

a) $3 \text{ cm} = \square \text{ mm}$

b) $9 \text{ cm } 9 \text{ mm} = \square \text{ mm}$

c) $28 \text{ mm} = \square \text{ cm } \square \text{ mm}$

d) $31 \text{ mm} = \square \text{ cm } \square \text{ mm}$

e) $15 \text{ m} = \square \text{ cm}$

f) $20 \text{ m } 20 \text{ cm} = \square \text{ cm}$

g) $120 \text{ cm} = \square \text{ m } \square \text{ cm}$

h) $211 \text{ cm} = \square \text{ m } \square \text{ cm}$

i) $3 \text{ km} = \square \text{ m}$

j) $9 \text{ km } 500 \text{ m} = \square \text{ m}$

k) $5200 \text{ m} = \square \text{ km } \square \text{ m}$

l) $4000 \text{ m} = \square \text{ km}$

4. The length of a cupboard is 2 m 55 cm. Convert this length to centimetres.

5. The distance between Sara's house and the park is 2 500 metres. Convert this distance to kilometres and metres.

7.2 Mass and capacity

Ahmad wants to measure the mass of his pencil.



The mass of the pencil is 3 grams. We can also write it as 3 g.

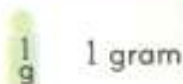
Sara wants to measure the mass of a sack of flour.



The mass of the sack is 1 kilogram.

We can also write it as 1 kg.

To measure the mass, we use kilograms for heavier objects and grams for lighter objects.



1 gram



1 kilogram

There are 1000 grams in 1 kg.

$$1 \text{ kg} = 1000 \text{ g}$$

Ali measures the mass of a sack of rice.

The mass of the sack is 3 kg.

We can also write this mass in grams.

$$1 \text{ kg} = 1000 \text{ g}$$

$$3 \text{ kg} = 3 \times 1000 \text{ g}$$

$$= 3000 \text{ g}$$



We use different weights to measure the mass of objects.



The mass of a basket of oranges is 2 kg 500 g.

We can also write this mass in grams.

$$\begin{aligned}2 \text{ kg } 500 \text{ g} &= 2 \text{ kg} + 500 \text{ g} \\ &= 2000 \text{ g} + 500 \text{ g} \\ &= 2500 \text{ g}\end{aligned}$$

$$\begin{aligned}1 \text{ kg} &= 1000 \text{ g} \\ 2 \text{ kg} &= 2 \times 1000 \text{ g} \\ &= 2000 \text{ g}\end{aligned}$$

The mass of the basket of oranges is 2500 g.

Can you convert 1 600 grams into kilograms and grams?

$$\begin{aligned}1 \text{ 600 g} &= 1000 \text{ g} + 600 \text{ g} \\ &= 1 \text{ kg} + 600 \text{ g} \\ &= 1 \text{ kg } 600 \text{ g}\end{aligned}$$

We can regroup 1600 into 1000 and 600.
 $1600 = 1000 + 600$
And $1000 \text{ g} = 1 \text{ kg}$

Convert the following masses:

$$\begin{aligned}2 \text{ kg } 250 \text{ g} &= \boxed{} \text{ kg} + \boxed{} \text{ g} \\ &= \boxed{} \text{ g} + \boxed{} \text{ g} \\ &= \boxed{} \text{ g}\end{aligned}$$

$$\begin{aligned}2500 \text{ g} &= \boxed{} \text{ g} + \boxed{} \text{ g} \\ &= \boxed{} \text{ kg} + \boxed{} \text{ g} \\ &= \boxed{} \text{ kg } \boxed{} \text{ g}\end{aligned}$$

Capacity

We use litres and millilitres to measure capacity.

Look at this measuring cylinder.

It measures the capacity in millilitres. The amount of water in it is 800 mL.



There are 1000 millilitres in 1 litre.

1 litre = 1000 millilitres

$$1 \text{ L} = 1000 \text{ mL}$$

Sara drinks 2 L 250 mL water every day.

Can you convert 2 L 250 mL to mL?

$$\begin{aligned} 2 \text{ L } 250 \text{ mL} &= 2 \text{ L} + 250 \text{ mL} \\ &= 2000 \text{ mL} + 250 \text{ mL} \\ &= 2500 \text{ mL} \end{aligned}$$

$$1 \text{ L} = 1000 \text{ mL}$$

$$\begin{aligned} 2 \text{ L} &= 2 \times 1000 \text{ mL} \\ &= 2000 \text{ mL} \end{aligned}$$

Can you now convert 3 650 mL to L and mL?

$$\begin{aligned} 3 \text{ 650 mL} &= 3000 \text{ mL} + 650 \text{ mL} \\ &= 3 \text{ L} + 650 \text{ mL} \\ &= 3 \text{ L } 650 \text{ mL} \end{aligned}$$

Regroup 3650 into 3000 and 650.

$$3650 = 3000 + 650$$

$$\text{And } 1000 \text{ mL} = 1 \text{ L}$$

$$\text{So, } 3000 \text{ mL} = 3 \text{ L}$$

Convert the following:

$$\begin{aligned} 5 \text{ L } 600 \text{ mL} &= \boxed{} \text{ L} + \boxed{} \text{ mL} \\ &= \boxed{} \text{ mL} + \boxed{} \text{ mL} \\ &= \boxed{} \text{ mL} \end{aligned}$$

$$\begin{aligned} 5500 \text{ mL} &= \boxed{} \text{ mL} + \boxed{} \text{ mL} \\ &= \boxed{} \text{ L} + \boxed{} \text{ mL} \\ &= \boxed{} \text{ L } \boxed{} \text{ mL} \end{aligned}$$

Exercise 7.2

1. Convert the following:

a) $2 \text{ kg} = \square \text{ g}$

b) $4000 \text{ g} = \square \text{ kg}$

c) $1 \text{ kg } 500 \text{ g} = \square \text{ g}$

d) $8000 \text{ g} = \square \text{ kg}$

e) $4 \text{ kg } 200 \text{ g} = \square \text{ g}$

f) $6 \text{ L} = \square \text{ mL}$

g) $5000 \text{ mL} = \square \text{ L}$

h) $1650 \text{ mL} = \square \text{ L } \square \text{ mL}$

i) $2 \text{ L } 200 \text{ mL} = \square \text{ mL}$

j) $13 \text{ L } 540 \text{ mL} = \square \text{ mL}$

2. Sara's school bag has a mass of 5 500 g. Convert it to kg and g.



3. There is 5 L 200 mL water in a tank. Convert it to mL.

7.3 Addition and subtraction

Ahmad's pencil is 15 cm long. Sara's pencil is 12 cm long. What is the total length of both the pencils?



To find total length, we will add both lengths.

$$\begin{array}{r} 15 \text{ cm} \\ + 12 \text{ cm} \\ \hline 27 \text{ cm} \end{array}$$

Recall the addition rules.

We start adding from the ones column.

The total length of both pencils is 27 cm.

Always add the smaller unit of measurement first. We can only add same units of measurements. For example, metres cannot be added to litres.

A tailor uses 1 m 42 cm of cloth to make a shirt for Ali and 1 m 20 cm to make a shirt for Ahmad. How much cloth will he use in total?

