

Factoring Practice Worksheet

Factor each completely.

1)  $x^2 - 7x - 18$   
 $(x + 2)(x - 9)$

3)  $m^2 - 9m + 8$   
 $(m - 1)(m - 8)$

2)  $p^2 - 5p - 14$   
 $(p + 2)(p - 7)$

4)  $x^2 - 16x + 63$   
 $(x - 7)(x - 9)$

5)  $7x^2 - 31x - 20 = 7x^2 - 35x + 4x - 20$   
 $7x(x - 5) + 4(x - 5)$   
 $(x - 5)(7x + 4)$

6)  $7k^2 + 9k$   
 $k(7k + 9)$

7)  $7x^2 - 45x - 28$   
 $7x^2 + 4x - 49x - 28$   
 $x(7x + 4) - 7(7x + 4)$   
 $(7x + 4)(x - 7)$

8)  $2b^2 + 17b + 21$   
 $2b^2 + 3b + 14b + 21$   
 $b(2b + 3) + 7(2b + 3)$   
 $(2b + 3)(b + 7)$

9)  $5p^2 - p - 18$   
 $5p^2 - 10p + 9p - 18$   
 $5p(p - 2) + 9(p - 2)$   
 $(5p + 9)(p - 2)$

10)  $28n^4 + 16n^3 - 80n^2$   
 $4n^2(7n^2 + 4n - 20) = 4n^2(7n^2 - 10n + 14n - 20)$   
 $4n^2(n(7n - 10) + 2(7n - 10))$   
 $4n^2(7n - 10)(n + 2)$

11)  $3b^3 - 5b^2 + 2b$   
 $b(3b^2 - 5b + 2)$

13)  $30n^2b - 87nb + 30b$   
 $3b(10n^2 - 29n + 10)$   
 $3b(10n^2 - 25n - 4n + 10)$   
 $3b(5n(2n - 5) - 2(2n - 5))$   
 $3b(5n - 2)(2n - 5)$

15)  $9p^2r + 73pr + 70r$   
 $r(9p^2 + 73p + 70)$

12)  $7x^2 - 32x - 60$   
 $7x^2 - 42x + 10x - 60$   
 $7x(x - 6) + 10(x - 6)$   
 $(x - 6)(7x + 10)$

14)  $9r^2 - 5r - 10$   
 ~~$9r^2 - 5r - 10$~~   
 NOT FACTORABLE

16)  $9x^2 + 7x - 56$   
 $9x^2 + 7x - 56$

17)  $4x^3 + 43x^2 + 30x$   
 $x(4x^2 + 43x + 30)$   
 $x(4x^2 + 40x + 3x + 30)$   
 $x(4x(x + 10) + 3(x + 10))$   
 $x(x + 10)(4x + 3)$

18)  $10m^2 + 89m - 9$   
 $10m^2 + 90m - m - 9$   
 $10m(m + 9) - 1(m + 9)$   
 $(10m - 1)(m + 9)$

$$A) X^2 + 4X - 21 \quad \begin{array}{cc|cc} 1 & 21 & 7 & 3 \\ 3 & 7 & 21 & 1 \end{array} \quad \begin{array}{cc} \cancel{7} & \cancel{-21} \\ \cancel{4} & \cancel{-3} \end{array}$$

$$B) X^2 - X - 12 \quad \begin{array}{cc|cc} 1 & 12 & 12 & 1 \\ 2 & 6 & 6 & 2 \\ 3 & 4 & 4 & 3 \end{array} \quad \begin{array}{cc} \cancel{3} & \cancel{-12} \\ \cancel{-1} & \cancel{-4} \end{array}$$

$$C) X^2 - 9$$

$$D) 3X^2 + 10X - 8$$

$$A) \underline{(X+7)(X-3)}$$

$$B) \underline{(X+3)(X-4)}$$

$$C) \underline{(X+3)(X-3)}$$

$$D) \underline{(3X-2)(X+4)}$$

$$\begin{array}{cc} \cancel{-24} & \\ \cancel{12} & \cancel{-2} \\ & 10 \end{array}$$

$$\begin{array}{cc} 1 & 24 \\ 2 & 12 \\ 3 & 8 \\ 4 & 6 \\ 6 & 4 \\ 8 & 3 \\ 12 & 2 \\ 24 & 1 \end{array}$$

$$3X^2 + 12X - 2X - 8$$

$$3X(X+4) - 2(X+4)$$

A)  $X^2 - 6X + 5$   $\begin{array}{cc} 15 & 5 \\ 5 & 1 \\ \hline -5 & -1 \end{array}$

B)  $X^2 - 2X - 8$   $\begin{array}{cc} 4 & 2 \\ 8 & 1 \\ \hline -4 & -2 \end{array}$

C)  $X^2 + 8X + 16$   $\begin{array}{cc} 16 & 1 \\ 8 & 2 \\ \hline 4 & 4 \end{array}$

