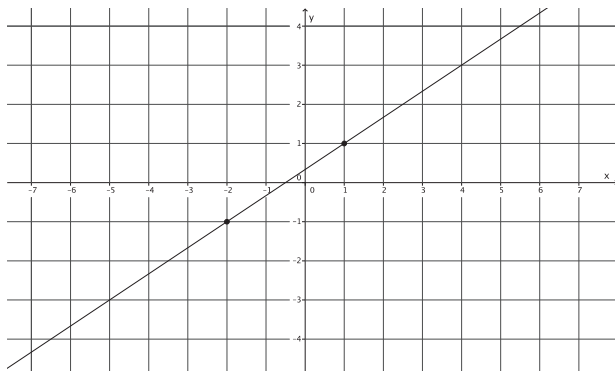# Lesson 15: The Slope of a Non-Vertical Line
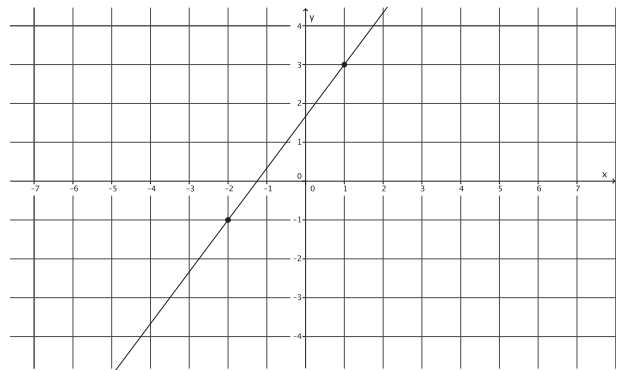
Classwork

Opening Exercise

Graph A

Graph B

a.   Which graph is steeper?

b.   Write directions that explain how to move from one point on the graph to the other for both Graph A and Graph B.

c.   Write the directions from part (b) as ratios, and then compare the ratios. How does this relate to which graph was steeper in part (a)?
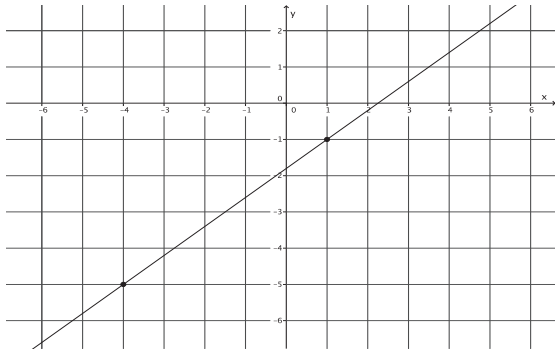
Pair 1:

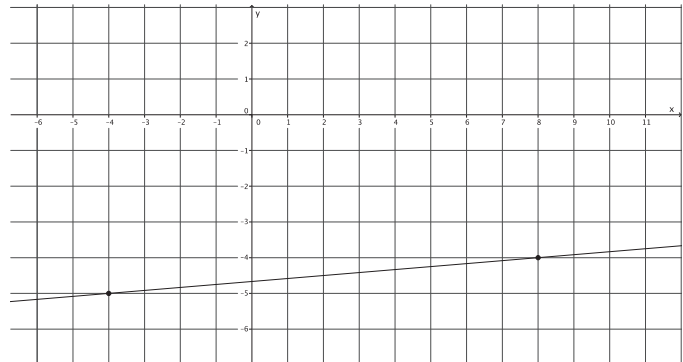**Graph A**

Graph B

a.   Which graph is steeper?

b.   Write directions that explain how to move from one point on the graph to the other for both Graph A and Graph B.

c.   Write the directions from part (b) as ratios, and then compare the ratios. How does this relate to which graph was steeper in part (a)?
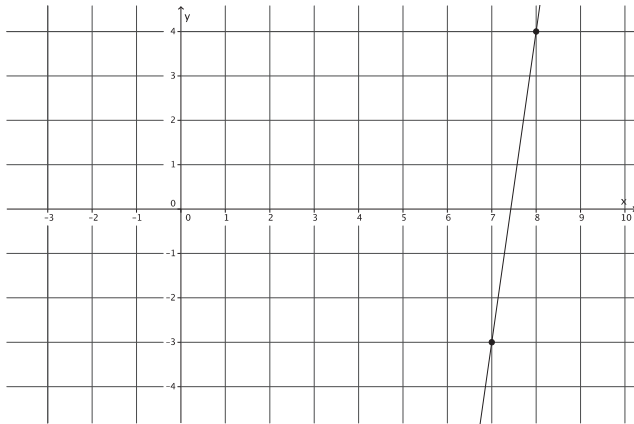
Pair 2:

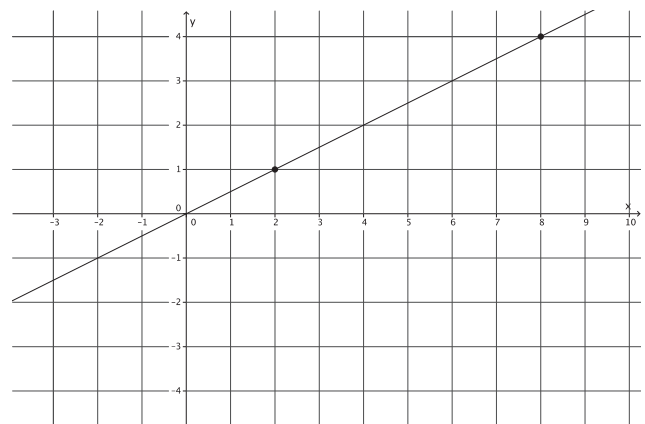**Graph A**

Graph B

a. Which graph is steeper?

b. Write directions that explain how to move from one point on the graph to the other for both Graph A and Graph B.

c. Write the directions from part (b) as ratios, and then compare the ratios. How does this relate to which graph was steeper in part (a)?

