

**Secondary One Mathematics:  
An Integrated Approach  
Module 7  
Connecting Algebra and  
Geometry**

**By**

**The Mathematics Vision Project:**

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## Module 7 – Connecting Algebra and Geometry

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**Classroom Task:** 7.1 Go the Distance- A Develop Understanding Task

*Use coordinates to find distances and determine the perimeter of geometric shapes (G.GPE.7)*

**Ready, Set, Go Homework:** Connecting Algebra and Geometry 7.1

**Classroom Task:** 7.2 Slippery Slopes – A Solidify Understanding Task

*Prove slope criteria for parallel and perpendicular lines (G.GPE.5)*

**Ready, Set, Go Homework:** Connecting Algebra and Geometry 7.2

**Classroom Task:** 7.3 Prove It! – A Solidify Understanding Task

*Use coordinates to algebraically prove geometric theorems (G.GPE.4)*

**Ready, Set, Go Homework:** Connecting Algebra and Geometry 7.3

**Classroom Task:** 7.4 Training Day– A Solidify Understanding Task

*Write the equation  $f(t) = m(t) + k$  by comparing parallel lines and finding  $k$  (F.BF.3, F.BF.1, F.IF.9)*

**Ready, Set, Go Homework:** Connecting Algebra and Geometry 7.4

**Classroom Task:** 7.5 Training Day Part II – A Practice Understanding Task

*Determine the transformation from one function to another (F.BF.3, F.BF.1, F.IF.9)*

**Ready, Set, Go Homework:** Connecting Algebra and Geometry 7.5

**Classroom Task:** 7.6 Shifting Functions – A Practice Understanding Task

*Translating linear and exponential functions using multiple representations (F.BF.3, F.BF.1, F.IF.9)*

**Ready, Set, Go Homework:** Connecting Algebra and Geometry 7.6

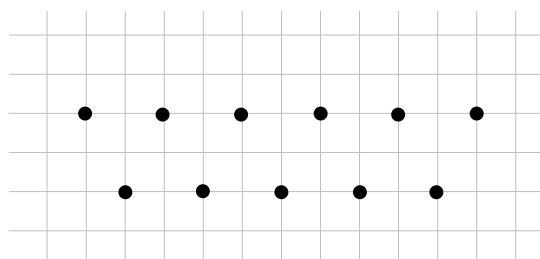
## 7.1 Go the Distance

### *A Develop Understanding Task*

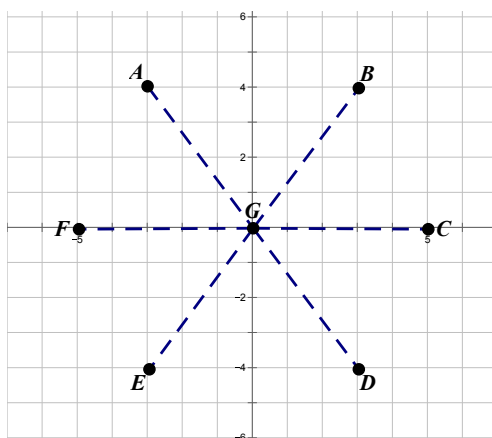
The performances of the Podunk High School drill team are very popular during half-time at the school's football and basketball games. When the Podunk High School drill team choreographs the dance moves that they will do on the football field, they lay out their positions on a grid like the one below:



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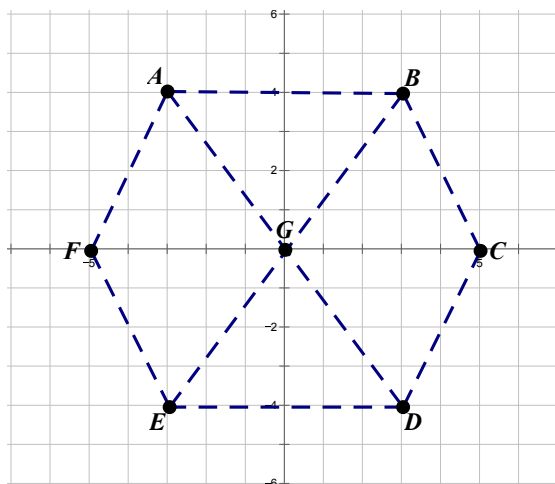
In one of their dances, they plan to make patterns holding long, wide ribbons that will span from one girl in the middle to six other girls. On the grid, their pattern looks like this:



The question the girls have is how long to make the ribbons. Some girls think that the ribbon from Gabriela (G) to Courtney (C) will be shorter than the one from Gabriela (G) to Brittney (B).

1. How long does each ribbon need to be?
2. Explain how you found the length of each ribbon.

When they have finished with the ribbons in this position, they are considering using them to form a new pattern like this:



3. Will the ribbons they used in the previous pattern be long enough to go between Brittney (B) and Courtney (C) in the new pattern? Explain your answer.





## Ready, Set, Go!



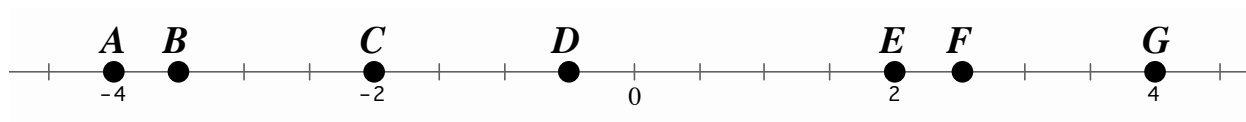
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## Ready

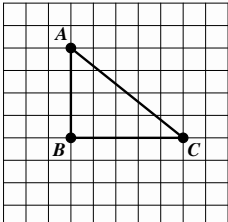
Topic: Finding the distance between two points

Use the number line to find the distance between the given points. (The notation  $AB$  means the distance between points  $A$  and  $B$ .)

1.  $AE$       2.  $CF$       3.  $GB$       4.  $CA$       5.  $BF$       6.  $EG$



7. Describe a way to find the distance between two points on a number line without counting the spaces.

8.  a. Find  $AB$   
b. Find  $BC$   
c. Find  $AC$

9. Why is it easier to find the distance between points  $A$  and  $B$  and points  $B$  and  $C$  than it is to find the distance between  $A$  and  $C$ ?

10. Explain how to find the distance between points  $A$  and  $C$ .

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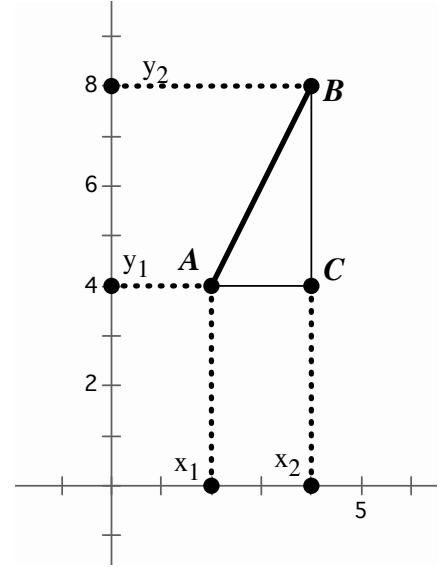
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**Set**

Topic: Slope triangles and the distance formula.

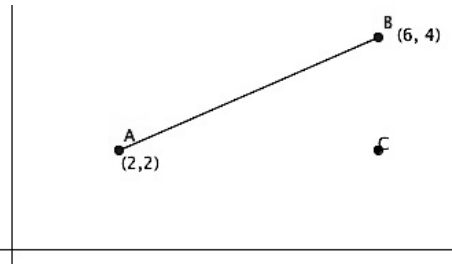
Triangle ABC is a slope triangle for the line segment AB where BC is the rise and AC is the run. Notice that the length of segment BC has a corresponding length on the y-axis and the length of AC has a corresponding length on the x-axis. The slope formula is written as  $m = \frac{y_2 - y_1}{x_2 - x_1}$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



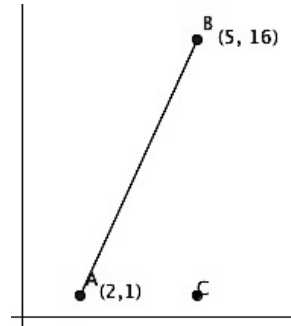
- 11a. What does the value  $(y_2 - y_1)$  tell you?
- b. What does the value  $(x_2 - x_1)$  tell you?

In the previous unit 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.

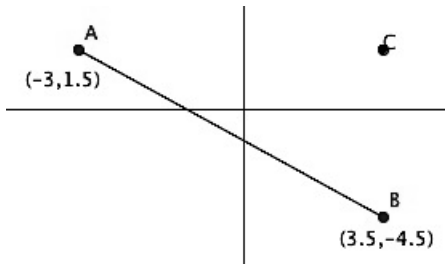
12. Find AB.



