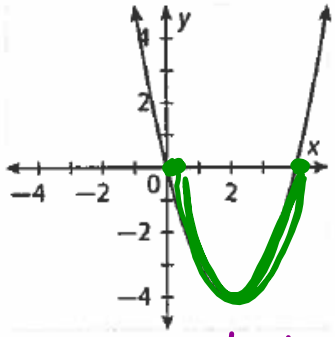
For 1–4, use the graph of the quadratic function $f(x) = x^2 - 4x$.



L to R

1. Write the domain of the function as an inequality.

$-\infty < x < \infty$

B to T

2. Write the range of the function using interval notation.

$[-4, \infty)$

3. What is the end behavior of the function?

As $x \to -\infty$, $f(x) \to \infty$

As $x \to \infty$, $f(x) \to \infty$

4. What is the range of the function if the domain is restricted to $[0, 4]$?

A $[0, \infty)$

B $[-4, 0]$

C $(-\infty, \infty)$

For 5–6, use the following situation.

During an eight-hour shift, a worker assembles 9 shipping crates every 2 hours.

5. Write a function that models this situation.

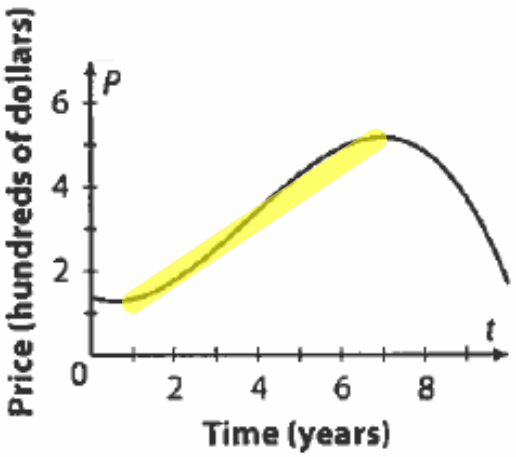
$y = \frac{9}{2}x$

6. Determine a domain from the situation and identify the range. Use interval notation for the domain and range.

D: $[0, 8]$

R $[0, 36]$

7. The graph shows a function that models the price of gold, in hundreds of dollars, at time t, in years, over a 9-year period.



Over which interval(s) is the function increasing?

A $\{t \mid 0 < t < 1\}$ and $\{t \mid 7 < t < \infty\}$

B $\{t \mid 1 < t < 7\}$

C $\{t \mid 0 < t < \infty\}$

8. The table shows some values of a polynomial function.

x	2	3	4	5	6
$g(x)$	40	50	30	10	20

Over which interval is the average rate of change of the function positive?

A From $x = 2$ to $x = 4$

B From $x = 4$ to $x = 5$

C From $x = 5$ to $x = 6$

slope $\frac{y_2 - y_1}{x_2 - x_1}$

$\frac{30-40}{4-2} = \frac{-10}{2} = -5$

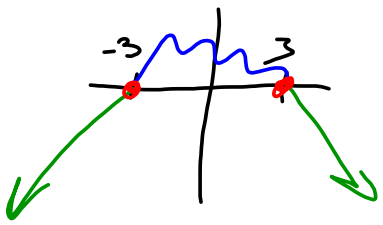
$\frac{10-30}{5-4} = -20$

$\frac{20-10}{6-5} = 10$ ✓

9. A function is negative over the intervals $\{x \mid -\infty < x < -3\}$ and $\{x \mid 3 < x < \infty\}$.

What are the zeros for the function?

-3 & 3



10. Which equation of best fit matches this data set?

x	1	2	3	4	5
y	1	4	7	10	13

A $y = x$

B $y = 2x + 1$

C $y = 3x - 2$

D $y = 3x + 1$

11. Write $g(x)$ in terms of $f(x)$ after performing a horizontal stretch of $f(x)$ by a factor of 4 followed by a translation of 3 units up.

$g(x) = f(\frac{1}{4}x) + 3$

$g(x) = A f(\frac{1}{b}x - h) + k$

EXTRA) $g(x) = 3f(-6x + 17) - 1,234$

VERT. STRETCH 3

HORIZ STRETCH $\frac{1}{6}$ & REFLECTION

SHIFT LEFT 17

SHIFT DOWN 1,234

10. Which equation of best fit matches this data set?

x	1	2	3	4	5
y	1	4	7	10	13

A $y = x$

B $y = 2x + 1$

C $y = 3x - 2$

D $y = 3x + 1$

11. Write $g(x)$ in terms of $f(x)$ after performing a horizontal stretch of $f(x)$ by a factor of 4 followed by a translation of 3 units up.

