Part A: Intercepts and Slope from a Graph

Practice 1

1.
x-intercept: $a = -4$ $(-4, 0)$
y-intercept: $b = 4$ $(0, 4)$

2.
x-intercept: $a = 8$ $(8, 0)$
y-intercept: $b = -2$ $(0, -2)$

3.
x-intercept: $a = 1$ $(1, 0)$
y-intercept: $b = -2$ $(0, -2)$

4.
x-intercept: $a = -3$ $(-3, 0)$
y-intercept: $b = 1$ $(0, 1)$

5.
x-intercept: $a = -2$ or $(-2, 0)$

$$h(a) = a + 2$$
$$0 = a + 2$$
$$-2 = a$$

y-intercept: $b = 2$ or $(0, 2)$

$$h(0) = (0) + 2 = 2$$
$$b = 2$$

6.
x-intercept: $a = \frac{1}{3}$ or $(\frac{1}{3}, 0)$

$$h(a) = 3a - 1$$
$$0 = 3a - 1$$
$$1 = 3a$$
$$\frac{1}{3} = a$$

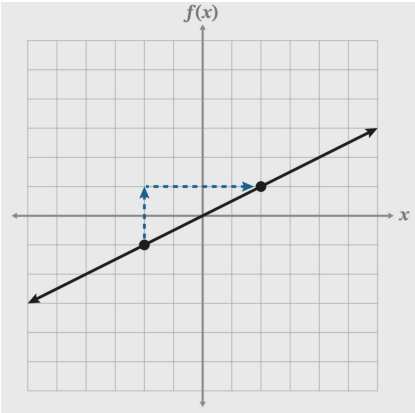
y-intercept: $b = -1$ or $(0, -1)$

$$h(0) = 3(0) - 1$$
$$h(0) = 0 - 1$$
$$h(0) = -1$$
$$b = -1$$

7.
The slope is positive because as the x-values increase, the y-values increase.

8.

$m = \frac{2}{4} = \frac{1}{2}$



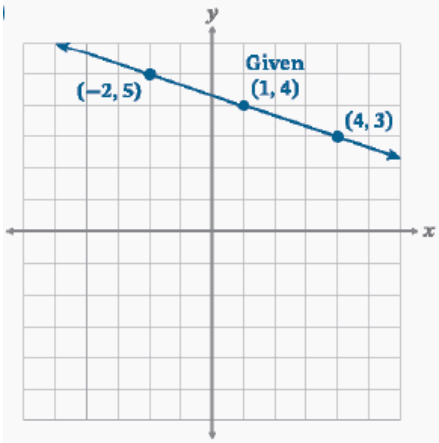
9.

The slope is undefined because the x-values stay the same as the y-values increase.

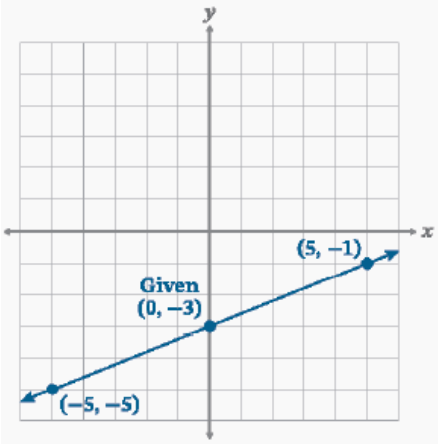
10.

Undefined slope is when you have a vertical line.

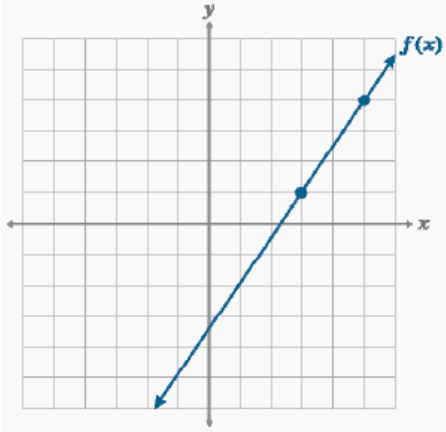
11.