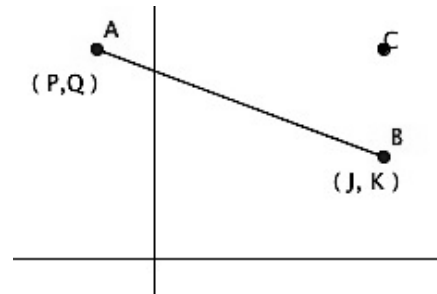
13. Find AB.



14. Find AB.



15. Find AB.

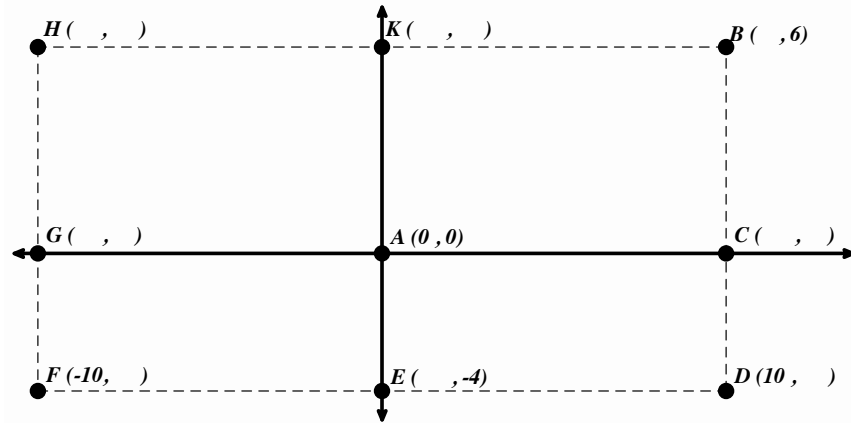


**Go** Topic: Rectangular coordinates

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

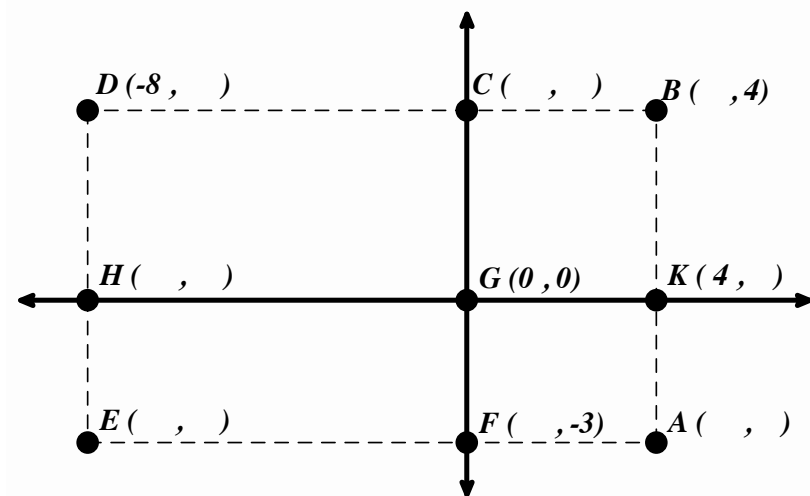
16a. Find HB

b. Find BD



17a. Find DB

b. Find CF



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<http://www.khanacademy.org/math/algebra/ck12-algebra-1/v/the-coordinate-plane>

<http://www.khanacademy.org/math/algebra/ck12-algebra-1/v/distance-formula>

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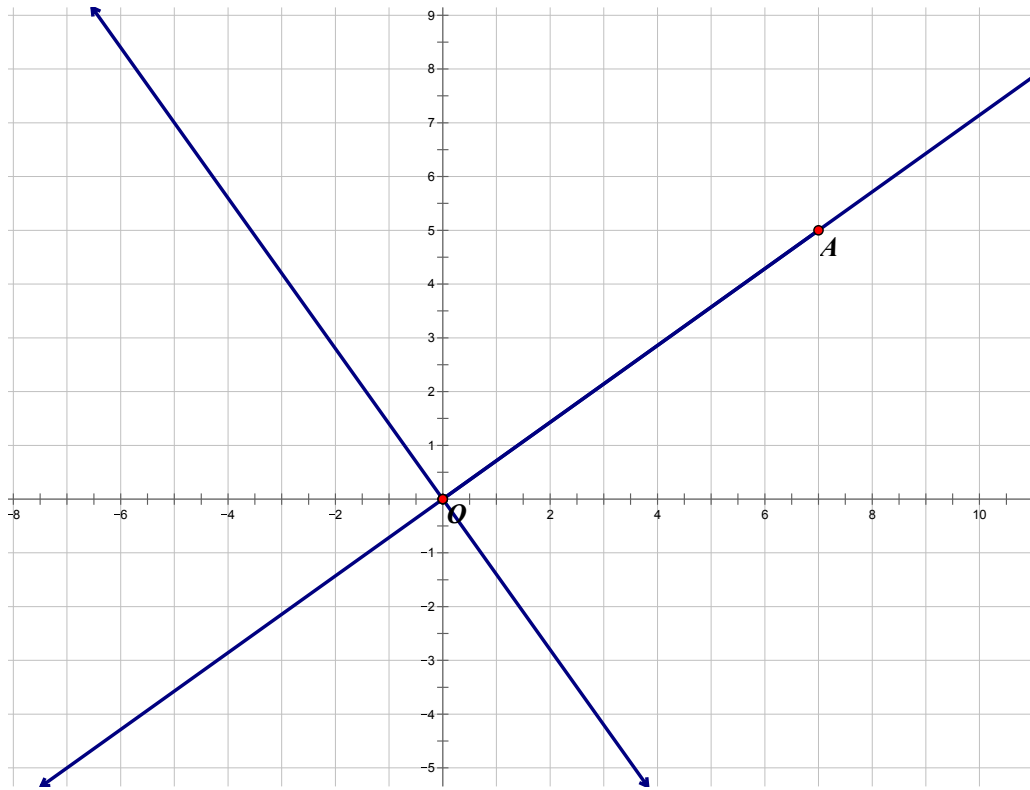
## 7.2 Slippery Slopes

*A Solidify Understanding Task*



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While working on “Is It Right?” in the previous module you looked at several examples that lead to the conclusion that the slopes of perpendicular lines are negative reciprocals. Your work here is to formalize this work into a proof. Let’s start by thinking about two perpendicular lines that intersect at the origin, like these:



1. Start by drawing a right triangle with the segment  $\overline{OA}$  as the hypotenuse. These are often called slope triangles. Based on the slope triangle that you have drawn, what is the slope of  $\overrightarrow{OA}$ ?
2. Now, rotate the slope triangle  $90^\circ$  about the origin. What are the coordinates of the image of point A?

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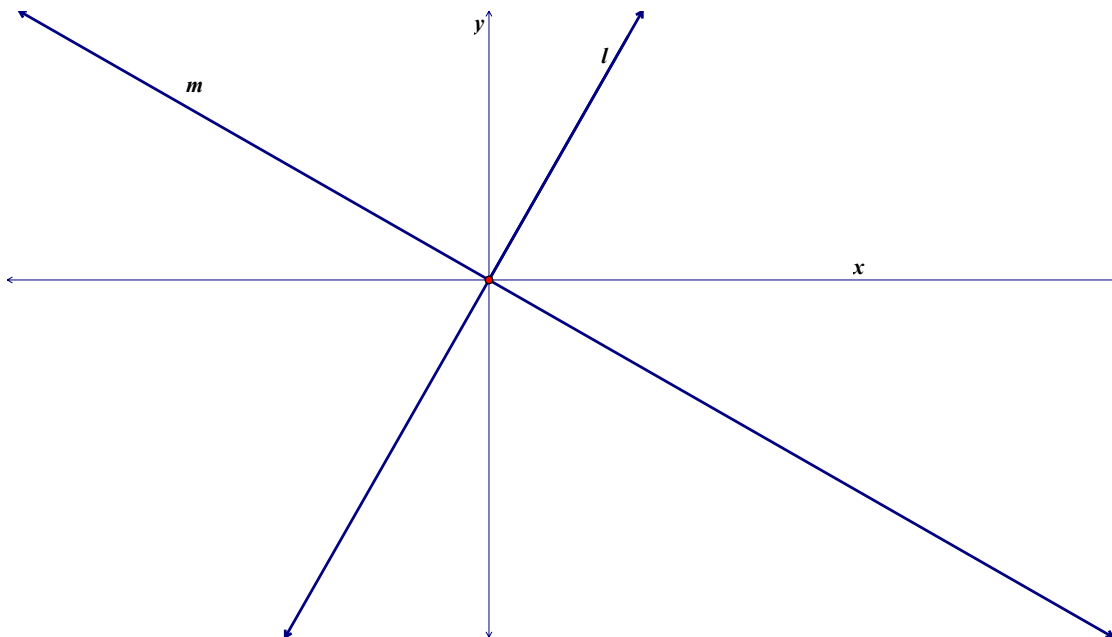
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3. Using this new point,  $A'$ , draw a slope triangle with hypotenuse  $\overline{OA'}$ . Based on the slope triangle, what is the slope of the line  $\overleftrightarrow{OA'}$ ?
  