Let's add the given lengths.

$$\begin{array}{r} 1 \text{ m } 42 \text{ cm} \\ + 1 \text{ m } 20 \text{ cm} \\ \hline 62 \text{ cm} \end{array}$$

$$\begin{array}{r} 1 \text{ m } 42 \text{ cm} \\ + 1 \text{ m } 20 \text{ cm} \\ \hline 2 \text{ m } 62 \text{ cm} \end{array}$$

Step 1 Add the centimetres.
 $42 \text{ cm} + 20 \text{ cm} = 62 \text{ cm}$

Step 2 Add the metres.
 $1 \text{ m} + 1 \text{ m} = 2 \text{ m}$

The tailor will use 2 m 62 cm of cloth to make both shirts.

Add the following lengths:

$$\begin{array}{r} 3 \text{ m } 2 \text{ cm} \\ + 4 \text{ m } 3 \text{ cm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 2 \text{ m } 52 \text{ cm} \\ + 8 \text{ m } 19 \text{ cm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 5 \text{ m } 71 \text{ cm} \\ + 1 \text{ m } 12 \text{ cm} \\ \hline \\ \hline \end{array}$$

A shopkeeper has 38 m long rope. If he cuts 12 m out of it, how much length of the rope will be left?



Let's subtract 12 m from 38 m.

$$\begin{array}{r} 38 \text{ m} \\ - 12 \text{ m} \\ \hline 26 \text{ m} \end{array}$$

Recall the subtraction rules.

We start subtracting from the ones column.

The length of the rope left is 26 m.

Let's now subtract 1 m 26 cm from 2 m 41 cm.

$$\begin{array}{r} 2 \text{ m } 3\cancel{4}1 \text{ cm} \\ - 1 \text{ m } 26 \text{ cm} \\ \hline 1 \text{ m } 15 \text{ cm} \end{array}$$

$$\begin{array}{r} 2 \text{ m } 3\cancel{4}1 \text{ cm} \\ - 1 \text{ m } 26 \text{ cm} \\ \hline 1 \text{ m } 15 \text{ cm} \end{array}$$

Step 1

Subtract the centimetres.
41 cm - 26 cm = 15 cm

Step 2

Subtract the metres.
2 m - 1 m = 1 m

The answer is 1 m 15 cm.

Subtract the following lengths:

$$\begin{array}{r} 8 \text{ m } 5 \text{ cm} \\ - 2 \text{ m } 1 \text{ cm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 2 \text{ m } 61 \text{ cm} \\ - 1 \text{ m } 12 \text{ cm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 6 \text{ m } 11 \text{ cm} \\ - 2 \text{ m } 10 \text{ cm} \\ \hline \\ \hline \end{array}$$

A bus travelled 1 km 380 m from first stop to second stop. Then, it travelled 2 km 420 m to the third stop. How much did it travel in total?



We will add 1 km 380 m and 2 km 420 m. Metre is smaller unit of measurement. So, we will add metres first and kilometers next.

$$\begin{array}{r} 1 \text{ km } \textcircled{1} 380 \text{ m} \\ + 2 \text{ km } \textcircled{1} 420 \text{ m} \\ \hline 800 \text{ m} \end{array}$$

Step 1 Add the metres.
 $380 \text{ m} + 420 \text{ m} = 800 \text{ m}$

$$\begin{array}{r} 1 \text{ km } \textcircled{1} 380 \text{ m} \\ + 2 \text{ km } \textcircled{1} 420 \text{ m} \\ \hline 3 \text{ km } 800 \text{ m} \end{array}$$

Step 2 Add the kilometres.
 $1 \text{ km} + 2 \text{ km} = 3 \text{ km}$

There is 4 L 850 mL water in a bucket. 3 L 840 mL was removed from it. How much water is left?

$$\begin{array}{r} 4 \text{ L } \textcircled{1} 850 \text{ mL} \\ - 3 \text{ L } \textcircled{1} 840 \text{ mL} \\ \hline 010 \text{ mL} \end{array}$$

Step 1 Subtract the millilitres.
 $850 \text{ mL} - 840 \text{ mL} = 10 \text{ mL}$

$$\begin{array}{r} 4 \text{ L } \textcircled{1} 850 \text{ mL} \\ - 3 \text{ L } \textcircled{1} 840 \text{ mL} \\ \hline 1 \text{ L } 010 \text{ mL} \end{array}$$

Step 2 Subtract the litres.
 $4 \text{ L} - 3 \text{ L} = 1 \text{ L}$

The answer is 1 L 10 mL.

Solve the following:

$$\begin{array}{r} 1 \text{ km } \quad 60 \text{ m} \\ + 4 \text{ km } \quad 850 \text{ m} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 6 \text{ L } \quad 715 \text{ mL} \\ - 5 \text{ L } \quad 420 \text{ mL} \\ \hline \\ \hline \end{array}$$

Exercise 7.3

1. Add the following:

$$\begin{array}{r} \text{a)} \quad 5 \text{ cm } 4 \text{ mm} \\ + \quad 1 \text{ cm } 3 \text{ mm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{b)} \quad 1 \text{ cm } 1 \text{ mm} \\ + \quad 9 \text{ cm } 4 \text{ mm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{c)} \quad 18 \text{ m } 59 \text{ cm} \\ + \quad 12 \text{ m } 10 \text{ cm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{d)} \quad 9 \text{ km } 200 \text{ m} \\ + \quad 10 \text{ km } 110 \text{ m} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{e)} \quad 5 \text{ kg } 236 \text{ g} \\ + \quad 3 \text{ kg } 120 \text{ g} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{f)} \quad 43 \text{ kg } 209 \text{ g} \\ + \quad 44 \text{ kg } 241 \text{ g} \\ \hline \\ \hline \end{array}$$

2. Subtract the following:

$$\begin{array}{r} \text{a)} \quad 17 \text{ cm } 4 \text{ mm} \\ - \quad 16 \text{ cm } 2 \text{ mm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{b)} \quad 29 \text{ cm } 9 \text{ mm} \\ - \quad 8 \text{ cm } 0 \text{ mm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{c)} \quad 42 \text{ m } 55 \text{ cm} \\ - \quad 2 \text{ m } 45 \text{ cm} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{d)} \quad 85 \text{ km } 660 \text{ m} \\ - \quad 11 \text{ km } 50 \text{ m} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{e)} \quad 6 \text{ L } 540 \text{ mL} \\ - \quad 1 \text{ L } 420 \text{ mL} \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{f)} \quad 42 \text{ L } 540 \text{ mL} \\ - \quad 41 \text{ L } 420 \text{ mL} \\ \hline \\ \hline \end{array}$$

7.4 Time

Look at the clock. It tells us time.

It has hours hand, a minutes hand and a seconds hand.

The small thick hand is the **hours hand**.

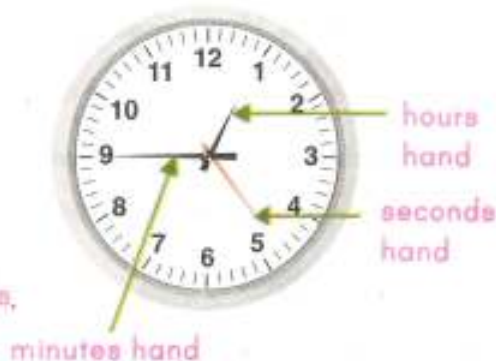
It shows us the hours.

The long thick hand is the **minutes hand**.

It shows us the minutes.

The thin hand is the seconds hand.

It moves very fast. It shows us the **seconds**.



There are **60** small lines on the clock.