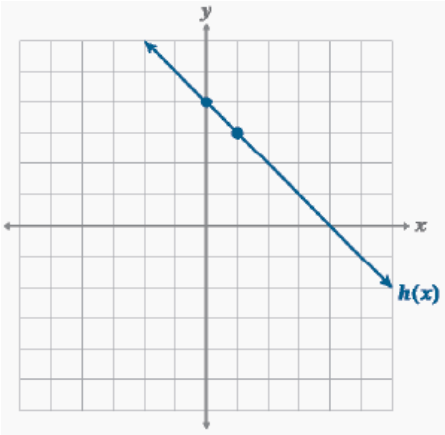
12.



13.



14.



15.

$m = \frac{3}{2}$

x-coordinate: $3 + 2 = 5$
y-coordinate: $1 + 3 = 4$
next point: $(5, 4)$

Practice 2

1.

x-intercept: $a = 1$ $(1, 0)$
y-intercept: $b = 1$ $(0, 1)$

2.

x-intercept: $a = 7$

$g(a) = a - 7$
$0 = a - 7$
$7 = a$
$(7, 0)$

y-intercept: $b = -7$

$g(0) = (0) - 7$

$g(0) = -7$

$b = -7$

$(0, -7)$

3.

x-intercept: $a = 0$ $(0, 0)$

y-intercept: $b = 0$ $(0, 0)$

4.

x-intercept: $a = 4$ $(4, 0)$

y-intercept: $b = 1$ $(0, 1)$

5.

x-intercept: $a = -\frac{1}{2}$ $(-\frac{1}{2}, 0)$

y-intercept: $b = -2$ $(0, -2)$

6.

x-intercept: $a = 8$ $(8, 0)$

$f(a) = -\frac{1}{2}(a) + 4$

$0 = -\frac{1}{2}a + 4$

$-4 = -\frac{1}{2}a$

$8 = a$

y-intercept: $b = 4$ $(0, 4)$

$f(0) = -\frac{1}{2}(0) + 4$

$f(0) = 0 + 4$

$f(0) = 4$

$b = 4$

7.

The slope is negative because the x-values are increasing and the y-values are decreasing.

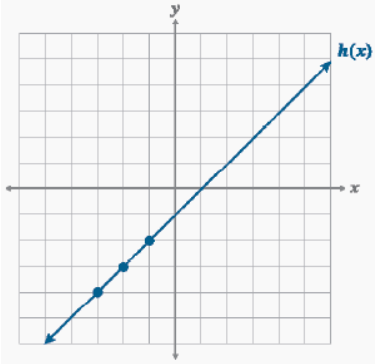
8.

$m = \frac{-4}{+2} = \frac{-2}{1} = -2$

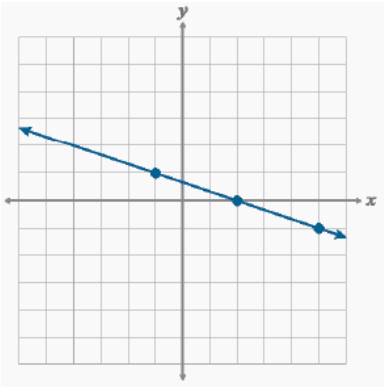
9.

$m = \frac{3}{2}$

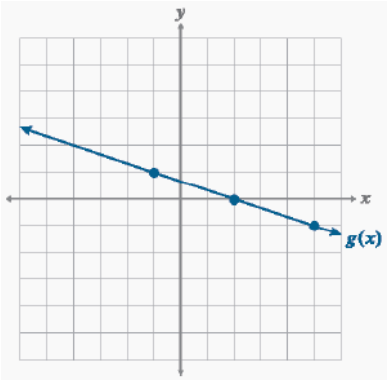
10.



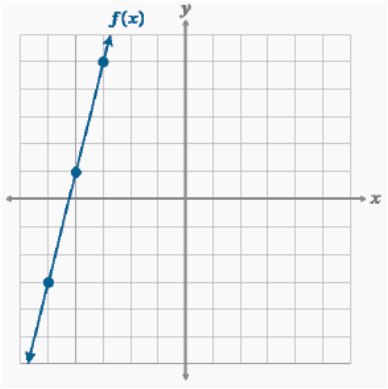
11.



12.



13.



14.

When the slope is zero ($m = 0$), the graph is a horizontal line. As the x-values increase, the y-value remains the same.

