Name: _____ **Connecting Algebra and Geometry** | **7.1**

Set, Go!

## Set

Topic: Slope triangles and the distance formula.

ΔABC is a slope triangle for $\overline{AB}$ where BC is the rise and AC is the run. Notice that the length of $\overline{BC}$ has a corresponding length on the y-axis and the length of $\overline{AC}$ has a corresponding length on the x-axis. The slope formula is written as $m = \frac{y_2 - y_1}{x_2 - x_1}$ where m is the slope.

1. a. What does the value $(y_2 - y_1)$ tell you?

    the vertical distance

    b. What does the value $(x_2 - x_1)$ tell you?
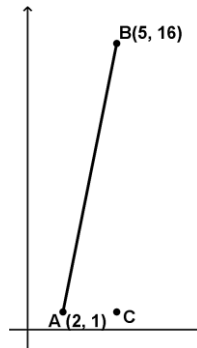
    the horizontal distance
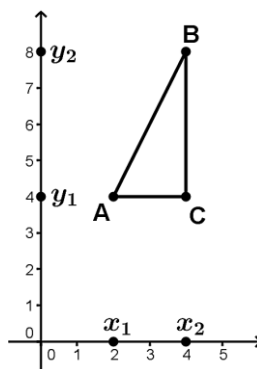
In the previous module you found the length of a slanted line segment by drawing the slope triangle and performing the Pythagorean Theorem. In this exercise try to develop a more efficient method of finding the length of a line segment by using the meaning of $(y_2 - y_1)$ and $(x_2 - x_1)$ combined with the Pythagorean Theorem.
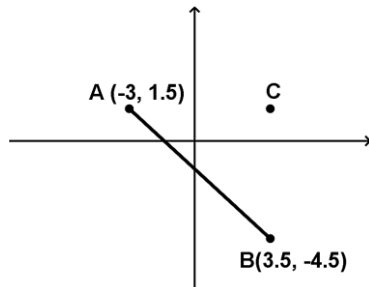
2. Find AB
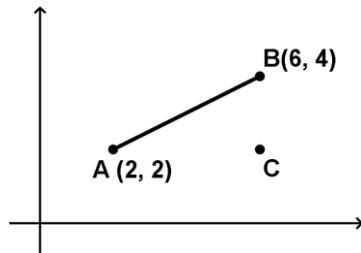
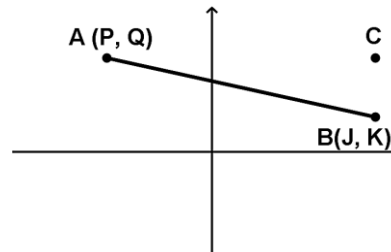**$\sqrt{20} \approx 4.47$**

3. Find AB

$\sqrt{234} \approx 15.30$

4. Find AB

$\sqrt{78.25} \approx 8.85$
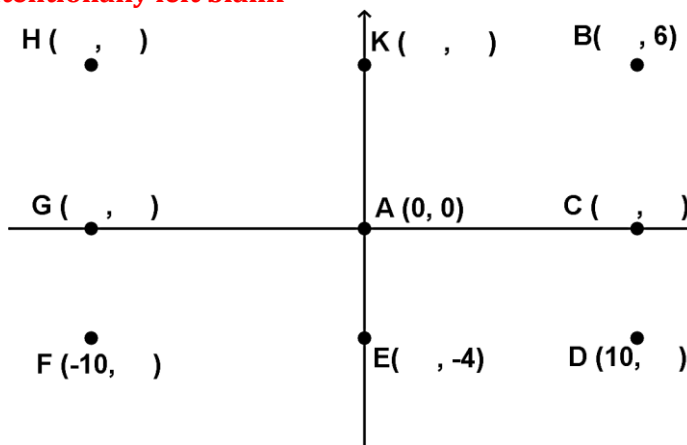
5. Find AB

$\sqrt{(P - J)^2 + (Q - K)^2}$

Go

Topic: Rectangular coordinates

Use the given information to fill in the missing coordinates. Then find the length of the indicated line segment.