The time it takes the seconds hand to move past one small line is equal to **1 second**.

The time it takes the seconds hand to move past each of these 60 lines once, is equal to 1 minute. So, one complete round of seconds hand is equal to **1 minute**.

There are **60 seconds** in a minute.



$$1 \text{ minute} = 60 \text{ seconds}$$

There are 12 numbers on the clock. Each number shows an hour.

The time it takes the minutes hand to move past the 60 lines once, is equal to **1 hour**. So, one complete round of minutes hand is equal to one hour.

There are **60 minutes** in an hour.

$$1 \text{ hour} = 60 \text{ minutes}$$

Let's read the time on this clock.

The hours hand is at 6.

The minutes hand is at 3 which is 15 according to the smaller lines.

We say that it is 15 minutes past 6 o' clock.

We write it as 6 : 15 and read it as six fifteen.

The seconds hand is at 45 according to the smaller lines.

This means 45 seconds have passed after six fifteen.

Look at the clock.

The hours hand is between 2 and 3.

We will read the smaller number.

The minute hand is at 8.

Which is 40 according to smaller lines.

We write it as 2 : 40 and read it as two forty.

The seconds hand is at 24 according to smaller lines.

This means 24 seconds have passed after two forty.



Read the time on each of the following clocks and write it in the given box.



Hours : Minutes : Seconds
10 : 30 : 15



Hours : Minutes : Seconds
: : :



Hours : Minutes : Seconds
: : :

Converting time

Ahmad took 1 hour 10 minutes to finish his homework. How many minutes did he spend on his homework?

We know that there are 60 minutes in 1 hour.

$$\begin{aligned}1 \text{ hour } 10 \text{ minutes} &= \underbrace{1 \text{ hour}} + 10 \text{ minutes} \\ &= 60 \text{ minutes} + 10 \text{ minutes} \\ &= 70 \text{ minutes}\end{aligned}$$

Ahmad spent 70 minutes doing his homework.

Sara's father went to office for 4 hours 30 minutes. Let's see how many minutes are there in 4 hours 30 minutes.

$$\begin{aligned}\underbrace{4 \text{ hours}} + 30 \text{ minutes} \\ &= 240 \text{ minutes} + 30 \text{ minutes} \\ &= 270 \text{ minutes}\end{aligned}$$

$$\begin{aligned}1 \text{ hour} &= 60 \text{ minutes} \\ 2 \text{ hours} &= 60 \times 2 = 120 \text{ minutes} \\ 3 \text{ hours} &= 60 \times 3 = 180 \text{ minutes} \\ 4 \text{ hours} &= 60 \times 4 = 240 \text{ minutes}\end{aligned}$$

Zara went out of the classroom for 6 minutes 30 seconds. Convert this time into seconds.

We know that there are 60 seconds in 1 minute.

$$\begin{aligned}\underbrace{6 \text{ minutes}} + 30 \text{ seconds} \\ &= 360 \text{ seconds} + 30 \text{ seconds} \\ &= 390 \text{ seconds}\end{aligned}$$

To know how many seconds are there in 6 minutes, we will multiply 6 by 60. $6 \times 60 = 360$

Convert the following:

$$2 \text{ hours } 3 \text{ minutes} = \square \text{ minutes} \quad 5 \text{ minutes } 50 \text{ seconds} = \square \text{ seconds}$$

Exercise 7.4

1. Read time in hours, minutes and seconds.

a)



b)



c)



d)



e)



f)



g)



h)



i)



2. Convert the following into minutes:

a) 3 hours

b) 7 hours

c) 1 hour 15 minutes

d) 2 hours 5 minutes

e) 3 hours 20 minutes

f) 7 hours 40 minutes

3. Convert the following into seconds:

a) 8 minutes

b) 24 minutes

c) 5 minutes 20 seconds

d) 6 minutes 16 seconds

e) 9 minutes 32 seconds

f) 10 minutes 20 seconds

Addition and subtraction of time

Ahmad's family left the house at 4:15 am and reached Islamabad after 5 hours 20 minutes. What was the time when they reached Islamabad?

We will add 4 hours 15 minutes and 5 hours 20 minutes.

Recall that we start adding from the right and always start from smaller unit of measurement.

$$\begin{array}{r} 4 \text{ hours } 15 \text{ minutes} \\ + 5 \text{ hours } 20 \text{ minutes} \\ \hline \phantom{4 \text{ hours }} 35 \text{ minutes} \end{array}$$

Step 1 Add the minutes.
 $15 + 20 = 35$

$$\begin{array}{r} 4 \text{ hours } 15 \text{ minutes} \\ + 5 \text{ hours } 20 \text{ minutes} \\ \hline 9 \text{ hours } 35 \text{ minutes} \end{array}$$

Step 2 Add the hours.
 $4 + 5 = 9$

It was 9:35 am when they reached Islamabad.

Anam started her homework 2 hours before 7:15 pm. At what time did she start her homework?

Let's subtract 2 hours 0 minutes from 7 hours 15 minutes.

$$\begin{array}{r} 7 \text{ hours } 15 \text{ minutes} \\ - 2 \text{ hours } 00 \text{ minutes} \\ \hline \phantom{7 \text{ hours }} 15 \text{ minutes} \end{array}$$

Step 1 Subtract the minutes.
 $15 - 0 = 15$

$$\begin{array}{r} 7 \text{ hours } 15 \text{ minutes} \\ - 2 \text{ hours } 00 \text{ minutes} \\ \hline 5 \text{ hours } 15 \text{ minutes} \end{array}$$

Step 2 Subtract the hours.
 $7 - 2 = 5$

It was 5:15 pm when Anam started her homework.

Solve the following:

$$\begin{array}{r} 3 \text{ hours } 15 \text{ minutes} \\ + 4 \text{ hours } 22 \text{ minutes} \\ \hline \phantom{3 \text{ hours }} \phantom{15 \text{ minutes}} \\ \hline \phantom{3 \text{ hours }} \phantom{15 \text{ minutes}} \end{array}$$

$$\begin{array}{r} 7 \text{ hours } 12 \text{ minutes} \\ - 1 \text{ hour } 02 \text{ minutes} \\ \hline \phantom{7 \text{ hours }} \phantom{12 \text{ minutes}} \\ \hline \phantom{7 \text{ hours }} \phantom{12 \text{ minutes}} \end{array}$$

7.5 Conversion

There are 7 days in a week.

Ahmad's father went to Karachi for four weeks. How many days are there in 4 weeks?

$$1 \text{ week} = 7 \text{ days}$$

$$4 \text{ weeks} = 7 \times 4 = 28 \text{ days.}$$

He went to Karachi for 28 days.

Complete the following:

$$3 \text{ weeks} = \square \text{ days}$$

$$6 \text{ weeks} = \square \text{ days}$$

$$9 \text{ weeks} = \square \text{ days}$$

Here is a calendar.

It shows days, weeks and months in the year 2017.