4. What is the relationship between these two slopes? How do you know?
  
5. Is the relationship changed if the two lines are translated so that the intersection is at  $(-5, 7)$ ?

How do you know?

To prove a theorem, we need to demonstrate that the property holds for any pair of perpendicular lines, not just a few specific examples. It is often done by drawing a very similar picture to the examples we have tried, but using variables instead of numbers. Using variables represents the idea that it doesn't matter which numbers we use, the relationship stays the same. Let's try that strategy with this theorem.



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- Lines  $l$  and  $m$  are constructed to be perpendicular.
- Start by labeling a point  $P$  on the line  $l$ .
- Label the coordinates of  $P$ .
- Draw the slope triangle from point  $P$ .
- Label the lengths of the sides of the slope triangle.

6. What is the slope of line  $l$ ?

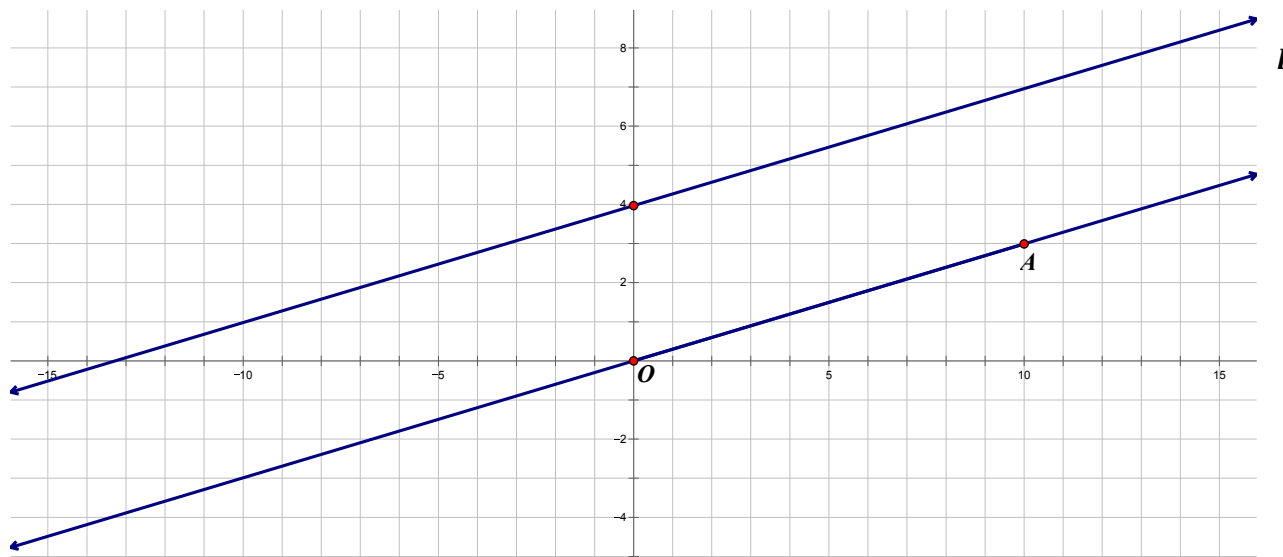
Rotate point  $P$   $90^\circ$  about the origin, label it  $P'$  and mark it on line  $m$ . What are the coordinates of  $P'$ ?

7. Draw the slope triangle from point  $P'$ . What are the lengths of the sides of the slope triangle? How do you know?
8. What is the slope of line  $m$ ?
9. What is the relationship between the slopes of line  $l$  and line  $m$ ? How do you know?
10. Is the relationship between the slopes changed if the intersection between line  $l$  and line  $m$  is translated to another location? How do you know?
11. Is the relationship between the slopes changed if lines  $l$  and  $m$  are rotated?
12. How do these steps demonstrate that the slopes of perpendicular lines are negative reciprocals for any pair of perpendicular lines?



Think now about parallel lines like the ones below.

Draw the slope triangle from point A. What is the slope of  $\overleftrightarrow{OA}$ ?

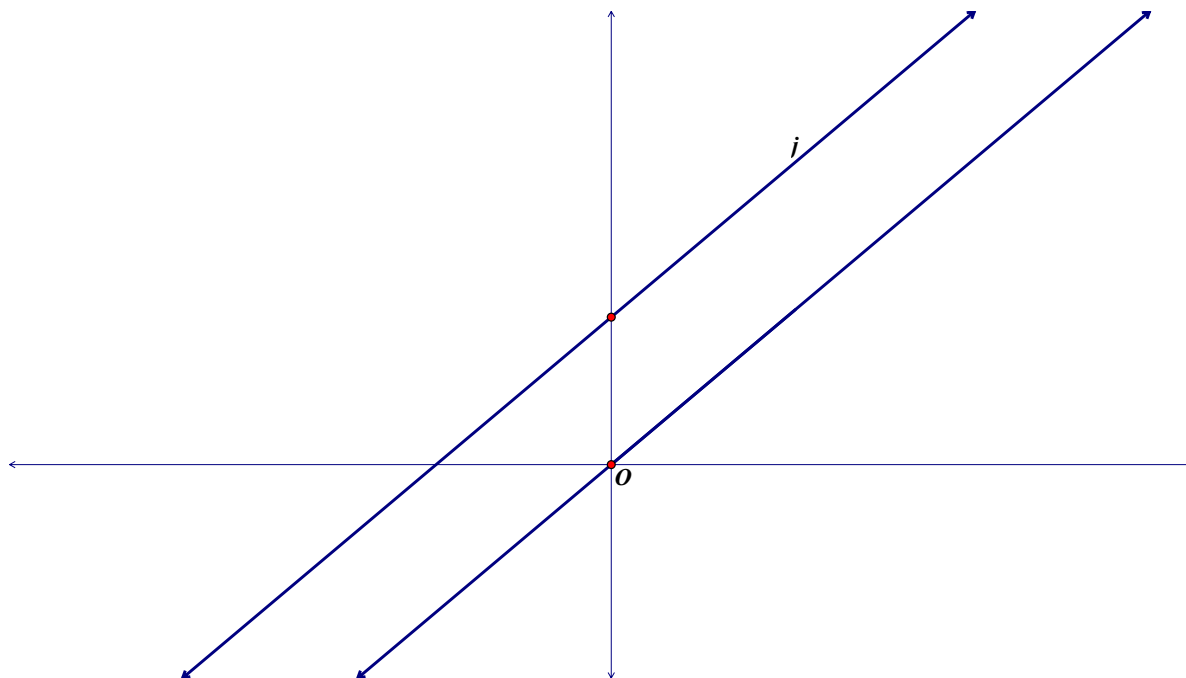


What translation(s) maps the slope triangle with hypotenuse  $\overline{OA}$  onto line  $l$ ?

What must be true about the slope of line  $l$ ? Why?

Now you're going to try to use this example to develop a proof, like you did with the perpendicular lines. Here are two lines that have been constructed to be parallel.





Show how you know that these two parallel lines have the same slope and explain why this proves that all parallel lines have the same slope.



Name: \_\_\_\_\_

## Connecting Algebra and Geometry | 7.2

## Ready, Set, Go!



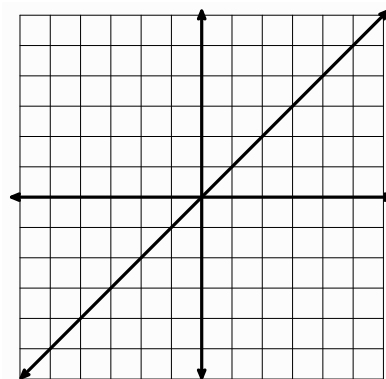
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## Ready

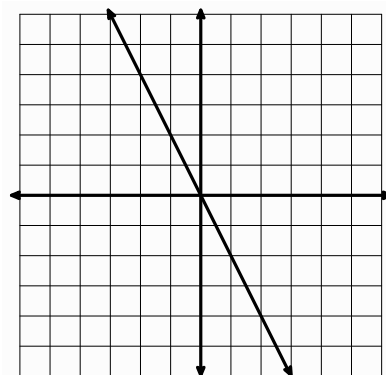
Topic: Graphing lines.