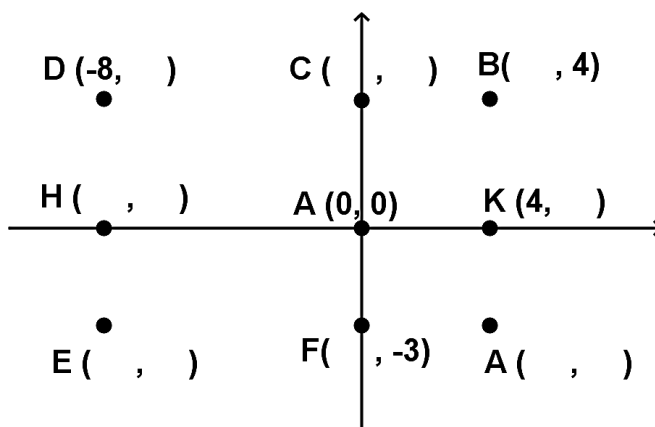**Coordinates on graphs are intentionally left blank**

6. a. Find HB

20

H (,)   K (,)   B(, 6)

G (,)   A (0, 0)   C (,)

b. Find BD

10

F (-10,)   E(, -4)   D (10,)

7. a. Find DB

12

D (-8,)   C (,)   B(, 4)

H (,)   A (0, 0)   K (4,)

b. Find CF

7

E (,)   F(, -3)   A (,)

Name: **Connecting Algebra and Geometry** | 7.2

Ready, Go!

Ready

Topic: Graphing lines.

The graph at the right is of the line $f(x) = -2x$.

1. On the same grid, graph a parallel line that is 4 units below it.
   Dashed line at right

2. Write the equation of the new line.

   $y = -2x - 4$

3. Write the y-intercept of the new line as an ordered pair.

   $(0, -4)$

4. Write the x-intercept as an ordered pair.

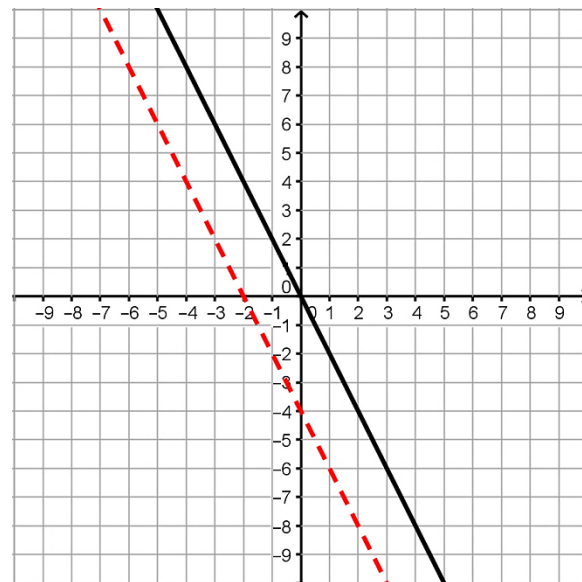 $(-2, 0)$

5. a. Write the equation of the new line in point-slope form using the y-intercept

   $(y - (-4)) = -2(x - 0)$ **or** $y = -2(x - 0) - 4$

   b. Write the equation of the new line in point-slope form using the x-intercept.

   $(y - 0) = -2(x - (-2))$ **or** $y = -2(x + 2) + 0$

   c. Explain in what way the equations in 5a and 5b are the same and in what way they are different.

   Simplified equations are equivalent. Difference is in the starting point.

The graph at the right is of $f(x) = \frac{1}{4}x$

6. Graph a parallel line 2 units below.
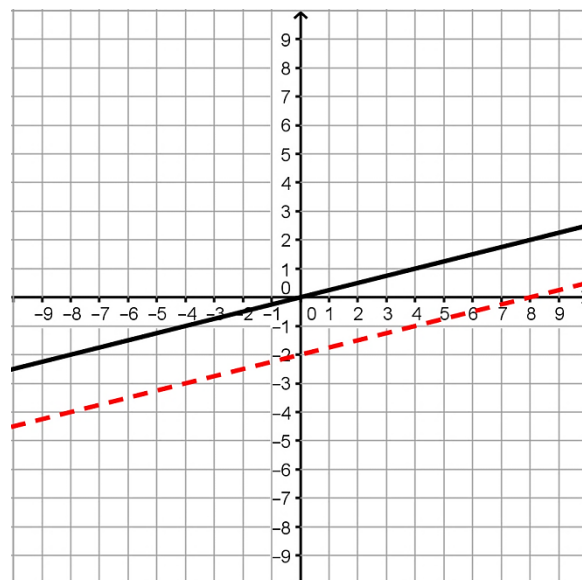

7. Write the equation of the new line.

    $y = \frac{1}{4}x - 2$

8. Write the y-intercept as an ordered pair.

    $(0, -2)$

9. Write the x-intercept as an ordered pair.

    $(8, 0)$

10. a. Write the equation of the new line in point-slope form using the y-intercept

    $(y - (-2)) = \frac{1}{4}(x - 0)$ **or** $y = \frac{1}{4}(x - 0) - 2$

    b. Write the equation of the new line in point-slope form using the x-intercept

    $(y - 0) = \frac{1}{4}(x - 8)$ **or** $y = \frac{1}{4}(x - 8) + 0$

    c. Explain in what way the equations are the same and in what way they are different.