JANUARY							FEBRUARY							MARCH							APRIL						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7				1	2	3	4														1
8	9	10	11	12	13	14	5	6	7	8	9	10	11	5	6	7	8	9	10	11	2	3	4	5	6	7	8
15	16	17	18	19	20	21	12	13	14	15	16	17	18	12	13	14	15	16	17	18	9	10	11	12	13	14	15
22	23	24	25	26	27	28	19	20	21	22	23	24	25	19	20	21	22	23	24	25	16	17	18	19	20	21	22
29	30	31					26	27	28					26	27	28	29	30	31		23	24	25	26	27	28	29
																					30						
MAY							JUNE							JULY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3						1				1	2	3	4	5
7	8	9	10	11	12	13	4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12
14	15	16	17	18	19	20	11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26
28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29	27	28	29	30	31		
														30	31												
SEPTEMBER							OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
					1	2	1	2	3	4	5	6	7					1	2	3	4					1	2
3	4	5	6	7	8	9	8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9
10	11	12	13	14	15	16	15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16
17	18	19	20	21	22	23	22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23
24	25	26	27	28	29	30	29	30	31					26	27	28	29	30			24	25	26	27	28	29	30
																					31						

You can see different months in the calendar.

Look at the number of the days of each month in the calendar.

Every month has 30 or 31 days. February has 28 days.

The summer vacations in our school are from June to August. How many days are there in these 3 months?

Look at the calendar. June has 30 days.

July has 31 days and August has 31 days.

Let's add the number of days.

$$30 + 31 + 31 = 92$$

Summer vacations in our school are for 92 days.

After every 4 years,
February has 29 days.
We call that year a
leap year.



Maria's teacher went out of the town for the month of September and October. For how many days, was she away?

Find the total number of days from January to April when it is not a leap year.

Look at the calendar again.

There are 12 months in a year.

Mr. Khan went to America for 2 years. Convert 2 years to months.

$$1 \text{ year} = 12 \text{ months}$$

$$2 \text{ years} = 12 \times 2 = 24 \text{ months}$$

Convert the following years to months:

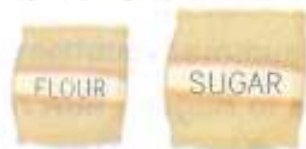
$$1 \text{ year} = \square \text{ months}$$

$$4 \text{ years} = \square \text{ months}$$

$$9 \text{ years} = \square \text{ months}$$

7.6 Measurement problems in daily life

1. A shopkeeper sold 3 kg 200 g flour and 4 kg 150 g of sugar. What is the total mass of both flour and sugar?



2. Asim is 1 m 25 cm tall. His teacher is 2 m 45 cm tall. What is the difference between their heights?



3. Asad bought 2 L 500 mL milk. He drank 1 L 250 mL of it. How much milk is left?



4. Maryam spent 1 hour 20 minutes on her English homework and 2 hours 30 minutes on her Mathematics homework. How much time did she spend in total?



5. Bashir went to Karachi for 3 weeks. How many days did he spend there?



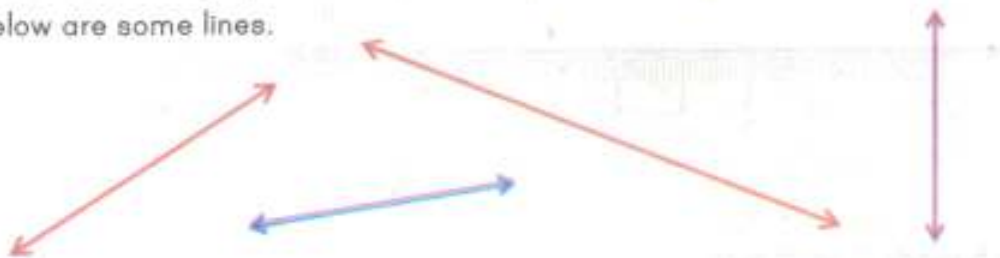
CHAPTER 8: GEOMETRY

8.1 Line

A line is a straight path without thickness.

It can be a straight path in any direction.

Below are some lines.



The arrows show that the lines can be extended in any direction.

We can also name the lines. Let's call one end of the line A and the other end B.



AB is a line. We write it as \overleftrightarrow{AB} .

Let's draw another line CD.



You can see that \overleftrightarrow{CD} is smaller than \overleftrightarrow{AB} .

A line segment is a part of a line and it has two endpoints.

PQ is a line segment. We write it as \overline{PQ} .



A ray is a part of a line that has one endpoint and extends in one direction without ending.

XY is a ray. We write it as \overrightarrow{XY} .



Let's measure the length of the line AB.

We can use a ruler to measure the length of the line.

Put your ruler over the line such that 0 of your ruler is at A. Mark the point where B is.



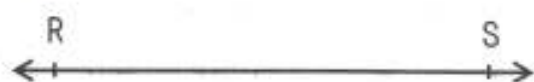
Point B reads 9 cm 5 mm.

The length of the line is 9 cm and 5 mm

Measure the length of the following lines.



cm mm



cm mm

Which line is bigger, \overleftrightarrow{MN} or \overleftrightarrow{RS} ? _____

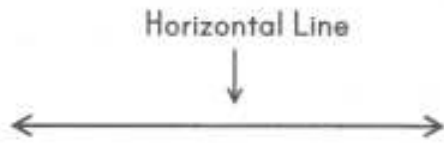
Draw a line in the given space and find its length.

Horizontal and vertical lines

Look at this line.

It goes from side to side or left and right.

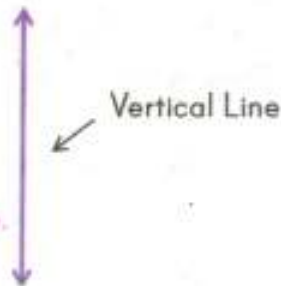
We call such line **horizontal line**.



Now, look at this line.

It goes up and down.

We call such line **vertical line**.



Look at the picture of the house.

There are many vertical and horizontal line segments. Can you identify them?

We will mark the vertical line segments with red and horizontal line segments with green.

There are 7 horizontal line segments and 9 vertical line segments.



Look at the water bottle.

The red line segment shows its position from the ground. It is a vertical line segment.



Parallel and non-parallel lines

Look at these two lines.

They are always at the same distance from each other.



We call such lines **parallel lines**.

Parallel lines are the lines that are at same distance from each other. They never meet each other.

Following pairs of lines show parallel lines.



Look at these two lines.

They are not always at the same distance from each other.

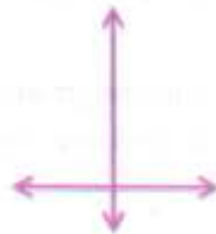
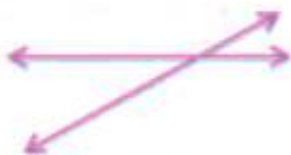


If we increase their length keeping same direction, they will meet.

We call such lines **non-parallel lines**.

Non-parallel lines are the lines in the same plane that are not at the same distance from each other. They cross each other.

Following pairs of lines show non-parallel lines.



Exercise 8.1

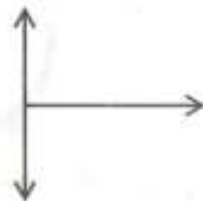
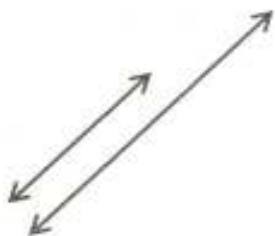
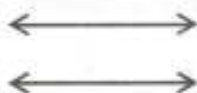
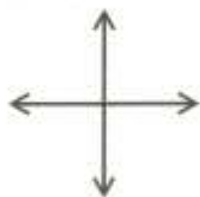
1. The red line segments show position of different objects with respect to the ground. Identify horizontal and vertical line segments.