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

- 1a. On the same grid, graph a parallel line that is 3 units above it.
- b. Write the equation of the new line. \_\_\_\_\_
- c. Write the y-intercept of the new line as an ordered pair.
- d. Write the x-intercept of the new line as an ordered pair.
- e. Write the equation of the new line in point-slope form using the y-intercept.
- f. Write the equation of the new line in point-slope form using the x-intercept.
- g. Explain in what way the equations are the same and in what way they are different.

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

- 2a. On the same grid, graph a parallel line that is 4 units below it.
- b. Write the equation of the new line. \_\_\_\_\_
- c. Write the y-intercept of the new line as an ordered pair.
- d. Write the x-intercept as an ordered pair.
- e. Write the equation of the new line in point-slope form using the y-intercept
- f. Write the equation of the new line in point-slope form using the x-intercept.
- g. Explain in what way the equations are the same and in what way they are different.



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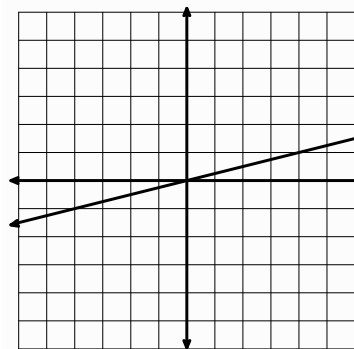
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Name: \_\_\_\_\_

## Connecting Algebra and Geometry | 7.2

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



3a. Graph a parallel line 2 units below.

b. Write the equation of the new line.

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

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

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

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

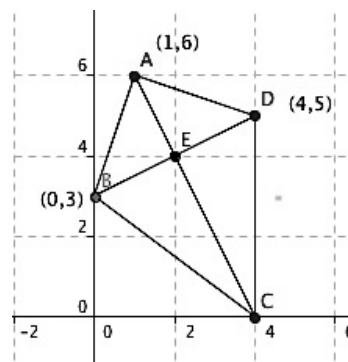
g. Explain in what way the equations are the same and in what way they are different.

## Set

Topic: Verifying and Proving Geometric Relationships

The quadrilateral at the right is called a **kite**.

**Complete the mathematical statements about the kite using the given symbols. Prove each statement algebraically.**  
(A symbol may be used more than once.)



$\cong$   $\perp$   $\parallel$   $<$   $>$   $=$

## Proof

4.  $\overline{BC}$  \_\_\_\_\_  $\overline{DC}$  \_\_\_\_\_

5.  $\overline{BD}$  \_\_\_\_\_  $\overline{AC}$  \_\_\_\_\_

6.  $\overline{AB}$  \_\_\_\_\_  $\overline{BC}$  \_\_\_\_\_

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# Name: \_\_\_\_\_ Connecting Algebra and Geometry | 7.2

7.  $\triangle ABC$  \_\_\_\_\_  $\triangle ADC$  \_\_\_\_\_

8.  $\overline{BE}$  \_\_\_\_\_  $\overline{ED}$  \_\_\_\_\_

9.  $\overline{AE}$  \_\_\_\_\_  $\overline{ED}$  \_\_\_\_\_

10.  $\overline{AC}$  \_\_\_\_\_  $\overline{BD}$  \_\_\_\_\_

## Go

Topic: Writing equations of lines.

**Write the equation of the line in standard form using the given information.**

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

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

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

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

15. Slope:  $\frac{1}{2}$  x-intercept: 5

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

Need Help? Check out these related videos:

<http://www.khanacademy.org/math/algebra/linear-equations-and-inequalitie/v/graphing-using-x-and-y-intercepts>

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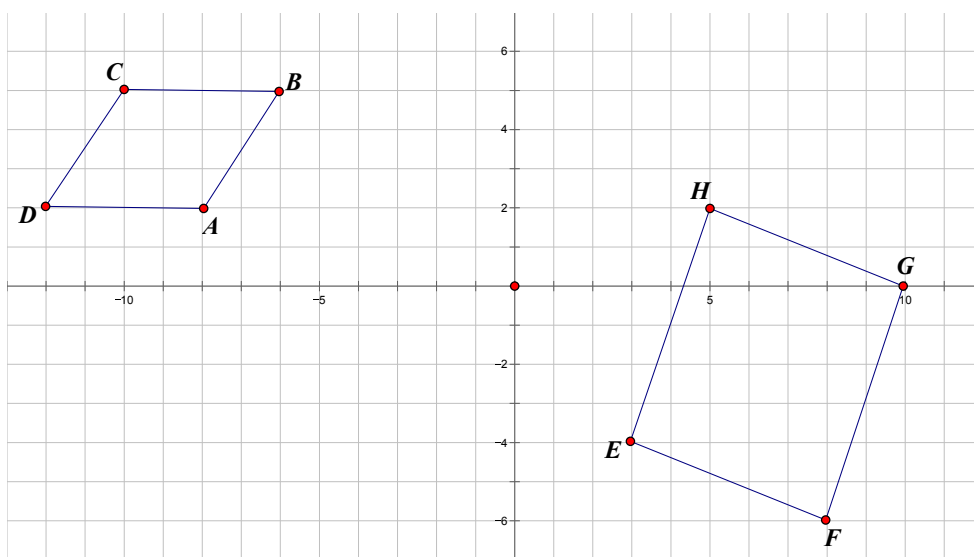
## 7.3 Prove It!

### *A Solidify Understanding Task*

In this task you need to use all the things you know about quadrilaterals, distance, and slope to prove that the shapes are parallelograms, rectangles, rhombi, or squares. Be systematic and be sure that you give all the evidence necessary to verify your claim.



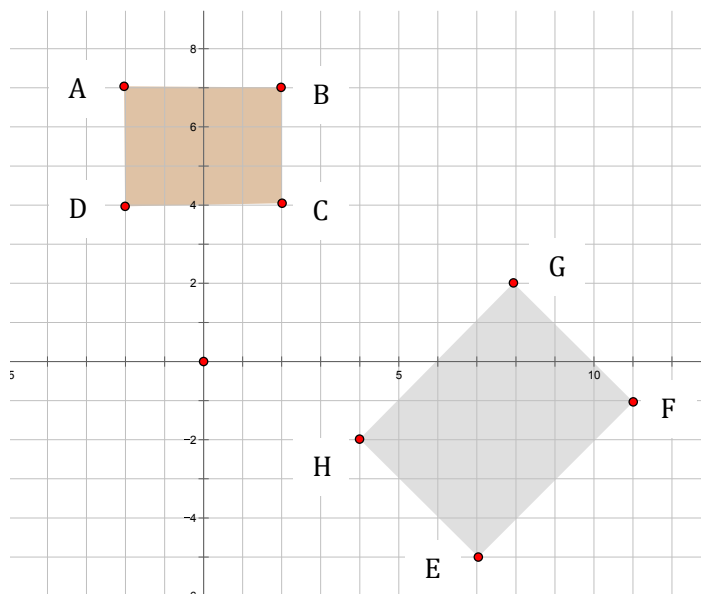
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Is ABCD a parallelogram? Explain how you know.

Is EFGH a parallelogram? Explain how you know.

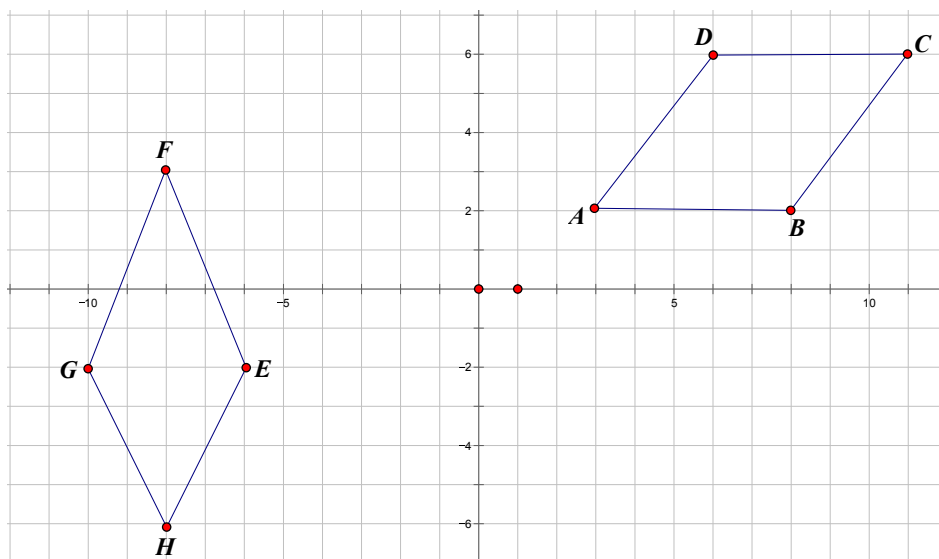




Is ABCD a rectangle? Explain how you know.