    Simplified equations are equivalent. Difference is in the starting point.

Go

Topic: Writing equations of lines.

Write the equation of the line in point-slope form using the given information.

11. Slope $= -\frac{1}{4}$ point $(12, 5)$

$$y - 5 = -\frac{1}{4}(x - 12)$$

12. $A(11, -3),\ B(6, 2)$

$$y + 3 = -1(x - 11)$$

13. x-intercept: -2, y-intercept: -3

$$y + 3 = -\frac{3}{2}x$$

14. All x values are $-7, y$ can be anything

$$x = -7$$

15. Slope: $-\frac{1}{2}$, x-intercept: 5
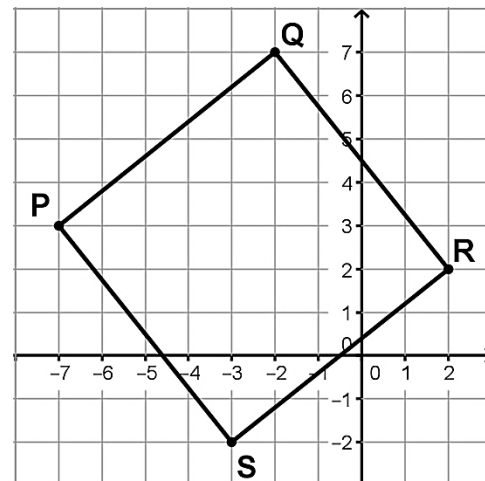
$$y = -\frac{1}{2}(x - 5)$$

16. $E(-10, 17),\ G(13, 17)$

$$y = 17$$

Name: **Connecting Algebra and Geometry** | 7.3

Set, Go!

Set

Topic: Characteristics of rectangles and squares

1. a. Is the figure below a rectangle? Justify your answer.

    Yes, justifications may vary

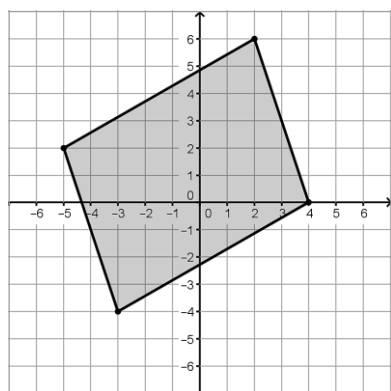   b. Is the figure a square? Justify your answer.

    Yes, justifications may vary

Go

Find the perimeter of each figure below.
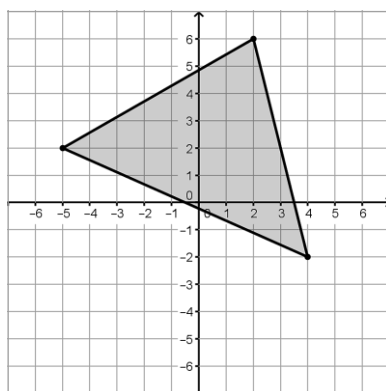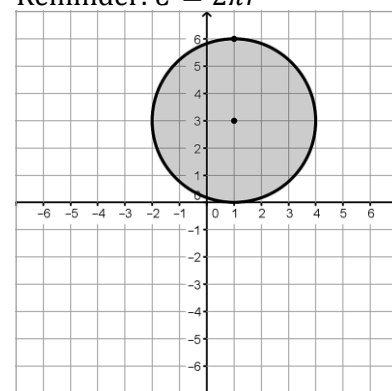Give exact solutions and show solutions rounded to the nearest hundredth.

2.