Vertical



2. Circle the pairs of parallel lines from the following:



3. Decide whether the line segments marked red are parallel or non parallel.

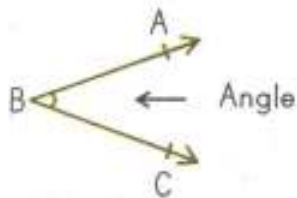


Parallel



8.2 Identifying angles

When two non-parallel rays meet at a point, an angle is formed.



Two straight rays meet each other at point B.

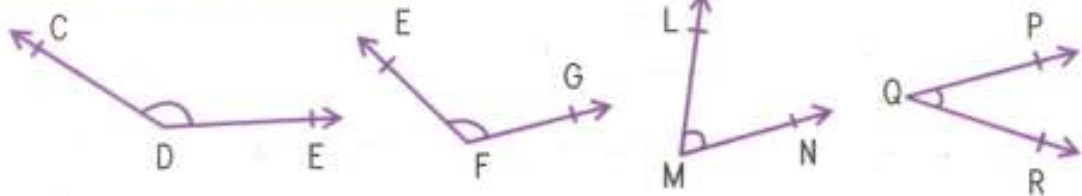
B is the vertex of the angle.

The symbol of the angle is \angle .

We can name it $\angle ABC$ or $\angle CBA$.

Angle is marked with a curved line.

Look at the angles below.



$\angle CDE$ is the greatest and $\angle PQR$ is the smallest.

Let's try to find angles around us.

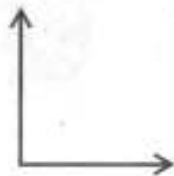
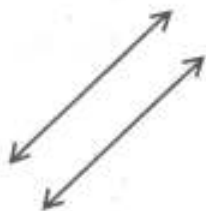


The minutes hand and the hours hand make an angle.

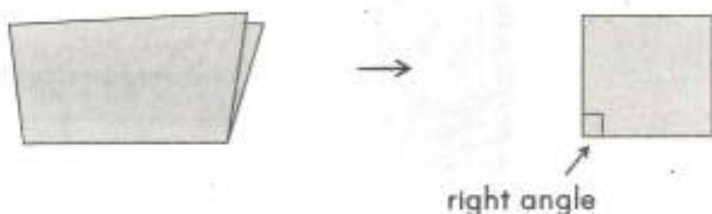


The blades of the scissors make an angle.

Which of these pairs of rays form an angle? Circle those pairs.

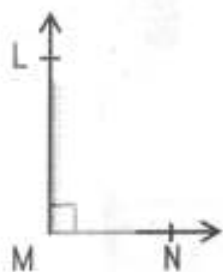


Take a piece of paper and fold it keeping the ends together.

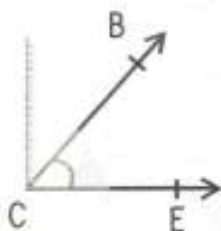


The angle at the corner of a piece of folded paper is a right angle.
It is marked as \perp .

We can also use a set-square to check if an angle is right angle.



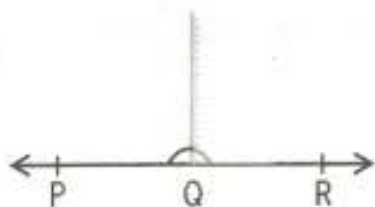
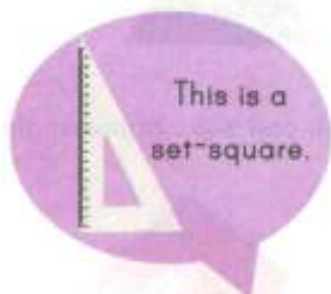
$\angle LMN$ is right angle



$\angle BCE$ is not a right angle.

It is smaller than a right angle.

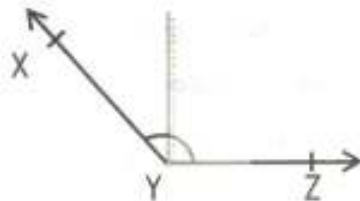
We call it **acute angle**.



$\angle PQR$ is not a right angle.

It is double than a right angle.

We call it a **straight angle**.



$\angle XYZ$ is not a right angle.

It is greater than a right angle
and smaller than a straight angle.

We call it **obtuse angle**.



We can see right angles around us.



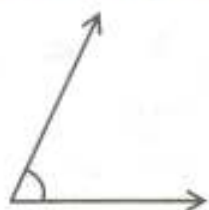
We can see acute angles around us.

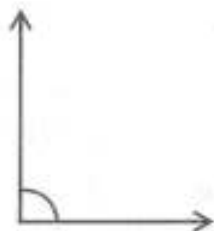


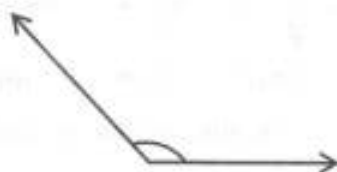
We can see obtuse angles around us.



Identify right angle, acute angle and obtuse angle from below and write in the given space.

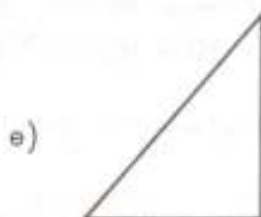
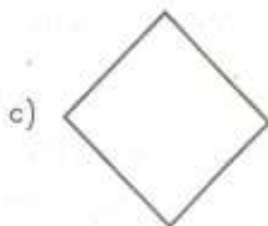




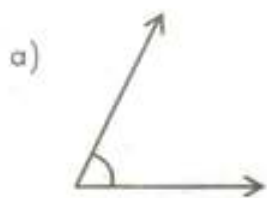


Exercise 8.2

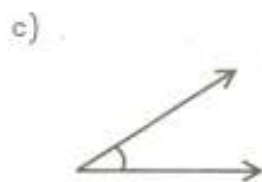
1. Mark right angles in the given shapes.



2. Identify right angles, acute angles and obtuse angles from below.

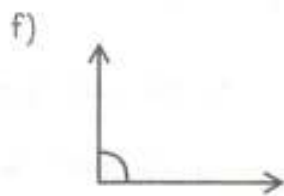












8.3 Measuring and drawing angles

We measure angles in degrees ($^{\circ}$).

There are 90° in a right angle.

There are two right angles in a straight line.

A straight line is 180° .

$$90^{\circ} + 90^{\circ} = 180^{\circ}$$

A complete circle is the same as four right angles or 360° .

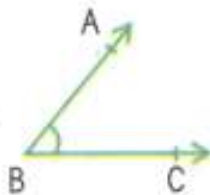
$$90^{\circ} + 90^{\circ} + 90^{\circ} + 90^{\circ} = 360^{\circ}$$

We can say that $\frac{1}{360}$ th part of complete circle is equal to one degree.

An angle less than 90° is an acute angle.

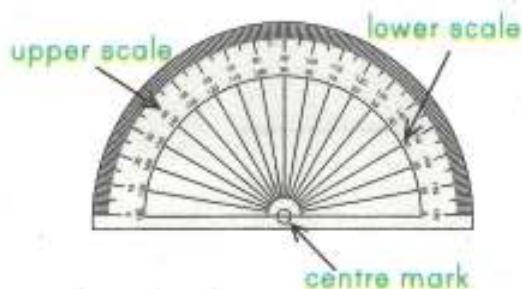
An angle greater than 90° but smaller than 180° is an obtuse angle.