Is EFGH a rectangle? Explain how you know.

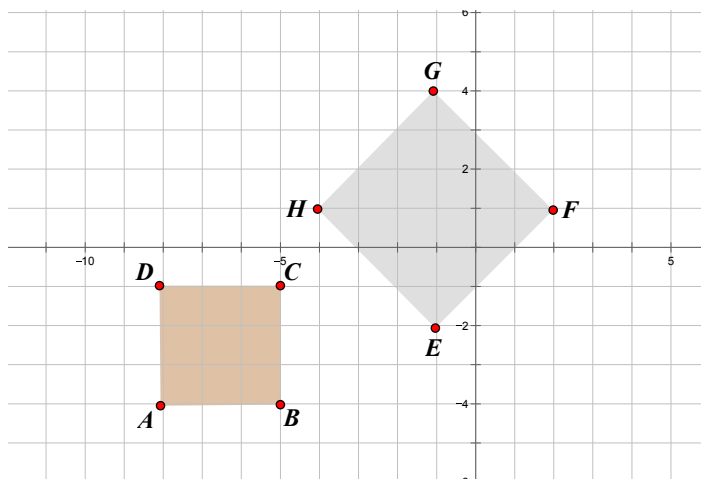




Is ABCD a rhombus? Explain how you know.

Is EFGH a rhombus? Explain how you know.





Is ABCD a square? Explain how you know.

Is EFGH a square? Explain how you know.



Name:

## Connecting Algebra and Geometry | 7.3

## Ready, Set, Go!



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## Ready

Topic: Tables of value

Find the value of  $f(x)$  for the given domain. Write  $x$  and  $f(x)$  as an ordered pair.

1.  $f(x) = 3x - 2$

$x$	$f(x)$	$(x, f(x))$
-2		
-1		
0		
1		
2		

2.  $f(x) = x^2$

$x$	$f(x)$	$(x, f(x))$
-2		
-1		
0		
1		
2		

3.  $f(x) = 5^x$

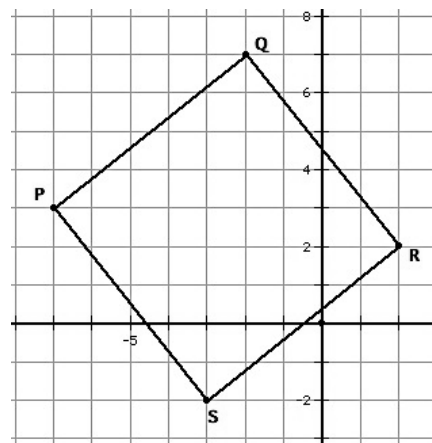
$x$	$f(x)$	$(x, f(x))$
-2		
-1		
0		
1		
2		

## Set

Topic: Characteristics of rectangles and squares

4a. Is the figure below a rectangle? (Justify your answer)

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



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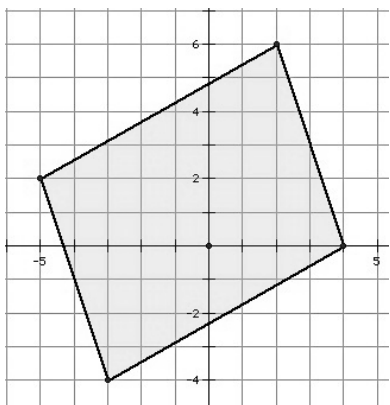
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## Connecting Algebra and Geometry | 7.3

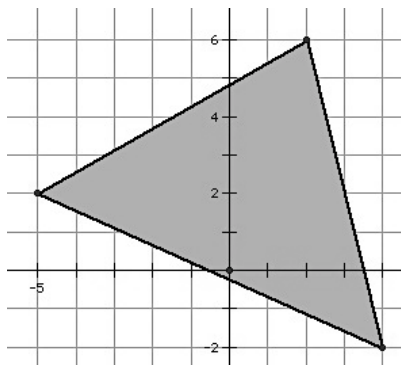
## Go

Find the perimeter of each figure below. Round to the nearest hundredth.

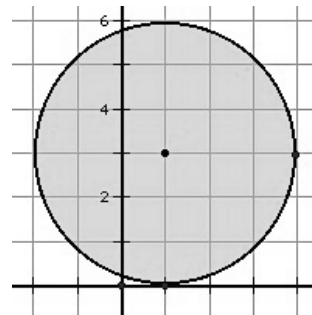
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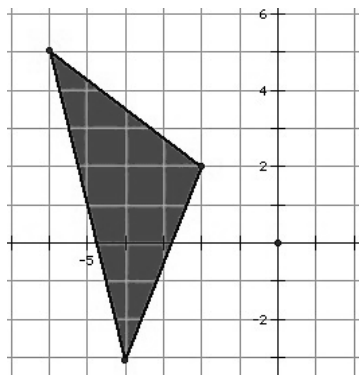
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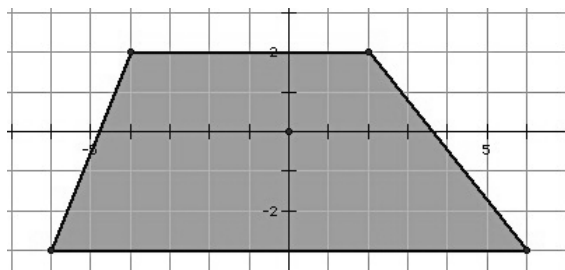
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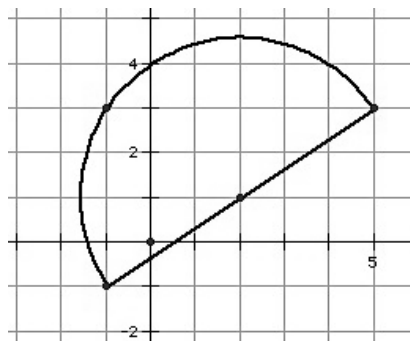
8.



9.



10.



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<http://www.khanacademy.org/math/geometry/basic-geometry/v/perimeter-and-area-of-a-non-standard-polygon>
<http://www.khanacademy.org/math/algebra/linear-equations-and-inequalities/v/distance-formula>

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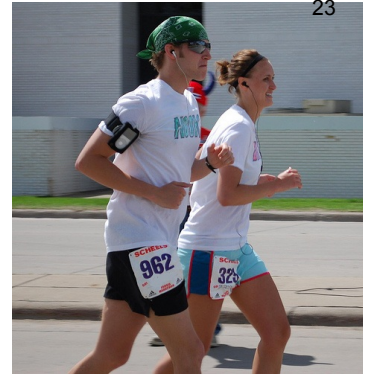
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## 7.4 Training Day

### *A Develop Understanding Task*

Fernando and Mariah are training for six weeks to run in the Salt Lake half-marathon. To train, they run laps around the track at Eastland High School. Since their schedules do not allow them to run together during the week, they each keep a record of the total number of laps they run throughout the week and then always train together on Saturday morning. The following are representations of how each person kept track of the total number of laps that they ran throughout the week plus the number of laps they ran on Saturday.