Part B: Translating the Linear Parent Function

Practice 1

1.

parent function

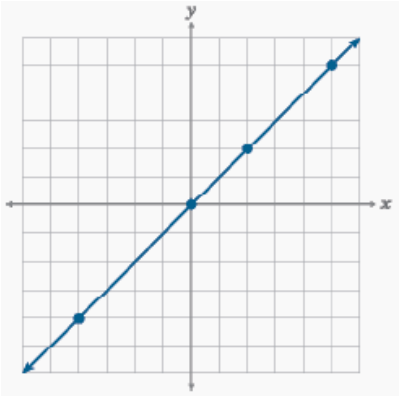
2.

zero

3.

x	$f(x) = x$
−4	−4
0	0
2	2
5	5

4.



5.
No, $f(7) = 8$ is not a solution to the parent function because the x- and y-values are equal in the parent function.

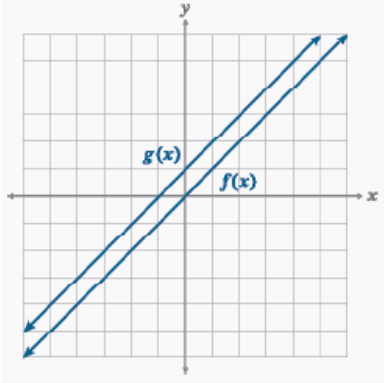
6.
The x-intercept and y-intercept are the same value because the parent function goes through the origin, or (0, 0).

7.

x	$f(x) = x$	$g(x) = x + 1$
−4	−4	−3
0	0	1
2	2	3
3	3	4

8.
Translating the graph of $f(x)$ up 1 unit will create the graph of $g(x)$.

9.

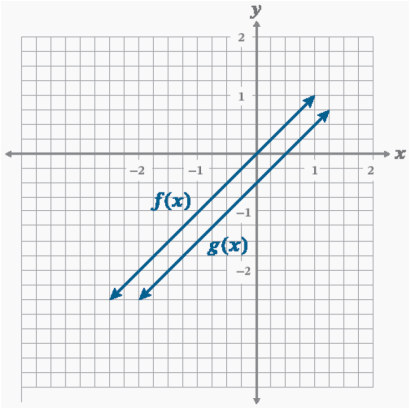


10.

x	$f(x) = x$	$g(x) = x - \frac{1}{2}$
−2	−2	$-2\frac{1}{2} = -\frac{5}{2}$
$-\frac{1}{2}$	$-\frac{1}{2}$	−1
0	0	$-\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$	0

11.
Translating the graph of $f(x)$ down $\frac{1}{2}$ unit will create the graph of $g(x)$.

12.



13.

x	$f(x) = 2x$	$g(x) = 2x - 1$
−2	−4	−5
−1	−2	−3
0	0	−1
1	2	1

14.

Translating the graph of $f(x)$ down 1 unit will create the graph of $g(x)$ even though the coefficient of x is different from the parent function.

Practice 2

1.

$f(x) = x$

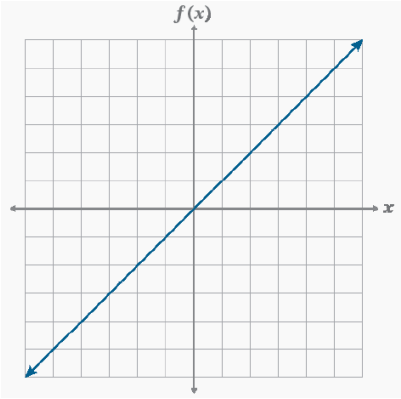
2.

one

3.

x	$f(x) = x$
−2	−2
0	0
$\frac{2}{5}$	$\frac{2}{5}$
56	56

4.



5.

Harrison used the parent function rather than the translation of the parent function. If he substitutes −20 for x in the equation, the result is −40.

$h(-20) = -20 - 20 = -40$

6.

The parent graph cannot be shifted by a value of b and still go through the origin because the parent graph cannot have two y-intercepts.

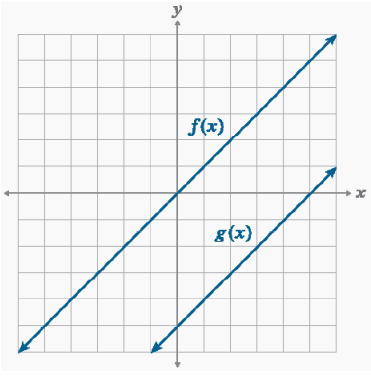
7.

x	$f(x) = x$	$g(x) = x - 5$
−4	−4	−9
0	0	−5
2	2	−3
5	5	0

8.