Pair 3:

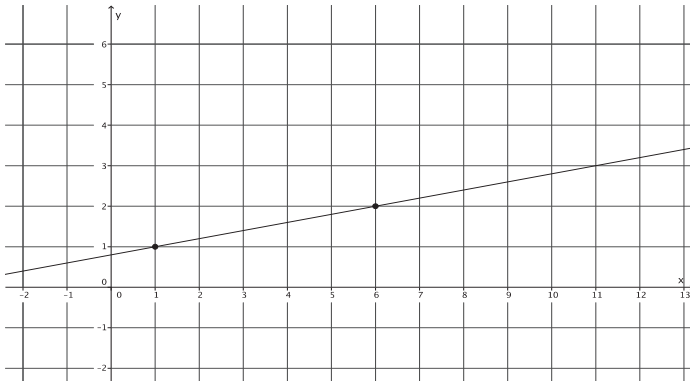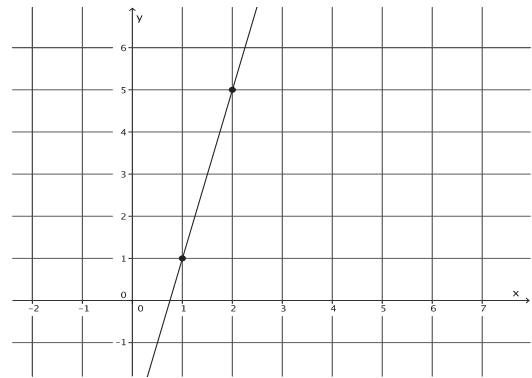**Graph A**   **Graph B**

a.   Which graph is steeper?

b.   Write directions that explain how to move from one point on the graph to the other for both Graph A and Graph B.

c.   Write the directions from part (b) as ratios, and then compare the ratios. How does this relate to which graph was steeper in part (a)?
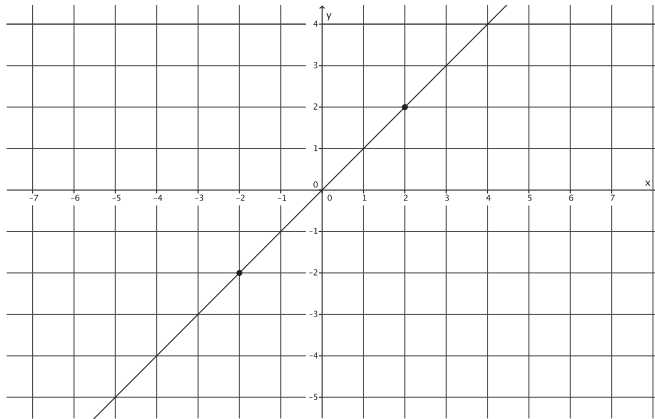
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Pair 4:

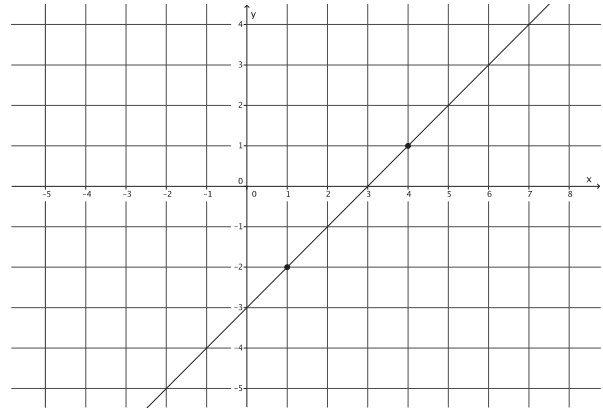**Graph A**

Graph B

a.   Which graph is steeper?

b.   Write directions that explain how to move from one point on the graph to the other for both Graph A and Graph B.

c.   Write the directions from part (b) as ratios, and then compare the ratios. How does this relate to which graph was steeper in part (a)?
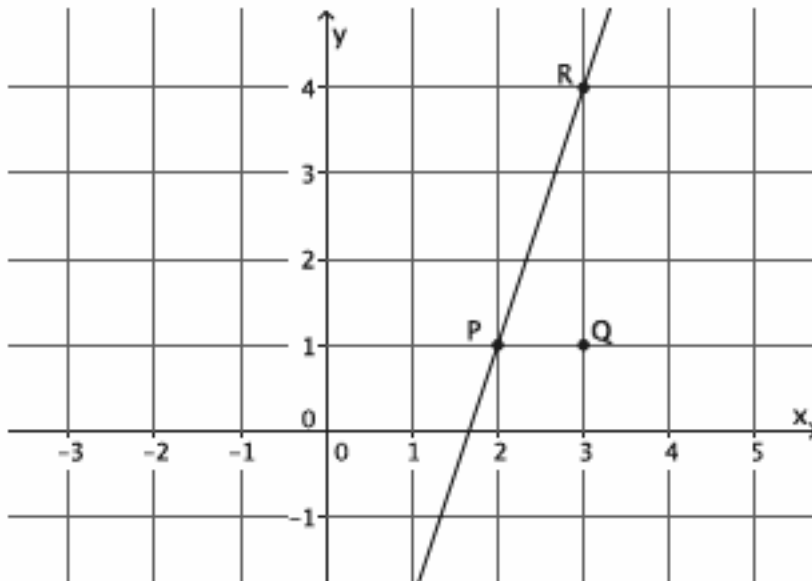
Exercises

Use your transparency to find the slope of each line if needed.