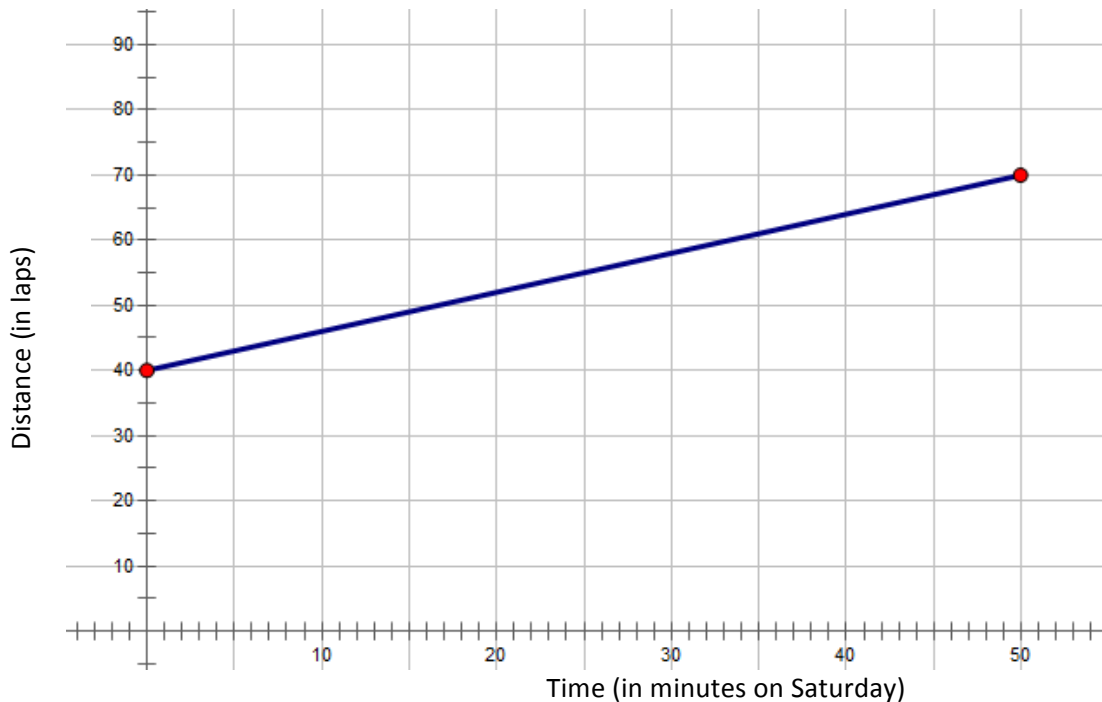


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Fernando's data:

Time (in minutes on Saturday)	0	10	20	30	40	50
Distance (in laps)	60	66	72	78	84	90

Mariah's data:

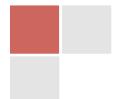


What observations can be made about the similarities and differences between the two trainers?

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1. Write the equation,  $m(t)$ , that models Mariah's distance.
2. Fernando and Mariah both said they ran the same rate during the week when they were training separately. Explain in words how Fernando's equation is similar to Mariah's. Use the sentence frame: The rate of both runners is the same throughout the week, however, Fernando \_\_\_\_\_.
3. In mathematics, sometimes one function can be used to build another. Write Fernando's equation,  $f(t)$ , by starting with Mariah's equation,  $m(t)$ .

$$f(t) =$$

4. Use the mathematical representations given in this task (table and graph) to model the equation you wrote for number 3. Write in words how you would explain this new function to your class.



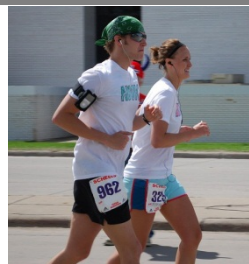


Name: \_\_\_\_\_

# Connecting Algebra and Geometry

7.4

## Ready, Set, Go!

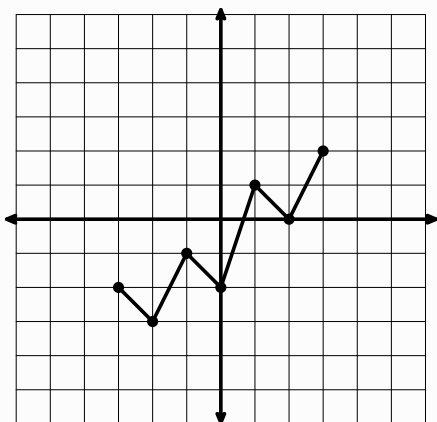


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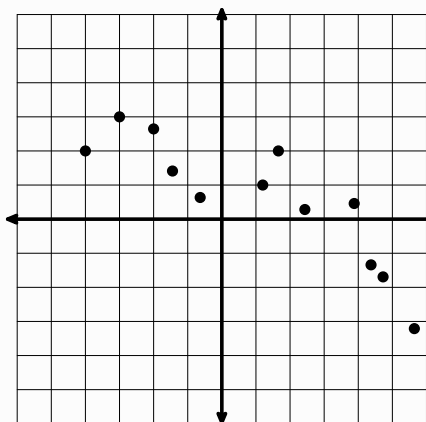
## Ready

Topic: Vertical transformations of graphs

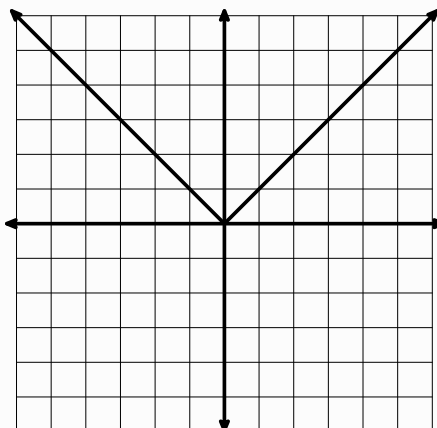
1. Use the graph below to draw a new graph that is translated up 3 units.



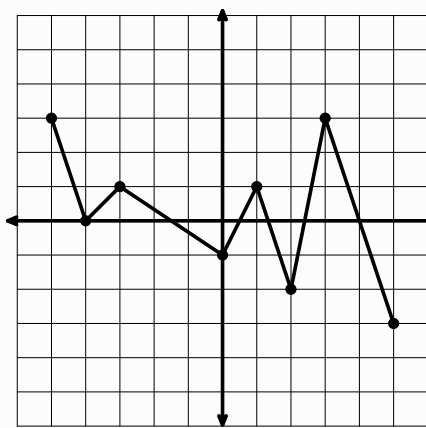
2. Use the graph below to draw a new graph that is translated down 1 unit.



3. Use the graph below to draw a new graph that is translated down 4 units.



4. Use the graph below to draw a new graph that is translated down 3 units.



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Name: \_\_\_\_\_

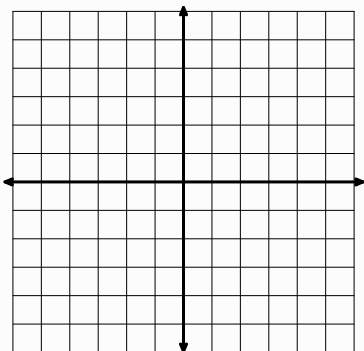
## Connecting Algebra and Geometry | 7.4

## Set

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

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

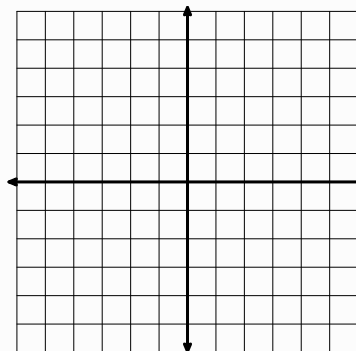
$g(x) = f(x) + 3$



$g(x) = \underline{\hspace{2cm}}$

6.  $f(x) = 0.5x$

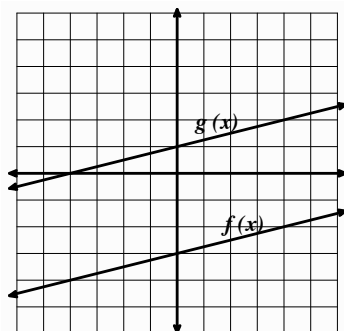
$g(x) = f(x) - 3$



$g(x) = \underline{\hspace{2cm}}$

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

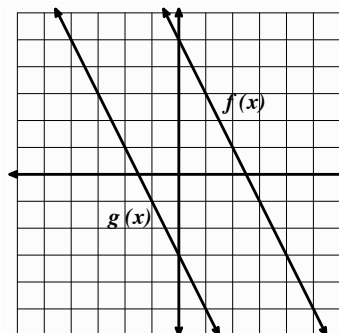
7.  $f(x) = \frac{1}{4}x - 3$



a.  $g(x) = \underline{\hspace{2cm}}$   
Translation form

b.  $g(x) = \underline{\hspace{2cm}}$   
Slope-Intercept form

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



a.  $g(x) = \underline{\hspace{2cm}}$   
Translation form

b.  $g(x) = \underline{\hspace{2cm}}$   
Slope-Intercept form

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Name:

## Connecting Algebra and Geometry | 7.4

## Go

9. 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

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## 7.5 Training Day Part II

### A Practice Understanding Task

Fernando and Mariah continued training in preparation for the half marathon. For the remaining weeks of training, they each separately kept track of the distance they ran during the week. Since they ran together at the same rate on Saturdays, they took turns keeping track of the distance they ran and the time it took. So they would both keep track of their own information, the other person would use the data to determine their own total distance for the week.



<http://www.flickr.com/photos/pdgoodman>

**Week 2:** Mariah had completed 15 more laps than Fernando before they trained on Saturday.

- a. Complete the table for Mariah.