$g(x) = f\left(\frac{1}{4}x\right) + 3$

VERT STRETCH

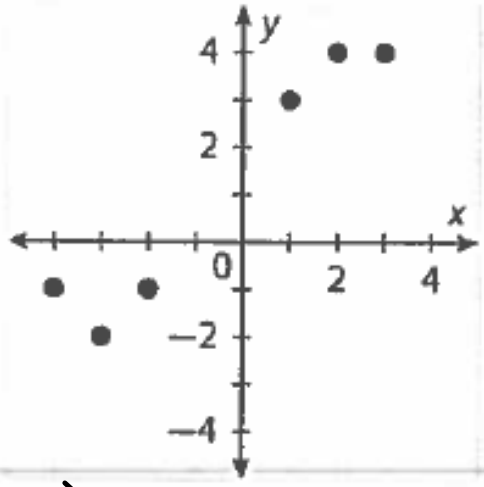
HORIZ STRETCH (INVERSE)

HORIZ SHIFT (INVERSE)

VERT SHIFT

$y(x) = f\left(\frac{1}{4}x\right) + 3$

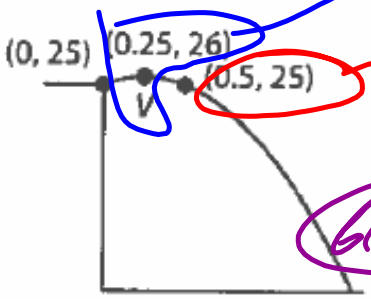
12. Write the function as a set of ordered pairs. Then write the inverse of the function as a set of ordered pairs.



(−4, −1) (−3, −2) (−2, −1) (1, 3) (2, 4) (3, 4)

(−1, −4) (−2, −3) (−1, −2) (3, 1) (4, 2) (4, 3)

13. Tony is standing on a cliff that is 25 feet high. She kicks a ball upward from the edge. In the illustration shown, the unit of measurement is feet, and the vertex of the ball's path is point *V*. What quadratic function $g(x)=af(x-h)^2+k$ models the path of the ball?



A $g(x)=-16f(x-0.25)^2+26$

B $g(x)=16f(x-0.5)^2+25$

C $g(x)=0.25f(x)^2+26$

D $g(x)=0.25f(x-0.25)^2+26$

$g(x)=Af(x-h)+k$

$g(x)=Af(x-.25)+26$

$25=Af(.5-.25)+26$

$f(x)=x^2$

$25=Af(.25)+26$

$25=A(.0625)+26$

$-1=A(.0625)$

$-16=A$

$g(x)=-16f(x-.25)+26$

14. Find the inverse function $f^{-1}(x)$ for the function $f(x) = -6x + 2$. Then use composition functions to verify that the function is an inverse.

$y = -6x + 2$

$y - 2 = -6x$

$\frac{y-2}{-6} = x$

$\frac{x-2}{-6} = y$

$f^{-1}(x) = \frac{x-2}{-6}$

$f^{-1}(f(x)) = \frac{(-6x+2)-2}{-6} = \frac{-6x}{-6} = x$

$f(f^{-1}(x)) = -6\left(\frac{x-2}{-6}\right) + 2 = x - 2 + 2 = x$

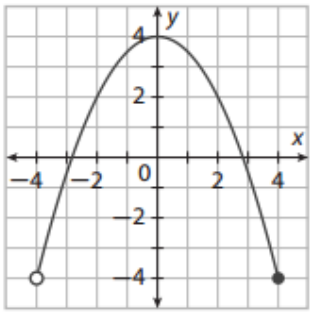
15. The monthly cost C (in dollars) a utility company charges for natural gas is $C = T + 40$, where T is the number of Therms of gas used that exceed 45 Therms per month. Solve for T.

$T = C - 40$

Write the domain and range of the function as an inequality, using set notation, and using interval notation. *(Lesson 1.1)*

Pg 60 1-4

1.