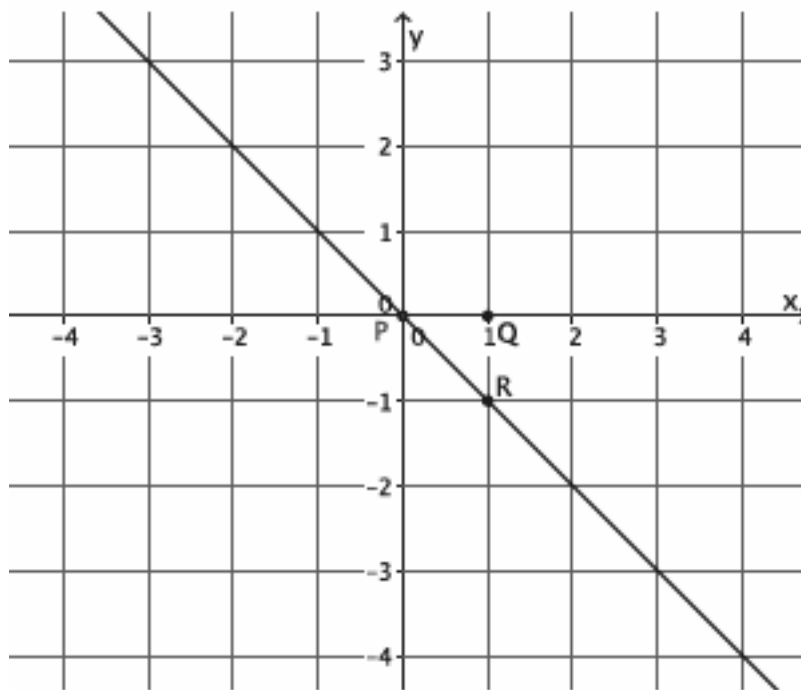1. What is the slope of this non-vertical line?
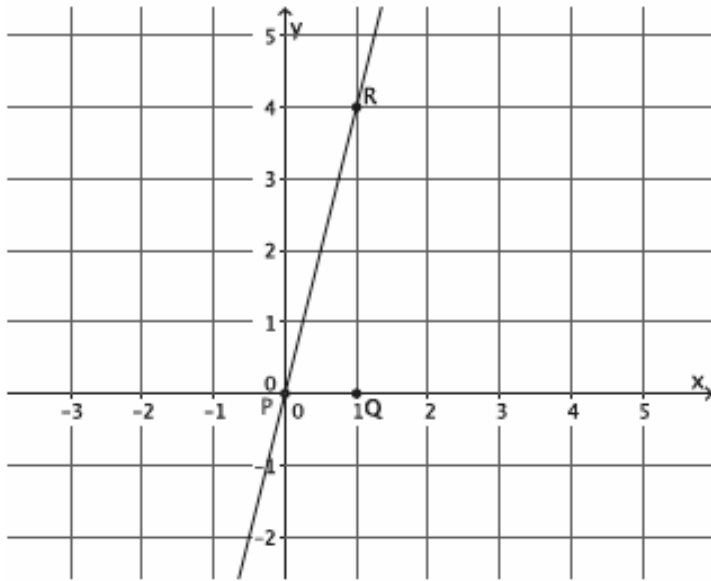
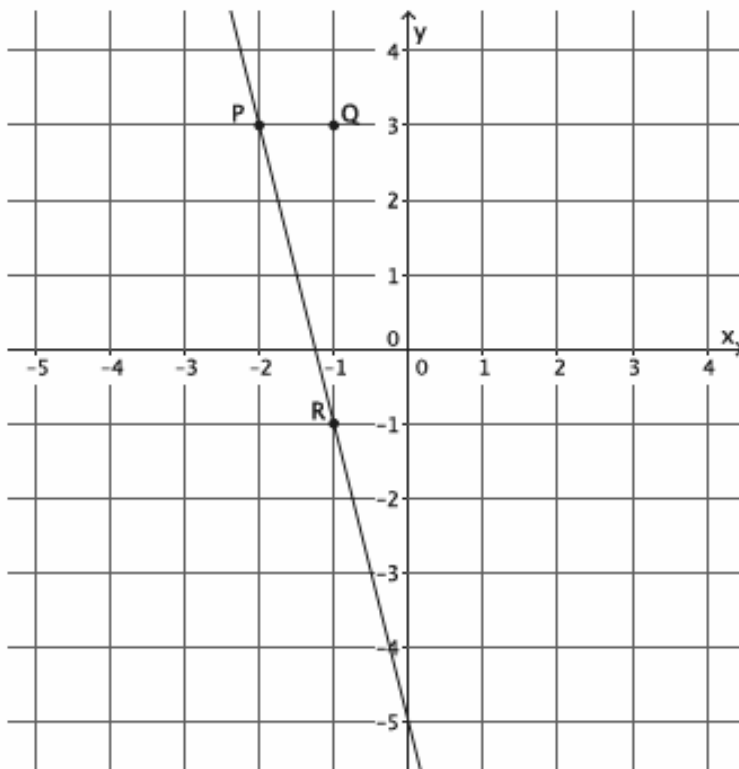2. What is the slope of this non-vertical line?

3.   Which of the lines in Exercises 1 and 2 is steeper? Compare the slopes of each of the lines. Is there a relationship between steepness and slope?
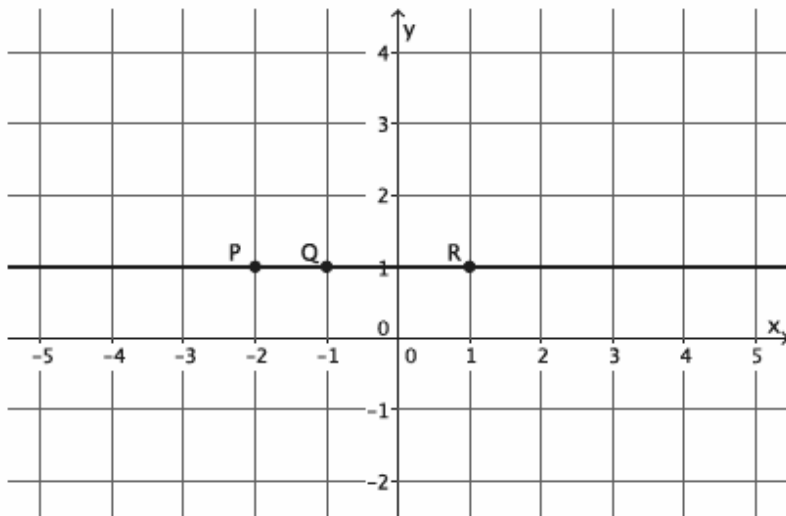
4.   What is the slope of this non-vertical line?