Look at the angle ABC .



Let's measure $\angle ABC$.

We can use a protractor to measure the angle.



A protractor has a centre mark, an upper scale and a lower scale.

Upper scale reads the measure of angles from left to right.

Lower scale reads the measure of angles from right to left.

Each small marking on the scales shows 1 degree (1°).

To measure $\angle ABC$, place the protractor on the line BC such that the **vertex** is at the **centre mark** of the protractor. If the line lies on the 0° of the lower scale, we read the lower scale of the protractor. If the line lies on the 0° of the upper scale, we read the upper scale of the protractor.

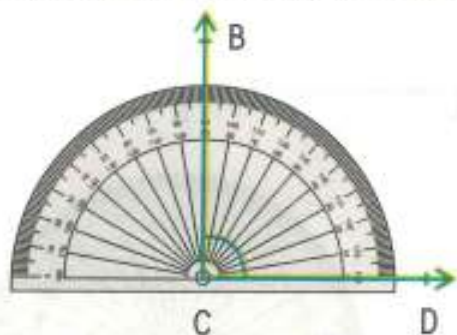
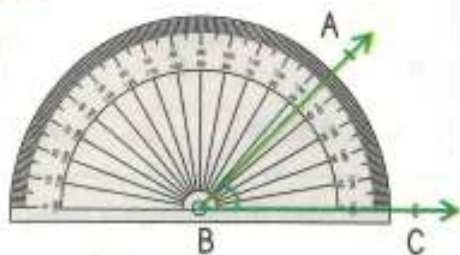
\overrightarrow{BC} lies on the 0 of the lower scale.

So, we will read the lower scale.

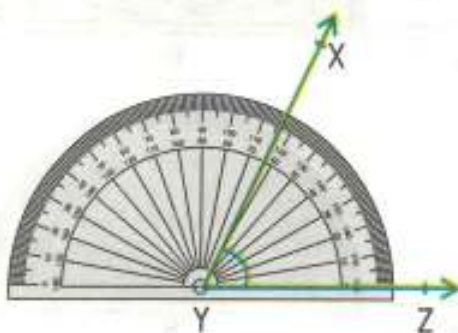
\overrightarrow{BA} falls on the marking that is 2 after 45.

So, $\angle ABC$ measures 47 degrees.

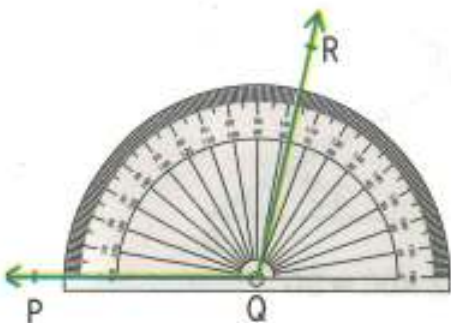
We can also write it as, $m \angle ABC = 47^\circ$



\overrightarrow{CD} lies on 0° of the lower scale. So, we read the lower scale. \overrightarrow{BC} meets on 90° .
 $m \angle BCD = 90^\circ$
 $\angle BCD$ is a right angle.

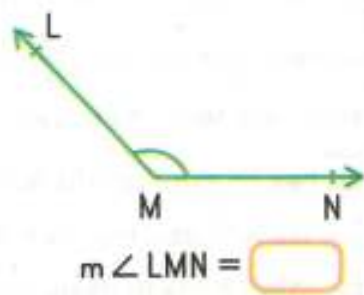
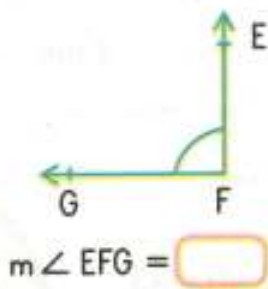
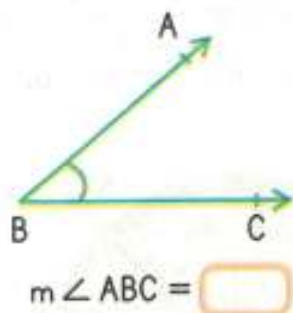


\overrightarrow{YZ} lies on 0° of the lower scale. So, we read the lower scale. \overrightarrow{XY} meets on 65° .
 $m \angle XYZ = 65^\circ$
 $\angle XYZ$ is an acute angle.



\overrightarrow{QP} lies on 0° of the upper scale. So, we read the upper scale. \overrightarrow{QR} meets on 102° .
 $m \angle PQR = 102^\circ$
 $\angle PQR$ is an obtuse angle.

Measure the following angles:



We can also draw angles using a protractor.

Let's draw $m\angle ABC = 30^\circ$

Step

1

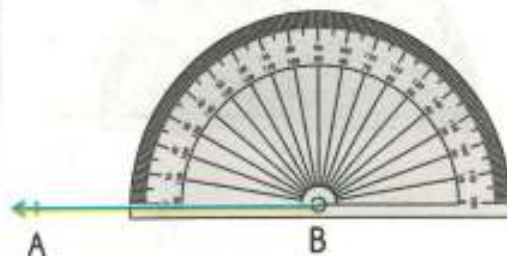
Draw a ray BA.



Step

2

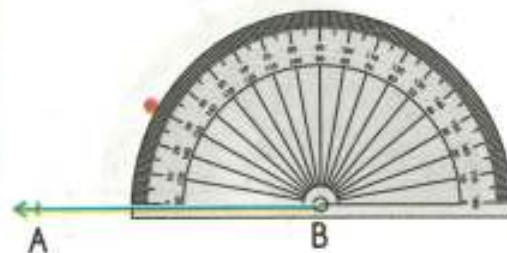
Place the protractor on the ray BA. Make sure that the centre mark of the protractor falls on point B which is the **vertex**.



Step

3

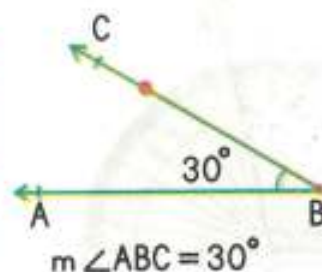
Find the 30° mark on the upper scale of the protractor and mark the point as point C.



Step

4

Remove the protractor and draw a straight line joining point B and point C.



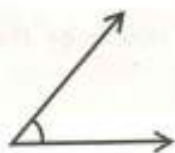
Exercise 8.3

1. Use protractor to measure the following angles:

a)



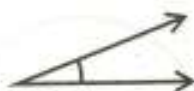
b)



c)



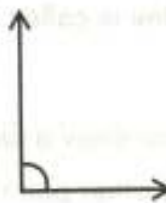
d)



e)



f)



2. Use protractor to draw the following angles.

a) $m\angle ABC = 40^\circ$

b) $m\angle LMN = 90^\circ$

c) $m\angle MNO = 70^\circ$

d) $m\angle ABC = 80^\circ$

e) $m\angle LMN = 120^\circ$

f) $m\angle MNO = 150^\circ$

8.4 Circle

Look at the circle. It has no sides.

It has a **centre**.

Centre is a point from which all points on the circle are at the same distance.

We can draw a line segment from the centre of the circle to any point on the circle.

This line is called **radius** of the circle.