Domain:

Inequality:

Set notation:

Interval notation:

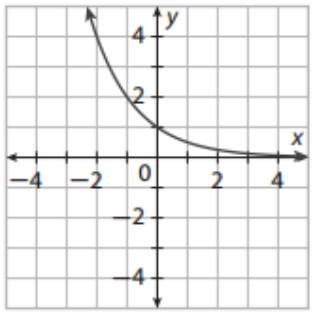
Range:

Inequality:

Set Notation:

Interval Notation:

2.



Domain:

Inequality:

Set notation:

Interval notation:

Range:

Inequality:

Set Notation:

Interval Notation:

Find the inverse function $f^{-1}(x)$ for the given function $f(x)$. *(Lesson 1.4)*

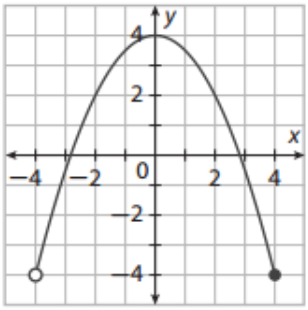
3. $f(x) = \frac{x+3}{5}$

4. $f(x) = 2x + 6$

Write the domain and range of the function as an inequality, using set notation, and using interval notation. *(Lesson 1.1)*

Pg 60 1–4

1.



Domain:

Inequality: $-4 < x \leq 4$

Set notation: $\{x \mid -4 < x \leq 4\}$

Interval notation: $(-4, 4]$

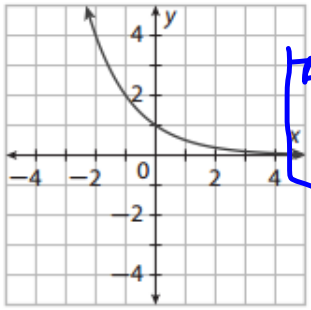
Range:

Inequality: $-4 \leq y \leq 4$

Set Notation: $\{y \mid -4 \leq y \leq 4\}$

Interval Notation: $[-4, 4]$

2.



As $x \to -\infty$, $f(x) \to \infty$

As $x \to \infty$, $f(x) \to 0$

Domain:

Inequality: $-\infty < x < \infty$

Set notation: $\{x \mid -\infty < x < \infty\}$

Interval notation: $(-\infty, \infty)$

Range:

Inequality: $0 < y < \infty$

Set Notation: $\{y \mid 0 < y < \infty\}$

Interval Notation: $(0, \infty)$

Find the inverse function $f^{-1}(x)$ for the given function $f(x)$. *(Lesson 1.4)*

3. $f(x) = \frac{x+3}{5}$

$y = \frac{x+3}{5}$

$5y = x + 3$

$5y - 3 = x$

$5x - 3 = y$

$f^{-1}(x) = 5x - 3$

4. $f(x) = 2x + 6$

$y = 2x + 6$

$y - 6 = 2x$

$\frac{y-6}{2} = x$

$\frac{x-6}{2} = y$

$f^{-1}(x) = \frac{x-6}{2}$

$f^{-1}(g(x)) = 5\left(\frac{x+3}{5}\right) - 3 = x + 3 - 3 = x$

$g(f^{-1}(x)) = \frac{(5x - 3) + 3}{5} = \frac{5x}{5} = x$

$f(f^{-1}(x)) = \frac{(2x+6) - 6}{2} = \frac{2x}{2} = x$

$f^{-1}(f(x)) = 2\left(\frac{x-6}{2}\right) + 6 = x - 6 + 6 = x$

5. Explain how to transform the graph of the function $f(x) = x^2$ to obtain the graph of the related function $g(x) = -2f(x + 1) - 3$. *(Lesson 1.3)*

Find the inverse for each linear function. *(Lesson 1.4)*

2. $f(x) = -2x + 4$

3. $g(x) = \frac{x}{4} - 3$

4. $h(x) = \frac{3}{4}x + 1$

5. $j(x) = 5x - 6$

2. Consider the function $g(x) = -f(x + 3) - 2$. Choose True or False for each statement.

A. When compared to $f(x) = x^2$, $g(x)$ will have a vertical stretch of 3. ◯ True ◯ False

B. When compared to $f(x) = x^2$, $g(x)$ will be reflected over the x-axis. ◯ True ◯ False

C. When compared to $f(x) = x^2$, $g(x)$ will be translated left 3 units. ◯ True ◯ False

$$g(x) = A\,f(x-h) + K$$

$$f^{-1}(f(x)) = x$$

$$f(f^{-1}(x)) = x$$