5. What is the slope of this non-vertical line?

6. What is the slope of this non-vertical line?
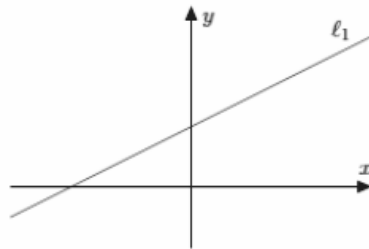
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Lesson Summary

Slope is a number that can be used to describe the steepness of a line in a coordinate plane. The slope of a line is often represented by the symbol m.

Lines in a coordinate plane that are *left-to-right inclining* have a positive slope, as shown below.


Lines in a coordinate plane that are *left-to-right declining* have a negative slope, as shown below.
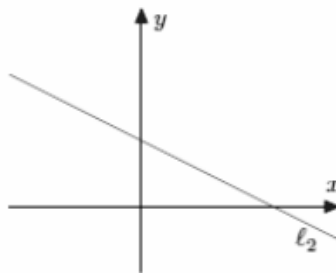

Determine the slope of a line when the horizontal distance between points is fixed at 1 by translating point Q to the origin of the graph and then identifying the y-coordinate of point R; by definition, that number is the slope of the line.

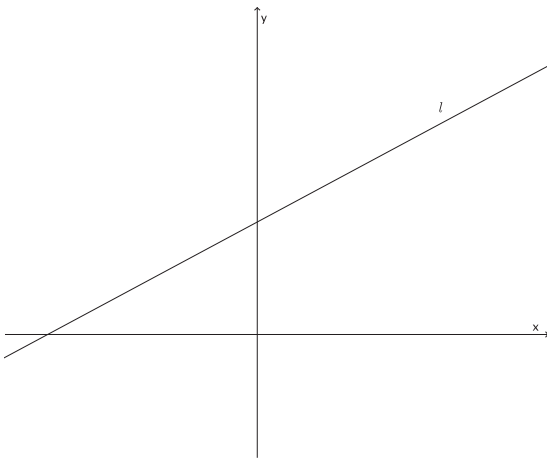The slope of the line shown below is 2, so $m = 2$, because point R is at 2 on the y-axis.
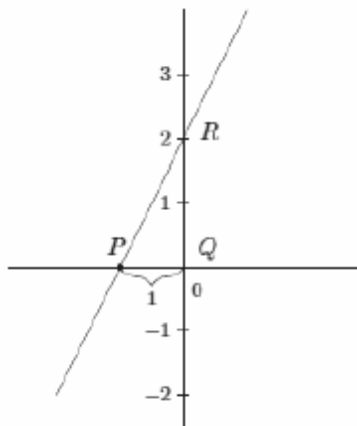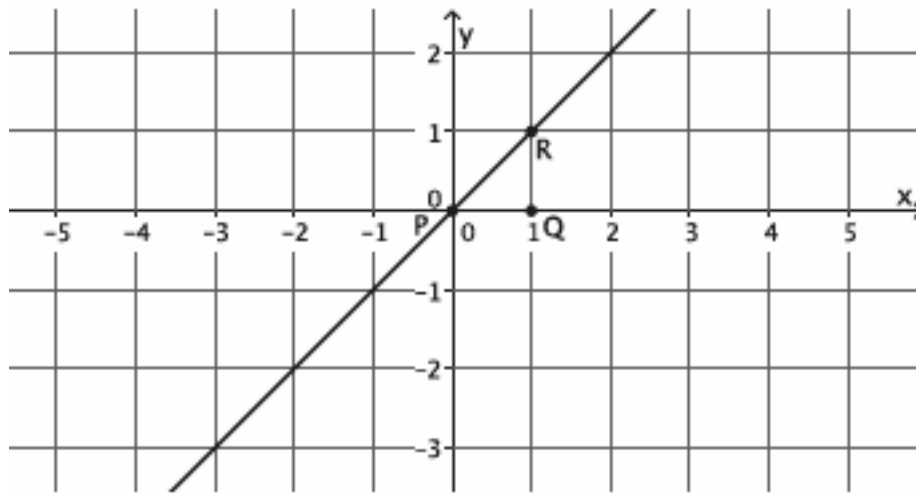
Problem Set

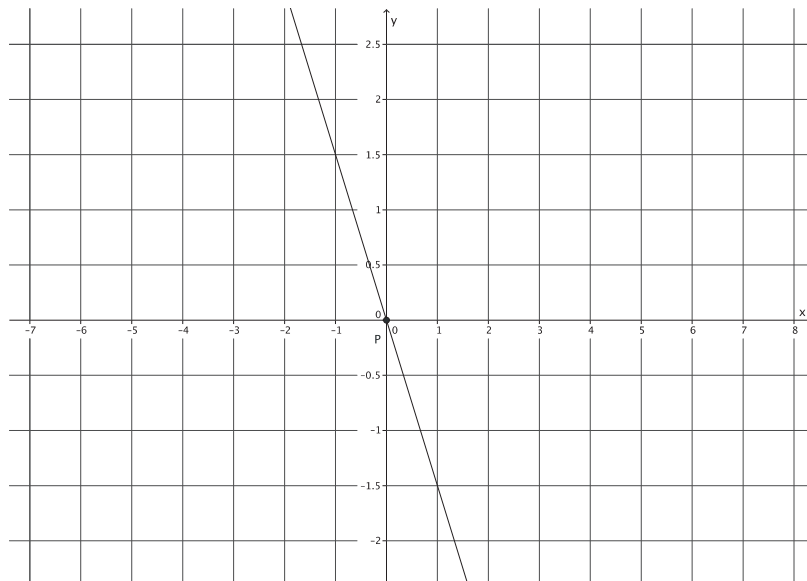1. Does the graph of the line shown below have a positive or negative slope? Explain.
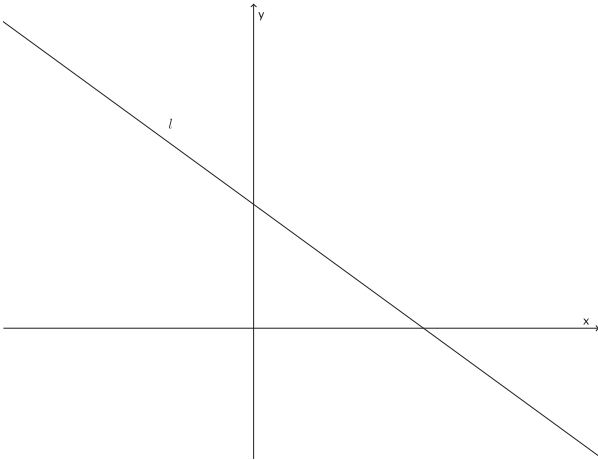
2. Does the graph of the line shown below have a positive or negative slope? Explain.