$2\sqrt{40} + 2\sqrt{65}$
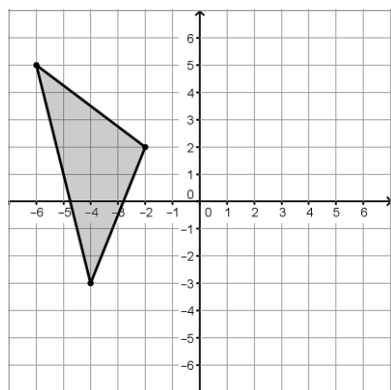**28.77 units**

3.

$\sqrt{68} + \sqrt{97} + \sqrt{65}$
26.16 units

4. Reminder: $C = 2\pi r$

9π
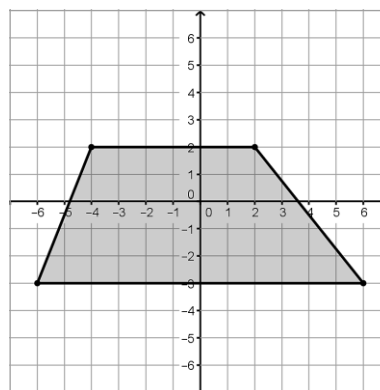**18.85 units**

5.

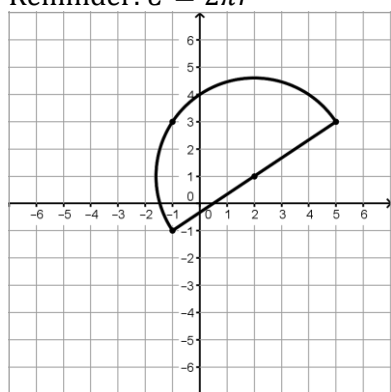$$\sqrt{68} + \sqrt{29} + 5$$
18.63 units

6.

$$18 + \sqrt{29} + \sqrt{41}$$
28.79 units

7. Reminder: $C = 2\pi r$
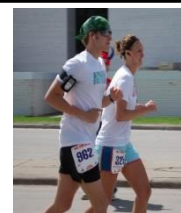

$$\sqrt{52} + \pi\sqrt{13}$$
18.54 units

Name: Connecting Algebra and Geometry | **7.4**
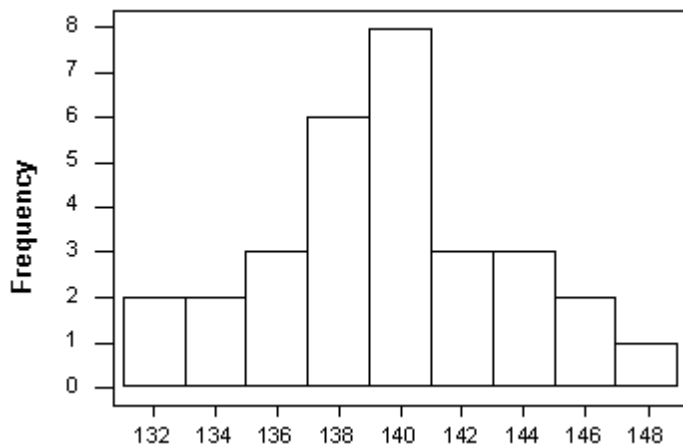
Ready, Set, Go!

Ready
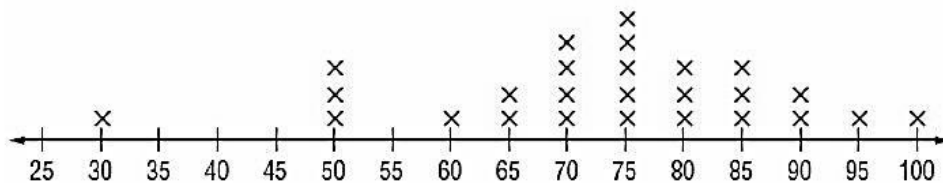Topic: Identifying center and spread.

<u>Center</u> **describes the central tendency of the data.**
<u>Spread</u> **describes how scattered the data is.**

1. Describe the center and spread in the histogram below.
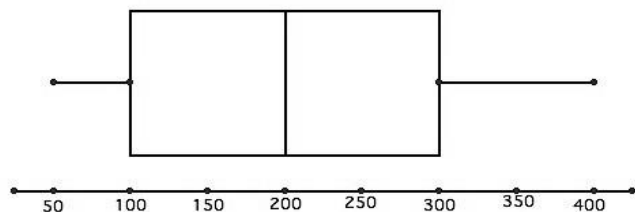

check student answers (normal distribution with center around 140)

2. Describe the center and spread in the line plot below.

check student answers (30 is outlier, skewed left, center around 75)