Time (in minutes on Saturday)	0	10	20	30	40	50	60
Fernando: Distance (in laps)	50	56	62	68	74	80	86
Mariah: Distance (in laps)							

- b. Write the equation for Mariah as a transformation of Fernando. Equation for Mariah:  
 $m(t) = f(t)$  \_\_\_\_\_

**Week 3:** On Saturday morning before they started running, Fernando saw Mariah's table and stated, "My equation this week will be  $f(t) = m(t) + 30$ ."

- a. What does Fernando's statement mean?  
 b. Based on Fernando's translated function, complete the table.

Time (in minutes on Saturday)	0	20	40	60	70
Fernando: Distance (in laps)					
Mariah: Distance (in laps)	45	57	69	81	87

- c. Write the equation for both runners:  
 d. Write the equation for Mariah, transformed from Fernando.  
 e. What relationship do you notice between your answers to parts c and d?

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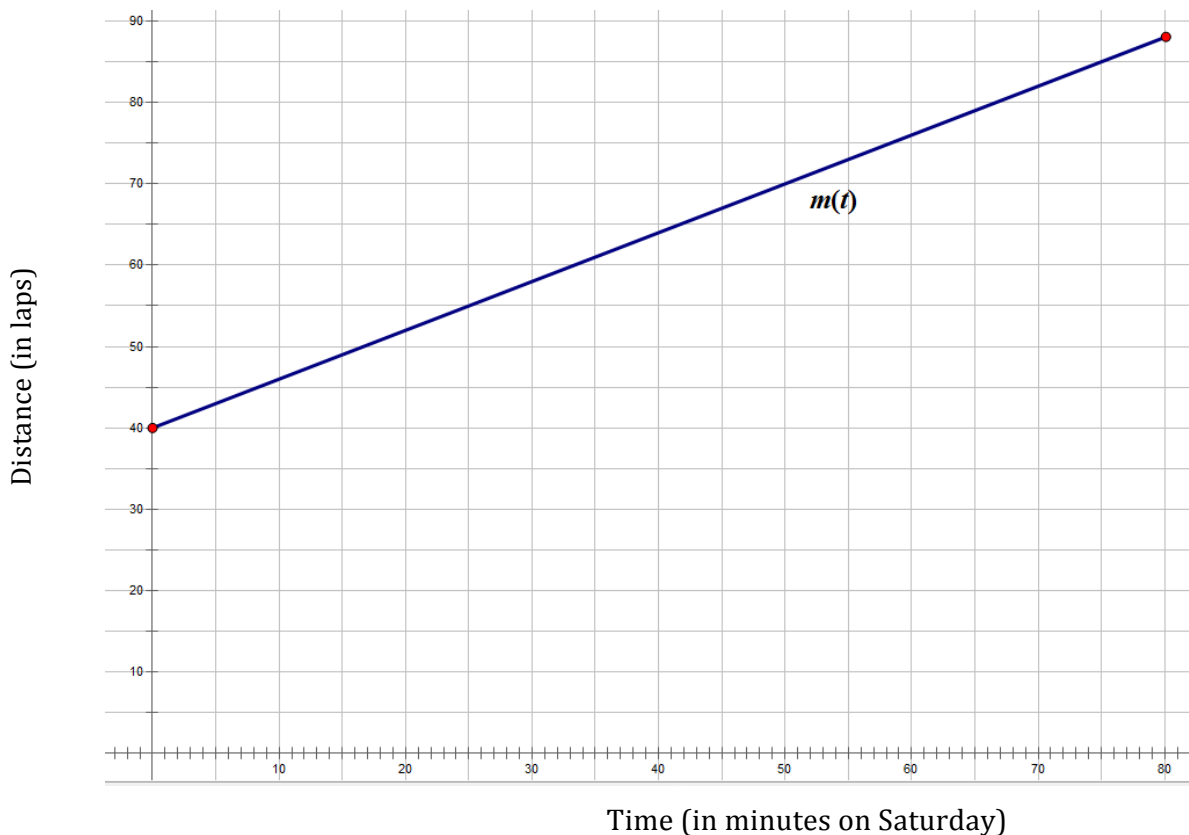
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**Week 4:** The marathon is only a couple of weeks away!

- a. Use Mariah's graph to sketch  $f(t)$ .  $f(t) = m(t) - 10$



- b. Write the equations for both runners.  
 c. What do you notice about the two graphs? Would this always be true if one person ran “ $k$ ” laps more or less each week?

**Week 5:** This is the last week of training together. Next Saturday is the big day. When they arrived to train, they noticed they had both run 60 laps during the week.

- a. Write the equation for Mariah given that they run at the same speed that they have every week.  
 b. Write Fernando's equation as a transformation of Mariah's equation.

**What conjectures can you make about the general statement: “ $g(x) = f(x) + k$ ” when it comes to linear functions?**



Name:

# Connecting Algebra and Geometry

7.5

## Ready, Set, Go!

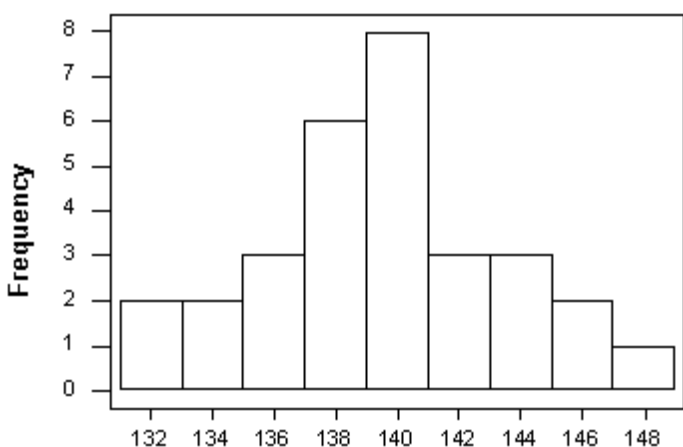


<http://www.flickr.com/photos/pdgoodman>

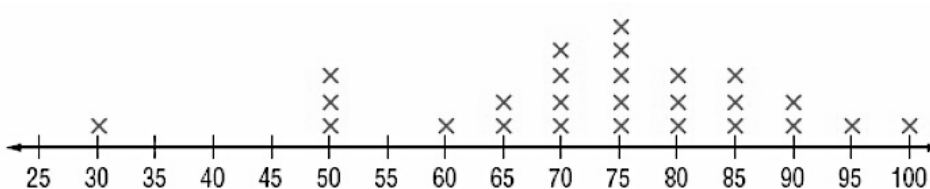
### Ready

Topic: Identifying spread.

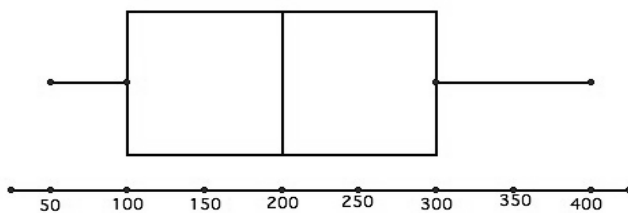
1. Describe the spread in the histogram below.



2. Describe the spread in the line plot below.



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



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Name: \_\_\_\_\_

## Connecting Algebra and Geometry | 7.5

## Set

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

$$g(x) = f(x) + k$$

4.  $f(x) = 7x + 13$   
 $g(x) = 7x - 5$

$$g(x) = \frac{\quad}{\text{Translation form}}$$

5.  $f(x) = 22x - 12$   
 $g(x) = 22x + 213$

$$g(x) = \frac{\quad}{\text{Translation form}}$$

6.  $f(x) = -15x + 305$   
 $g(x) = -15x - 11$

$$g(x) = \frac{\quad}{\text{Translation form}}$$

7.

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

$$g(x) = \frac{\quad}{\text{Translation form}}$$

8.

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

$$g(x) = \frac{\quad}{\text{Translation form}}$$

9.

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

$$g(x) = \frac{\quad}{\text{Translation form}}$$

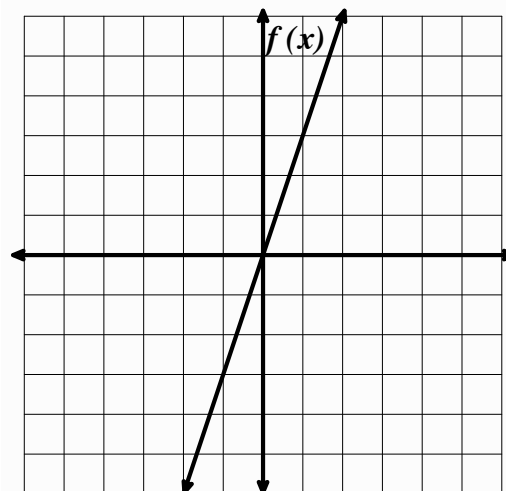
## Go

Topic: Vertical and horizontal translations

10. Use the graph of  $f(x) = 3x$  to answer the following questions.

- Sketch the graph of  $g(x) = 3x - 2$  on the same grid.
- Sketch the graph of  $h(x) = 3(x - 2)$ .
- Describe how  $f(x)$ ,  $g(x)$ , and  $h(x)$  are different and how they are the same.

d. Explain in what way the parentheses affect the graph. Why do you think this is so?