3. What is the slope of this non-vertical line? Use your transparency if needed.

4. What is the slope of this non-vertical line? Use your transparency if needed.

5. What is the slope of this non-vertical line? Use your transparency if needed.

6. What is the slope of this non-vertical line? Use your transparency if needed.

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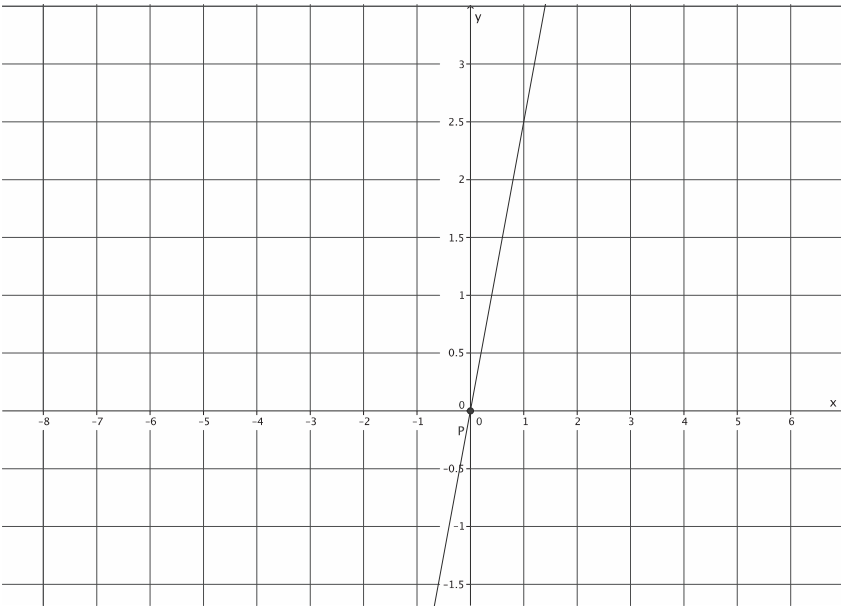7. What is the slope of this non-vertical line? Use your transparency if needed.

8. What is the slope of this non-vertical line? Use your transparency if needed.

9. What is the slope of this non-vertical line? Use your transparency if needed.
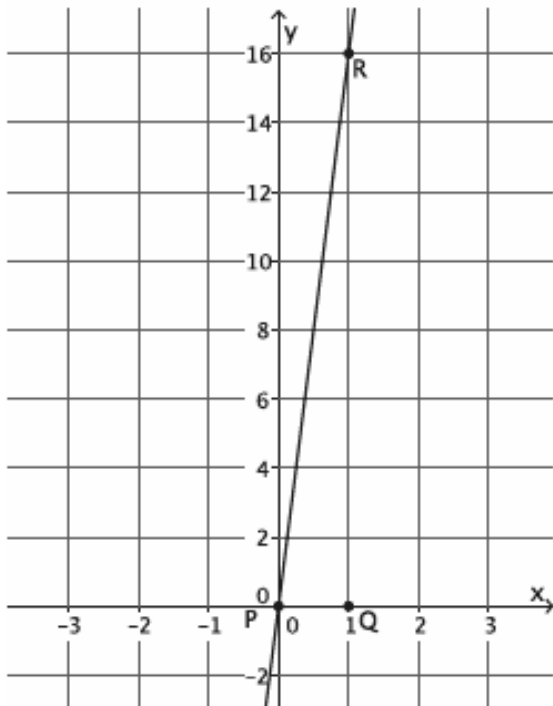