3. Describe the center and spread in the box and whisker plot.

check student answers (skewed slightly right, center around 200)

Set

You are given information about $f(x)$ and $g(x)$. Rewrite $g(x)$ in translation form: $g(x) = f(x) + k$

4. $f(x) = 7x + 13$ $g(x) = 7x - 5$ Translation form: $g(x) = f(x) - 18$	5. $f(x) = 22x - 12$ $g(x) = 22x + 213$ Translation form: $g(x) = f(x) + 225$	6. $f(x) = -15x + 305$ $g(x) = -15x - 11$ Translation form: $g(x) = f(x) - 316$
7. (table below) Translation form: $g(x) = f(x) + 15$	8. (table below) Translation form: $g(x) = f(x) - 47$	9. (table below) Translation form: $g(x) = f(x) - 19.5$

7.

x	$f(x)$	$g(x)$
3	11	26
10	46	61
25	121	136
40	196	211

8.

x	$f(x)$	$g(x)$
-4	5	-42
-1	-1	-48
5	-13	-60
20	-43	-90

9.

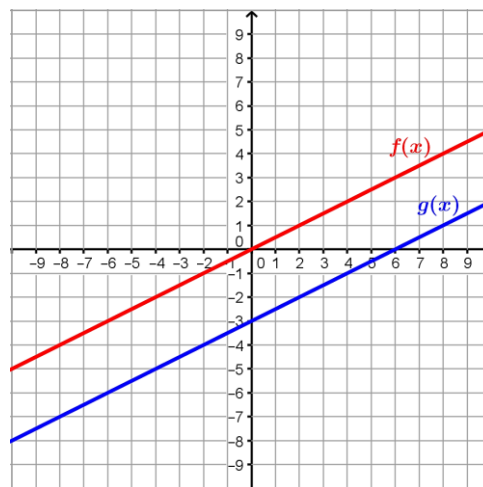| x	$f(x)$	$g(x)$
-10	4	-15.5
-3	7.5	-12
22	20	0.5
41	29.5	10

You are given the equation of $f(x)$ and the transformation $g(x) = f(x) + k$. Graph both $f(x)$ and $g(x)$ *and* write the linear equation for $g(x)$ below the graph.

10. $f(x) = 2x - 4$
    $g(x) = f(x) + 3$
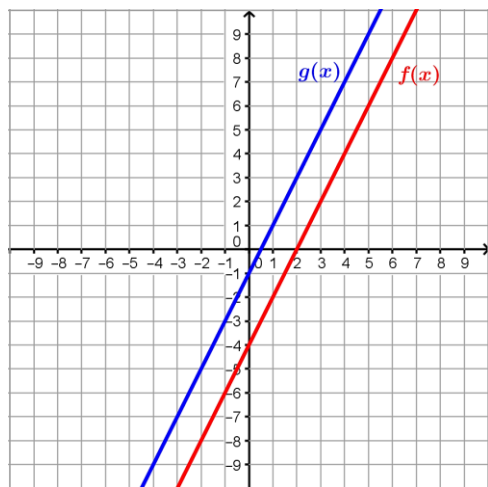
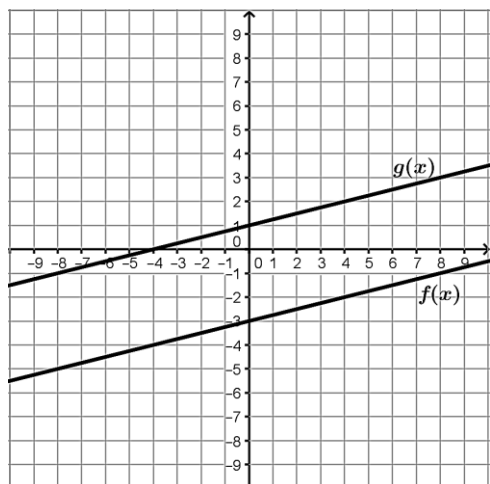Linear Equation for $g(x)$:
$g(x) = 2x - 1$