D)  $2X^2 + 5X - 3$   $\begin{array}{cc} 1 & 6 \\ 2 & 3 \\ \hline 3 & 2 \\ 6 & 1 \end{array}$

A)  $(x-5)(x-1)$

B)  $(x+2)(x-4)$

C)  $(x+4)(x+4)$

D)  $(2x-1)(x+3)$

$2x^2 + 6x - 1x - 3$

$2x(x+3) - 1(x+3)$

$$A) X^2 + 6X + 8 \quad \begin{array}{cc|cc} 1 & 8 & 8 & 1 \\ 2 & 4 & 4 & 2 \end{array} \quad \begin{array}{c} \cancel{8} \\ 2 \quad 4 \\ \cancel{4} \\ 6 \end{array}$$

$$B) X^2 - 9X + 20 \quad \begin{array}{cc|cc} 1 & 20 & 20 & 1 \\ 2 & 10 & 10 & 2 \\ 4 & 5 & 5 & 4 \end{array} \quad \begin{array}{c} \cancel{20} \\ -4 \quad -5 \\ \cancel{-5} \\ -9 \end{array}$$

$$C) X^2 - 11X + 28 \quad \begin{array}{cc|cc} 1 & 28 & 28 & 1 \\ 2 & 14 & 14 & 2 \\ 4 & 7 & 7 & 4 \end{array} \quad \begin{array}{c} \cancel{28} \\ -4 \quad -7 \\ \cancel{-7} \\ -11 \end{array}$$

$$D) 4X^2 + 4X + 1 \quad \begin{array}{c} \cancel{4} \\ 2 \quad 2 \\ \cancel{2} \\ 4 \end{array}$$

$$A) \underline{(X+2)(X+4)}$$

$$B) \underline{(X-4)(X-5)}$$

$$C) \underline{(X-4)(X-7)}$$

$$D) \underline{(2X+1)(2X+1)}$$

$$4X^2 + 2X + 2X + 1$$

$$2X(2X+1) + 1(2X+1)$$

$$A) X^2 - X - 6 \quad \begin{array}{cc} 1 & 6 \\ 2 & 3 \end{array} \quad \begin{array}{cc} 6 & 1 \\ 3 & 2 \end{array} \quad \begin{array}{cc} -6 & \\ 2 & -3 \\ -1 & \end{array}$$

$$B) X^2 + 3X - 18 \quad \begin{array}{cc} 1 & 18 \\ 2 & 9 \\ 3 & 6 \end{array} \quad \begin{array}{cc} 18 & 1 \\ 9 & 2 \\ 6 & 3 \end{array} \quad \begin{array}{cc} -18 & \\ 6 & -3 \\ 3 & \end{array}$$

$$C) X^2 - 2X + 2 \quad \begin{array}{cc} 1 & 2 \\ 2 & 1 \end{array} \quad \begin{array}{cc} 2 & \\ -2 & \end{array}$$

$$D) 15X^2 + 8X - 16 \quad \begin{array}{cc} -240 & \\ 20 & -12 \\ 8 & \end{array}$$

A)  $(X+2)(X-3)$

B)  $(X+6)(X-3)$

C) NOT Factorable

D)  $(5X-4)(3X+4)$

$$15X^2 + 20X - 12X - 16$$

$$5X(3X+4) - 4(3X+4)$$

## First Factor Out A Common Monomial

$$2x^2 + 6x + 4$$

$$2(x^2 + 3x + 2)$$

If Two Terms

Difference of Squares

$$4x^2 - 25 =$$

$$(2x+5)(2x-5)$$

Sum of Cubes

$$A^3 + b^3 = (A+b)(A^2 - Ab + b^2)$$

$$w^3 + 27 =$$

$$A = w \quad B = 3$$

$$(w+3)(w^2 - 3w + 9)$$

If Three Terms

No Coefficient

$$x^2 - 7x + 10$$

$$(x-5)(x-2)$$

$$\begin{array}{cc} \cancel{10} & \cancel{-2} \\ -5 & -7 \end{array} \quad \begin{array}{cc} 1 & 10 \\ 2 & 5 \end{array}$$

Coefficient \*

$$2x^2 + 5x - 12$$

$$\begin{array}{cc} \cancel{-24} & \cancel{-3} \\ 8 & 5 \end{array}$$

$$\begin{array}{cc} 1 & 24 \\ 2 & 12 \\ 3 & 8 \\ 4 & 6 \end{array}$$

$$2x^2 + 8x - 3x - 12$$

$$2x(x+4) - 3(x+4)$$

$$(2x-3)(x+4)$$

\*This or guess and check, or slide and divide\*

Four Terms (Grouping)

$$R^3 - 3R^2 + 6R - 18$$

$$R^2(R-3) + 6(R-3)$$

$$(R^2+6)(R-3)$$