10. What is the slope of this non-vertical line? Use your transparency if needed.

11. What is the slope of this non-vertical line? Use your transparency if needed.

12. What is the slope of this non-vertical line? Use your transparency if needed.

13. What is the slope of this non-vertical line? Use your transparency if needed.

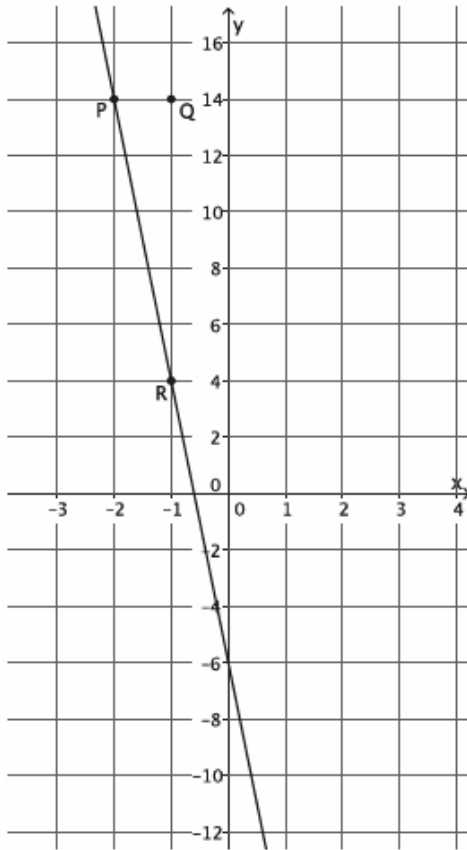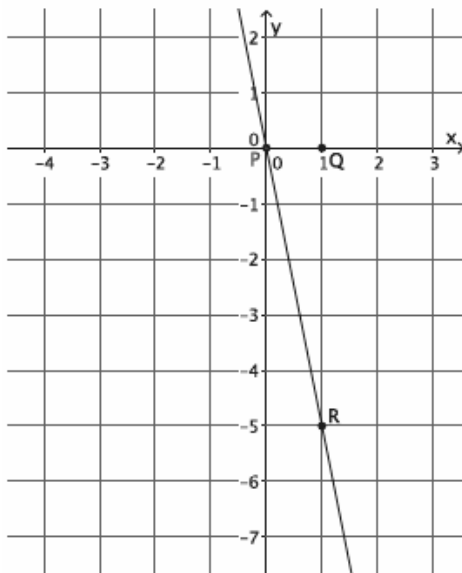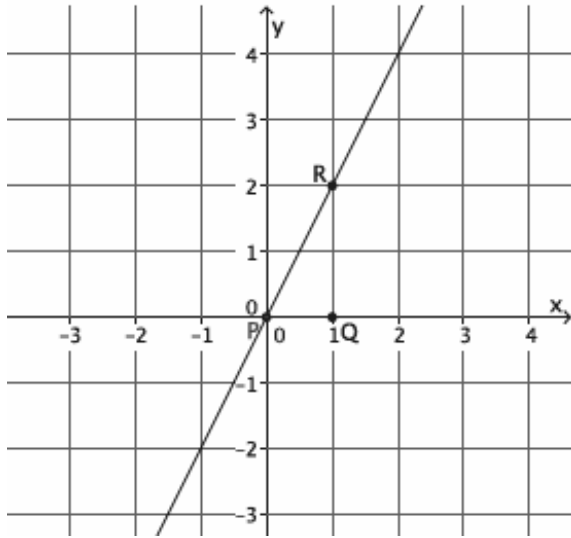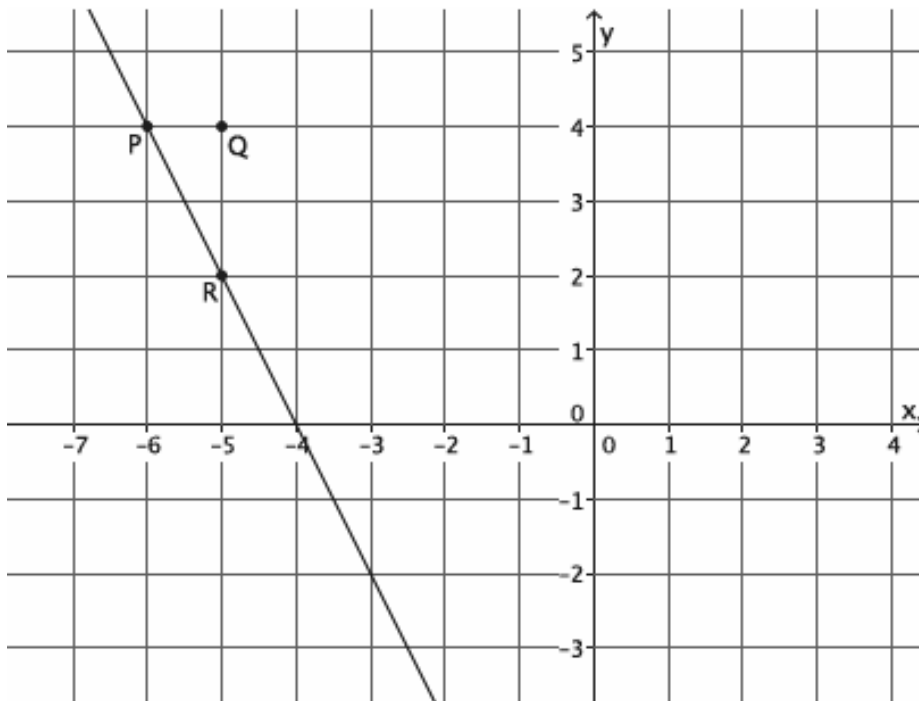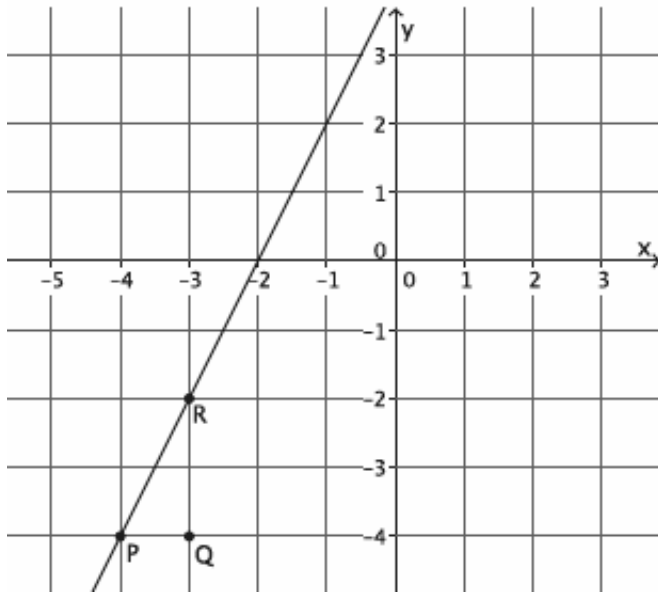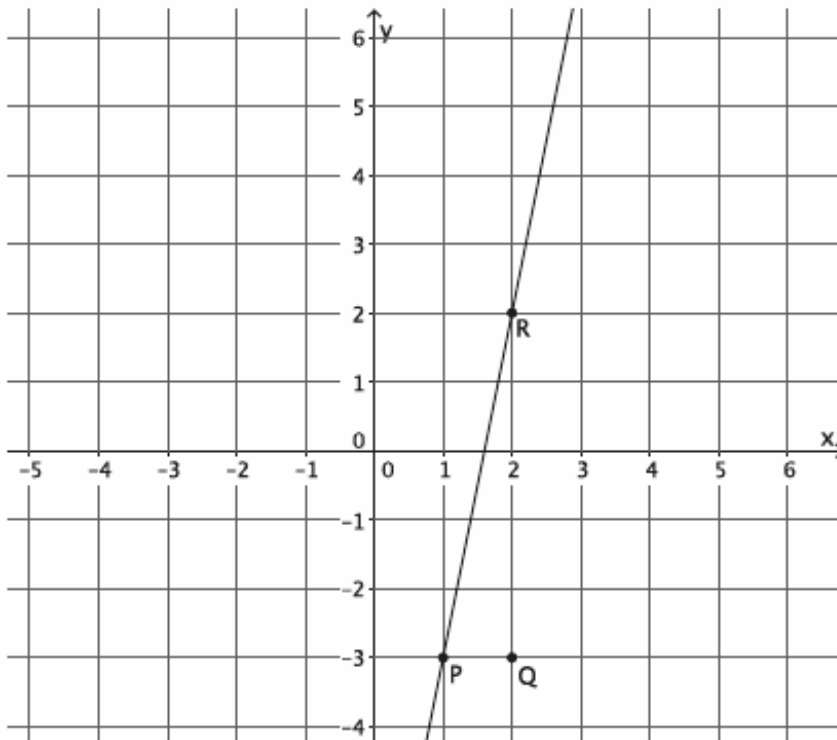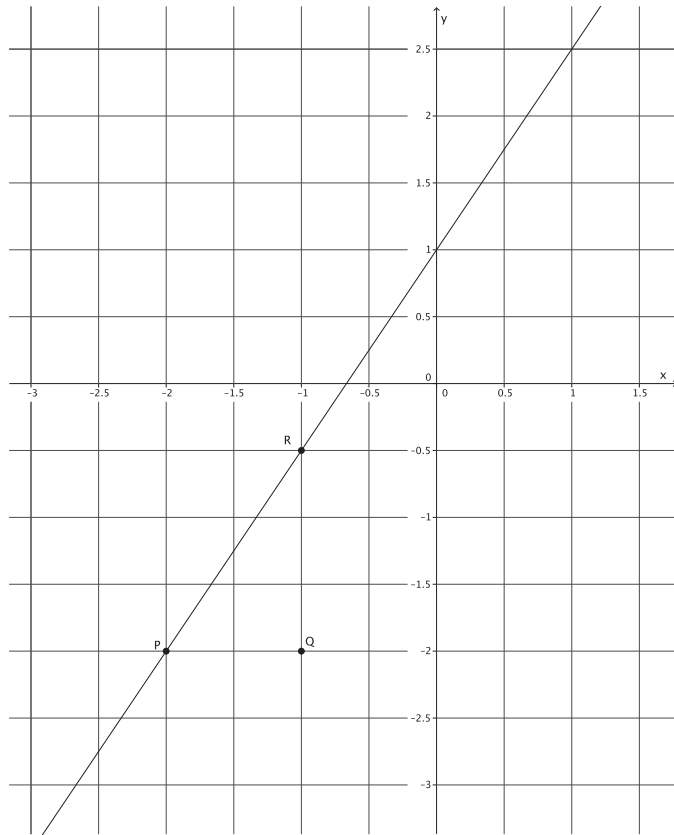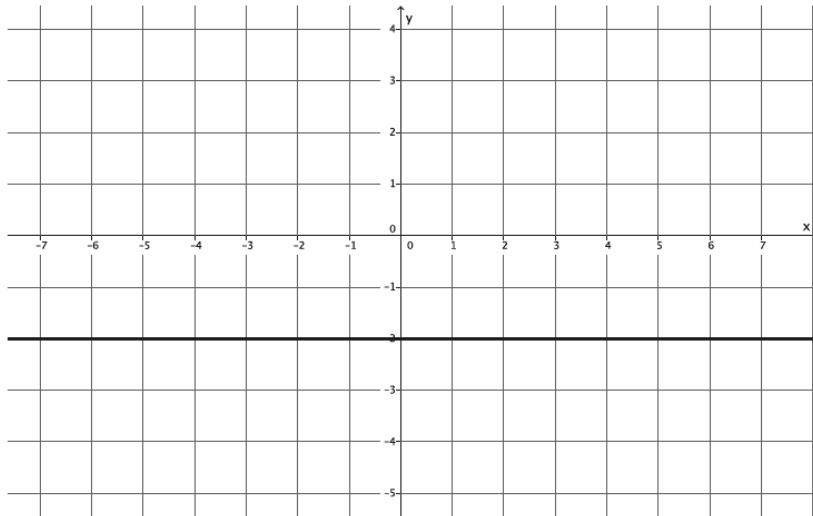14. What is the slope of this non-vertical line? Use your transparency if needed.