11. $f(x) = 0.5x$
    $g(x) = f(x) - 3$

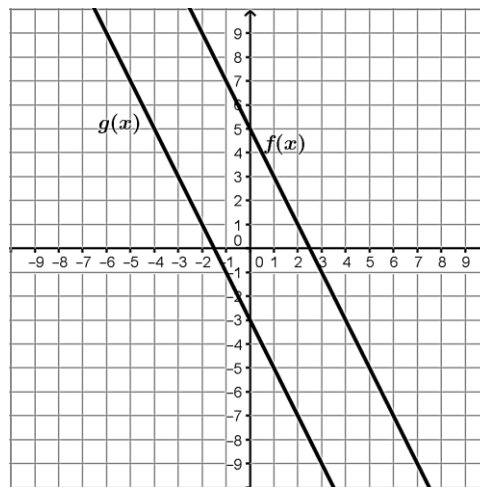Linear Equation for $g(x)$:
$g(x) = 0.5x - 3$

Based on the given graph, (a) write the equation of $g(x)$ in the form of $g(x) = f(x) + k$ and (b) simplify the equation of $g(x)$ into slope-intercept form. The equation of $f(x)$ is given.

12. $f(x) = \frac{1}{4}x - 3$

a.   Translation Form: $\mathbf{g(x) = f(x) + 4}$

b.   Slope-Intercept Form: $\mathbf{g(x) = \frac{1}{4}x + 1}$

13. $f(x) = -2x + 5$

a.   Translation Form: $\mathbf{g(x) = f(x) - 8}$

b.   Slope-Intercept Form: $\mathbf{g(x) = -2x - 3}$

Go

14. Fernando and Mariah are training for a half marathon. The chart below describes their workout for the week just before the half marathon. If four laps are equal to one mile, and if there are 13.1 miles in a half marathon, do you think Mariah and Fernando are prepared for the event? Describe how you think each person will perform in the race. Include who you think will finish first and what each person's finish time will be. Use the data to inform your conclusions and to justify your answers.

Day of the week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Fernando: Distance (in laps)	34	45	52	28	49	36
Time per day (in minutes)	60	72	112	63	88	58
Mariah: Distance (in laps)	30	48	55	44	38	22
Time per day (in minutes)	59	75	119	82	70	45

Answers may vary

Name: | **Connecting Algebra and Geometry** | **7.5**

Ready, Set, Go!

Ready
Topic: Finding percentages.

Mrs. Gonzalez noticed that her new chorus class had a lot more girls than boys in it. There were 32 girls (who sing soprano or alto) and 17 boys (who sing bass or tenor). Round answers to the nearest percent.

1. What percent of the class are girls?

   65%

2. What percent are boys?

   35%

3. 68% of the girls were sopranos, the rest were alto.
   a. How many girls sang soprano?

      22 girls

   b. What percent of the entire chorus sang soprano?

      About 45%

4. Only 30% of the boys could sing bass, the rest sang tenor.
   a. How many boys were in the bass section?

      5 boys

   b. What percent of the entire chorus sang bass?

      About 10%

5. Compare the number of girls who sang alto to the number of boys who sang tenor. Which musical section is larger? Justify your answer.

   Answers may vary. There are 20% of the total chorus singing alto v. 24% of the chorus singing tenor.
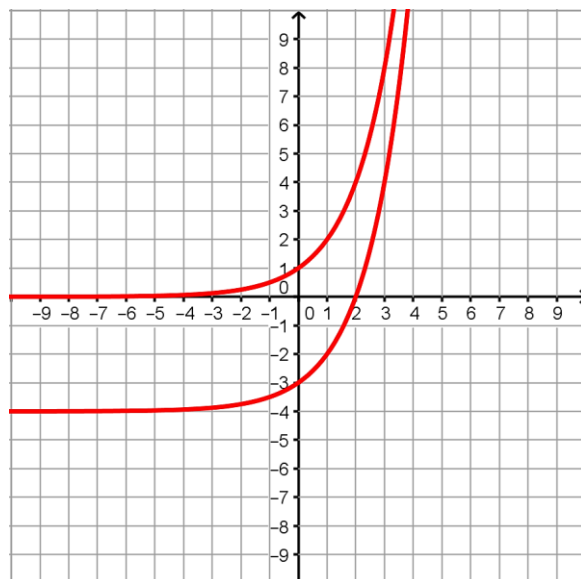
Set

Topic: Graphing exponential equations

6. Think about the graphs of $y = 2^x$ and $y = 2^x - 4$.

    a. Predict what you think is the same and what is different.