Translating the graph of $f(x)$ down 5 units will create the graph of $g(x)$.

9.



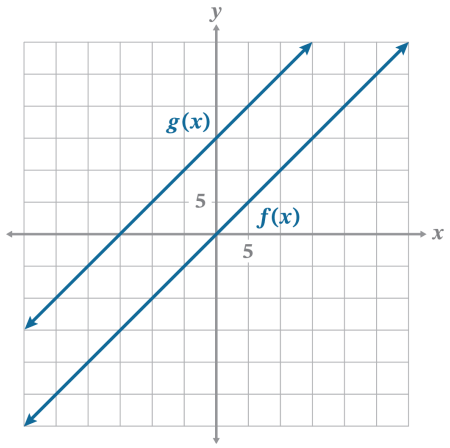
10.

x	$f(x) = 2x$	$g(x) = x + 15$
−30	−30	−15
0	0	15
15	15	30
40	40	55

11.

Translating the graph of $f(x)$ up 15 units will create the graph of $g(x)$.

12.



13.

x	$f(x) = -\frac{1}{2}x$	$g(x) = -\frac{1}{2}x + \frac{3}{2}$
−4	2	$\frac{7}{2}$
0	0	$\frac{3}{2}$
2	−1	$\frac{1}{2}$
5	$-\frac{5}{2}$	−1

14.

Translating the graph of $f(x)$ up $\frac{3}{2}$ units will create the graph of $g(x)$ even when the coefficient is different from the parent function.

15.

Zero. $f(x) = x$ and $g(x) = x + 0$ has the parent function translated 0 spaces.

Targeted Review

Problem	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lesson Origin	7	7	7	7	7	7	7	1, 2	4	4	5	5	7	1

1.
Sample: A function assigns each unique element of the domain to an element of the range. The domain values cannot repeat, but the range values can.

2.
Yes, because $g(-2) = 3(-2) = -6$. The ordered pair is on the graph of the function.

3.
No, because $g(-2) = 3(-2) = -6$. The result is -6, not 6, so the ordered pair is not on the graph of the function.

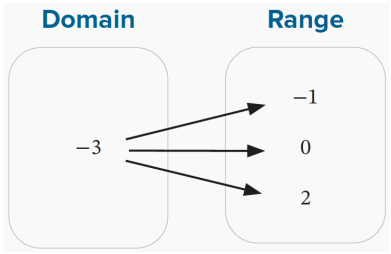
4.
(speed of car, distance traveled)
The distance traveled depends on the speed of the car.

5.

x	*y*
Domain	Range
−4	1
−2	1
0	1
2	1

This is a function because the domain values are unique (do not repeat).

6.



This is not a function because the domain value repeats.

7.
The vertical line test

8.

$3x - 12 = 6x - 7$ ◀ Distributive Property

$-3x - 12 = -7$ ◀ Addition Property of Equality

$-3x = 5$ ◀ Multiplication Property of Equality

$x = -\frac{5}{3}$

9.

$-2p > 3$

$p < -\frac{3}{2}$

10.

The direction of the inequality symbol changes when you multiply or divide both sides of the inequality by a negative number.

11.

$(\frac{70\ mi}{1\ hr})(\frac{5280\ ft}{1\ mi})(\frac{12\ in}{1\ ft})(\frac{2.54\ cm}{1\ in})(\frac{1\ m}{100\ cm})(\frac{1\ km}{1000\ m})$

= 112.65 km/hr

≈ 113 km/hr

12.

$2y - 10 = 18$

$2y = 28$

$y = 14$

13. D

A. $x = \frac{7}{2}y - 6$

B. $2y = 7x - 6$

C. $x = \frac{7}{2}f(x) - 6$

D. $y = \frac{7}{2}x - 6$

Distractor rationale:

A. This equation is written as x in terms of y.

B. This equation clears the fraction correctly, but y should be isolated.

C. switches x and $f(x)$ in the given equation.

$f(x) = \frac{7}{2}x - 6$

Replace $f(x)$ with y.

$y = \frac{7}{2}x - 6$

14.
☑ real number
☐ rational number
☑ irrational number
☐ whole number
real number, irrational number
Distractor Rationale:
An irrational number + a rational number = an irrational number. If a number is not rational, it cannot be a whole number.