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In Lesson 11, you did the work below involving constant rate problems. Use the table and the graphs provided to answer the questions that follow.

15. Suppose the volume of water that comes out in three minutes is 10.5 gallons.

t (time in minutes)	Linear Equation: $V = \dfrac{10.5}{3}t$	V (in gallons)
0	$V = \dfrac{10.5}{3}(0)$	0
1	$V = \dfrac{10.5}{3}(1)$	$\dfrac{10.5}{3} = 3.5$
2	$V = \dfrac{10.5}{3}(2)$	$\dfrac{21}{3} = 7$
3	$V = \dfrac{10.5}{3}(3)$	$\dfrac{31.5}{3} = 10.5$
4	$V = \dfrac{10.5}{3}(4)$	$\dfrac{42}{3} = 14$

a. How many gallons of water flow out of the faucet per minute? In other words, what is the unit rate of water flow?

b. Assume that the graph of the situation is a line, as shown in the graph. What is the slope of the line?
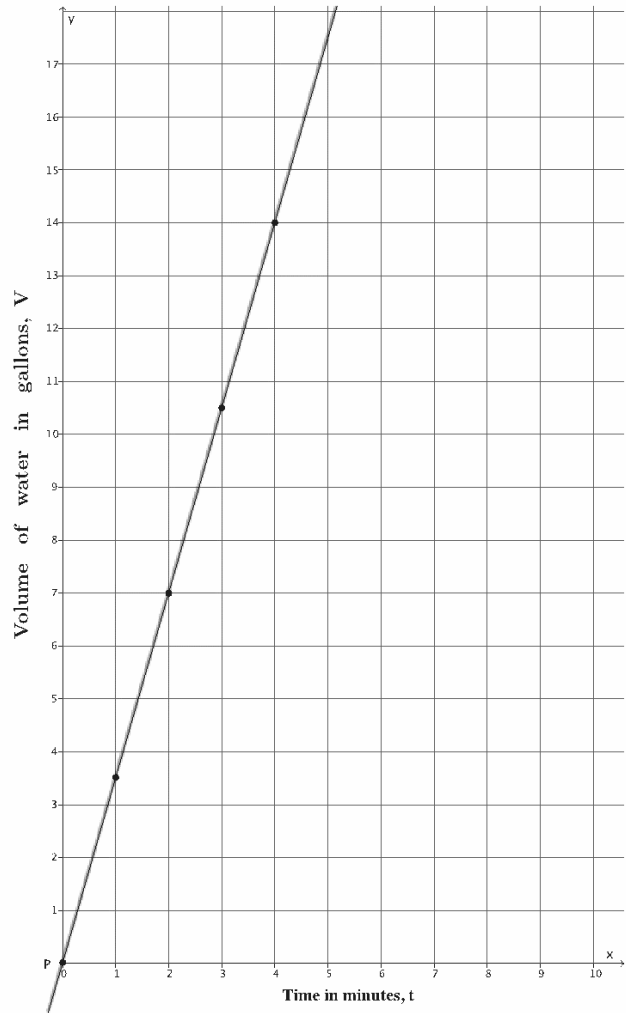
16. Emily paints at a constant rate. She can paint 32 square feet in five minutes.
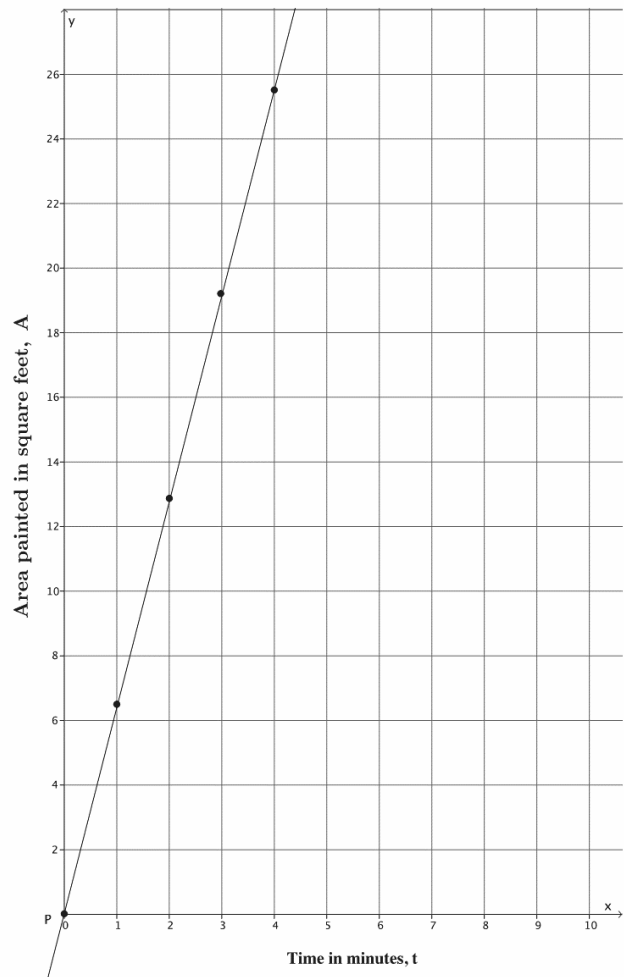
t (time in minutes)	Linear Equation: $A = \dfrac{32}{5}t$	A (area painted in square feet)
0	$A = \dfrac{32}{5}(0)$	0
1	$A = \dfrac{32}{5}(1)$	$\dfrac{32}{5} = 6.4$
2	$A = \dfrac{32}{5}(2)$	$\dfrac{64}{5} = 12.8$
3	$A = \dfrac{32}{5}(3)$	$\dfrac{96}{5} = 19.2$
4	$A = \dfrac{32}{5}(4)$	$\dfrac{128}{5} = 25.6$

a. How many square feet can Emily paint in one minute? In other words, what is her unit rate of painting?

b. Assume that the graph of the situation is a line, as shown in the graph. What is the slope of the line?

17. A copy machine makes copies at a constant rate. The machine can make 80 copies in $2\frac{1}{2}$ minutes.

t (time in minutes)	Linear Equation: $n = 32t$	n (number of copies)
0	$n = 32(0)$	0
0.25	$n = 32(0.25)$	8
0.5	$n = 32(0.5)$	16
0.75	$n = 32(0.75)$	24
1	$n = 32(1)$	32

a. How many copies can the machine make each minute? In other words, what is the unit rate of the copy machine?

b. Assume that the graph of the situation is a line, as shown in the graph. What is the slope of the line?