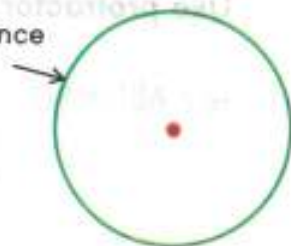
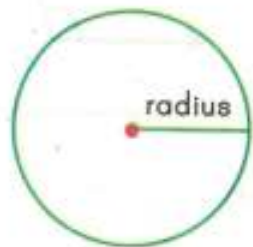
We can draw a line segment from one point of the circle to any other point of the circle, through the centre.

This line segment is called **diameter** of the circle.

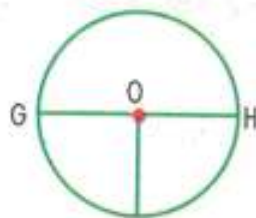
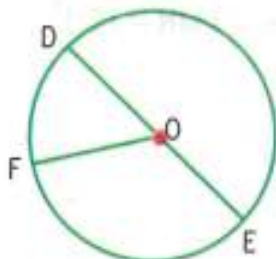
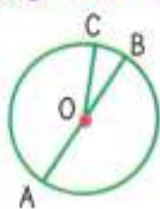
Remember that **diameter is double of the radius**.

circumference

The distance around the circle is called **circumference**.



Identify the centre, radius, diameter and circumference of the following circles:



Here is a compasses.

Before using it, make sure to

1. tighten the hold of the pencil so that it does not slip.
2. align the tip of the pencil with the needle.



Let's draw a circle.

Open the compasses. Press down the needle and turn the knob all the way around keeping the needle fixed. You will see a circle made.

step
1



step
2



step
3



step
4



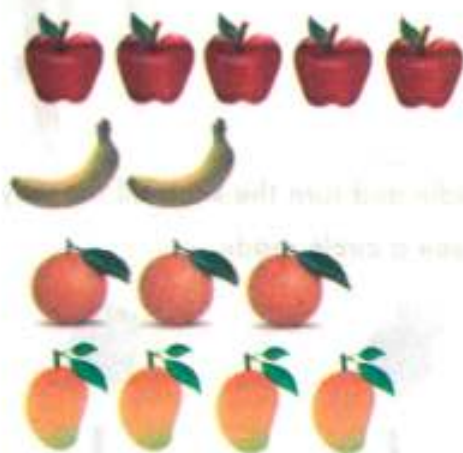
Draw a circle in the given space.



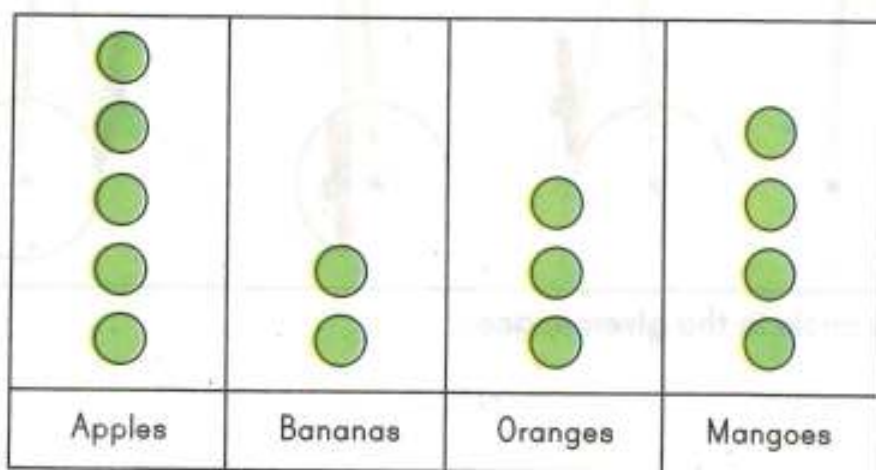
CHAPTER 9: INFORMATION HANDLING

9.1 Bar graph


Sara buys four types of fruits in different quantities.



She uses a picture graph to show the number of each type of fruit she bought.



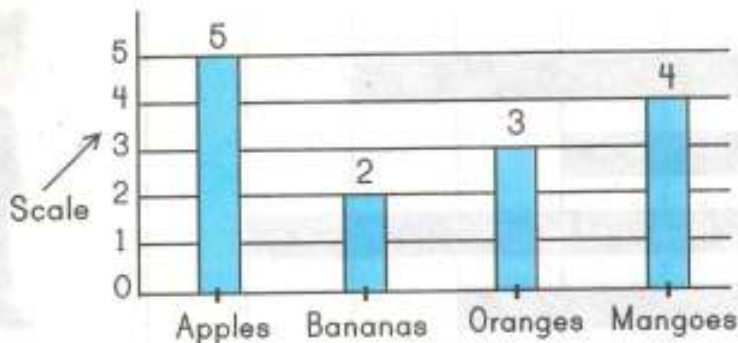
Each  stands for 1 fruit.

We can read the picture graph by counting the  in each column.

Sara bought 5 apples, 2 bananas, 3 oranges and 4 mangoes.

We can also show this data on a vertical bar graph.

A bar graph uses bars instead of pictures to show data.



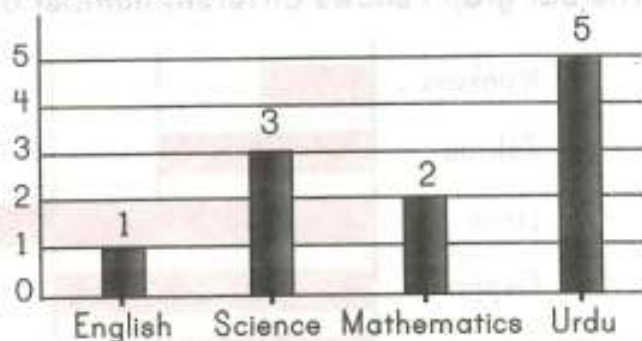
We can find out how many apples, bananas, oranges and mangoes Sara bought by reading the scale on the bar graph.

The bar at apples goes to 5, the bar at bananas goes to 2, the bar at oranges goes to 3 and the bar at mangoes goes to 4.

Ahmad collected books on different subjects as shown in the table.

Subjects	Number of Books
English	1
Science	3
Mathematics	2
Urdu	5

We can also show this data on a bar graph.

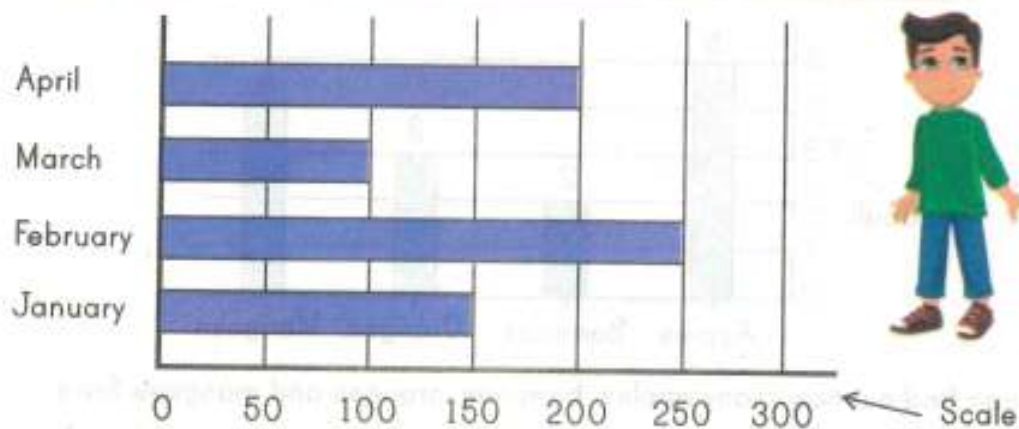


Read the scale and write the number of books Ahmad has.