   **answers vary**

    b. Graph both equations on the same grid. Explain what stayed the same and what changed when you subtracted 4. Identify in what way it changed.

    answers vary

7. Think about the graphs of $y = 2^x$ and $y = 2^{(x-4)}$.

    a. Predict what you think is the same and what is different.

    answers vary

    b. Graph both equations on the same grid. Explain what stayed the same and what changed. Identify in what way it changed.
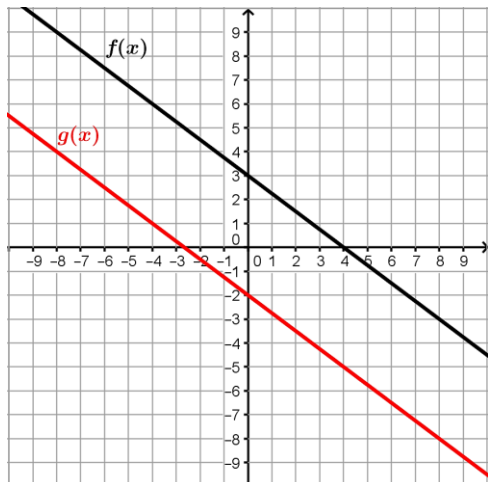
    answers vary
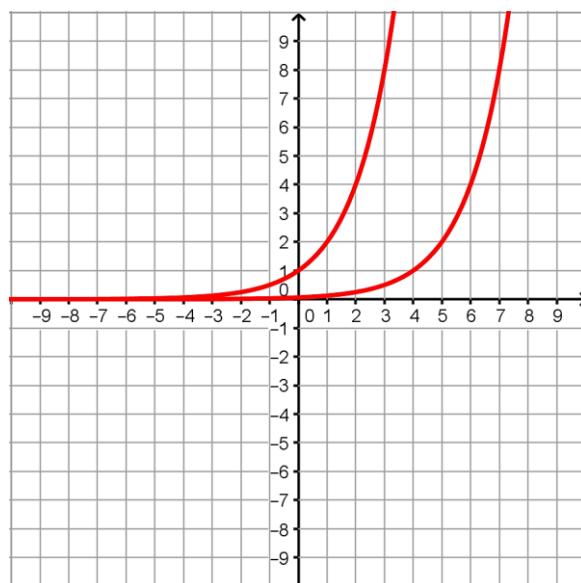
Go

Topic: Vertical translations of linear equations

The graph of $f(x)$ and the translation form equation of $g(x)$ are given. Graph $g(x)$ on the same grid and write the slope-intercept equation of $f(x)$ and $g(x)$.
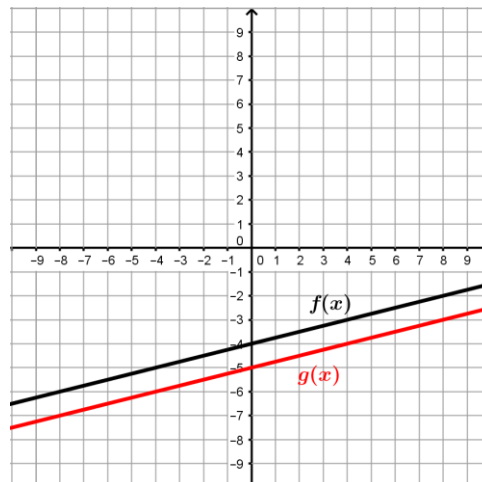
8. $g(x) = f(x) - 5$
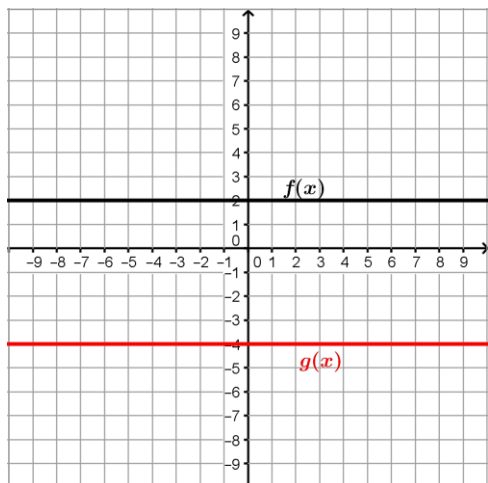

$f(x) = -\dfrac{3}{4}x + 3$

$g(x) = -\dfrac{3}{4}x - 2$

9. $g(x) = f(x - 4)$

$f(x) = \dfrac{1}{4}x - 4$

$g(x) = \dfrac{1}{4}x - 5$

10. $g(x) = f(x) - 6$

$f(x) = 2$

$g(x) = -4$