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## 7.6 Shifting Functions

### A Practice Understanding Task



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#### Part I: Transformation of an exponential function.

The table below represents the property value of Rebekah's house over a period of four years.

Rebekah's Home

Time (years)	Property Value	Common Ratio
0	150,000	
1	159,000	
2	168,540	
3	178,652	
4	189,372	

Rebekah says the function  $P(t) = 150,000(1.06)^t$  represents the value of her home.

1. Explain how this function is correct by using the table to show the initial value and the common ratio between terms.

Jeremy lives close to Rebekah and says that his house is always worth \$20,000 more than Rebekah's house. Jeremy created the following table of values to represent the property value of his home.

Jeremy's Home

Time (years)	Property Value	Relationship to Rebekah's table
0	170,000	
1	179,000	
2	188,540	
3	198,652	
4	209,372	

When Rebekah and Jeremy tried to write an exponential function to represent Jeremy's property value, they discovered there was not a common ratio between all of the terms.

2. Use your knowledge of transformations to write the function that could be used to determine the property value of Jeremy's house.

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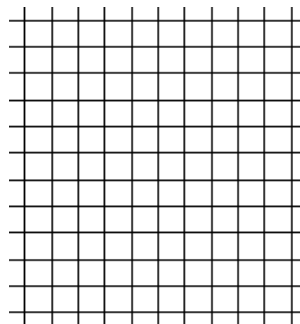
## Part 2: Shifty functions.

Given the function  $g(x)$  and information about  $f(x)$ ,

- write the function for  $f(x)$ ,
- graph both functions on the set of axes, and
- show a table of values that compares  $f(x)$  and  $g(x)$ .

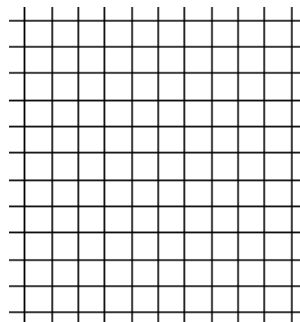
3. If  $g(x) = 3(2)^x$  and  $f(x) = g(x) - 5$ , then  $f(x) =$  \_\_\_\_\_

$x$				
$f(x)$				
$g(x)$				



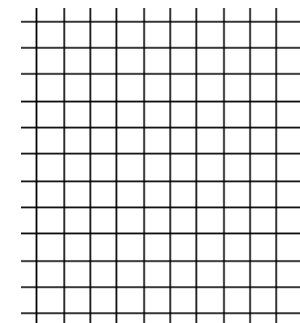
4. If  $g(x) = 4(.5)^x$  and  $f(x) = g(x) + 3$ , then  $f(x) =$  \_\_\_\_\_

$x$				
$f(x)$				
$g(x)$				



5. If  $g(x) = 4x + 3$  and  $f(x) = g(x) + 7$ , then  $f(x) =$  \_\_\_\_\_

$x$				
$f(x)$				
$g(x)$				



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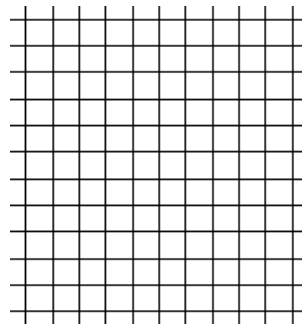
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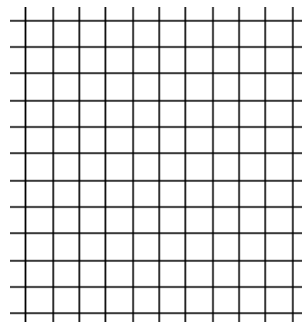
6. If  $g(x) = 2x + 1$  and  $f(x) = g(x) - 4$ , then  $f(x) =$  \_\_\_\_\_

$x$				
$f(x)$				
$g(x)$				



7. If  $g(x) = -x$  and  $f(x) = g(x) + 3$ , then  $f(x) =$  \_\_\_\_\_

$x$				
$f(x)$				
$g(x)$				



**Part III: Communicate your understanding.**

8. If  $f(x) = g(x) + k$ , describe the relationship between  $f(x)$  and  $g(x)$ . Support your answers with tables and graphs.



Name:

Connecting Algebra and Geometry **7.6****Ready, Set, Go!**

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**Ready**

Topic: Finding percentages.

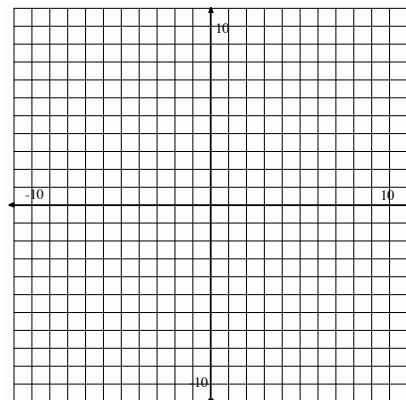
**Mrs. Gonzalez noticed that her new chorus class had a lot more girls than boys in it. There were 32 girls and 17 boys. (Round answers to the nearest %.)**

1. What percent of the class are girls?
2. What percent are boys?
3. 68% of the girls were sopranos.
  - a. How many girls sang soprano?
  - b. What percent of the entire chorus sang soprano?
4. Only 30% of the boys could sing bass.
  - a. How many boys were in the bass section?
  - b. What percent of the entire chorus sang bass?
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.

**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.
  - b. Use your calculator to 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.



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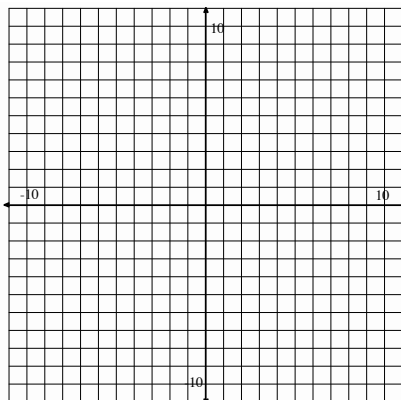
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# Name: \_\_\_\_\_ Connecting Algebra and Geometry | 7.6

7. Think about the graphs of  $y = 2^x$  and  $y = 2^{(x-4)}$
- Predict what you think is the same and what is different.

- Use your calculator to graph both equations on the same grid.  
Explain what stayed the same and what changed.  
Identify in what way it changed.

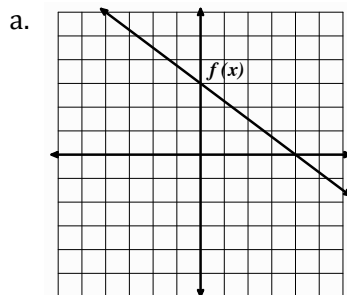


## Go

Topic: Vertical translations of linear equations

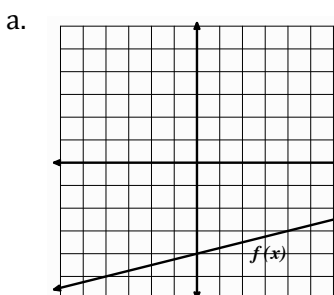
The graph of  $f(x)$  and the translation form equation of  $g(x)$  are given. Graph  $g(x)$  on the same grid and write the slope-intercept equation of  $f(x)$  and  $g(x)$ .

8.  $g(x) = f(x) - 5$



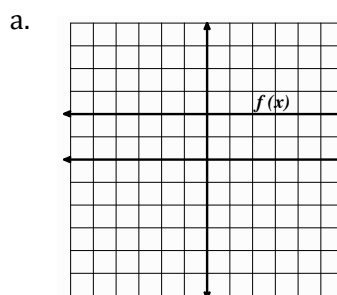
- $f(x) =$  \_\_\_\_\_
- $g(x) =$  \_\_\_\_\_  
Slope-Intercept form

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



- $f(x) =$  \_\_\_\_\_
- $g(x) =$  \_\_\_\_\_  
Slope-Intercept form

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



- $f(x) =$  \_\_\_\_\_
- $g(x) =$  \_\_\_\_\_  
Slope-Intercept form

Need Help? Check out these related videos:

<http://www.khanacademy.org/math/arithmetic/percents/v/identifying-percent-amount-and-base>