- English: The scale reads 1, Ahmad has 1 English book.
Science: The scale reads 3, Ahmad has 3 Science books.
Mathematics: The scale reads 2, Ahmad has 2 Mathematics books.
Urdu: The scale reads 5, Ahmad has 5 Urdu books.

We can also represent data on a horizontal bar graph.

The bar graph shows number of toys sold by a shopkeeper over four months.



The number of toys sold every month can be read from graph.

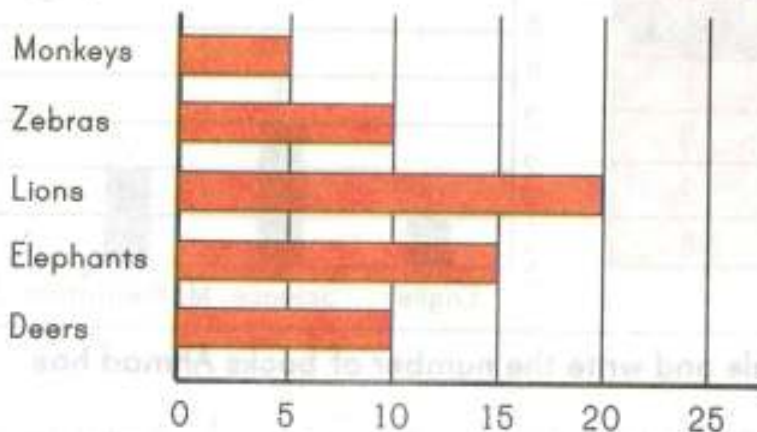
January 150

February 250

March 100

April 200

The bar graph shows different number of animals kept in a zoo.



Read the scale and write the number of animals.

Monkeys _____ Zebras _____ Lions _____

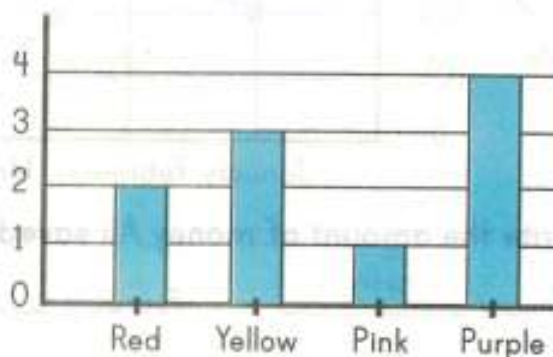
Elephants _____ Deers _____

9.2 Line graph

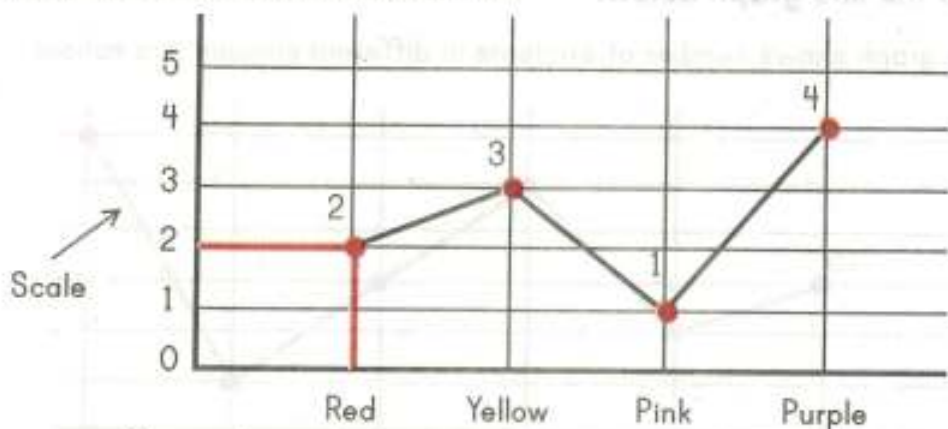
Ahmad has flowers of 4 different colours. The following table shows number of flowers of every colour, Ahmad has.

Colour	Number of flowers
Red	2
Yellow	3
Pink	1
Purple	4

We can show this data on a bar graph.



We can also show this data on a line graph. On a line graph, instead of bars, we just put dots and join them by a line.



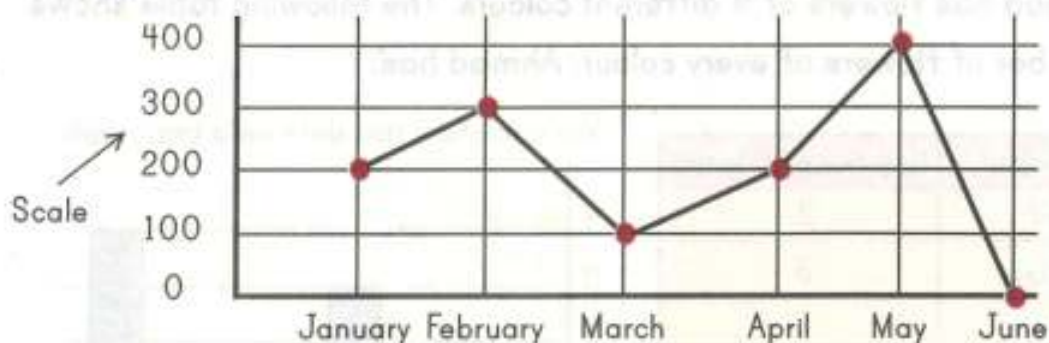
We can read the scale on the line graph.

Look at the dot above **Red**. On the scale, it reads 2.

This means Ahmad has 2 red flowers. Similarly, the scale tells us that Ahmad has 3 yellow flowers, 1 pink flower and 4 purple flowers.

A line graph uses lines to show the data.

All saves some money every month. A line graph below shows his savings.

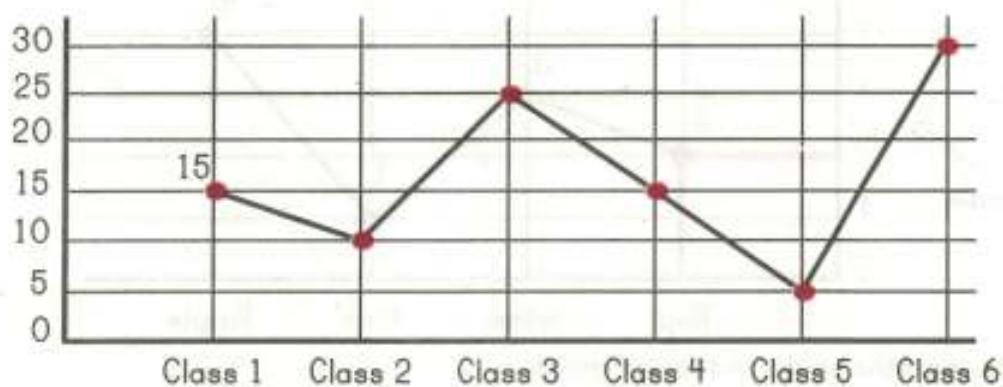


Write the amount of money Ali saved every month.

January 200 February 300 March 100
 April 200 May 400 June 0

Look at the line graph below.

The line graph shows number of students in different classes in a school.



Read the graph and write the number of students in each class.

Class 1 15 Class 4
 Class 2 Class 5
 Class 3 Class 6