

## Bell Ringer

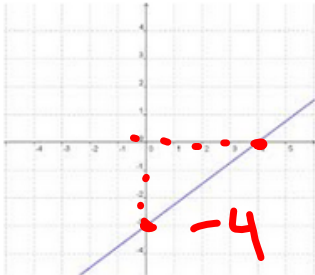
Section 3.4 B – Transforming a Function

1) How does the graph  $f(x) = 2x$  differ from the graph  $g(x) = 2x - 4$ ?  
How are they alike?  
same slope

2)  $f(x) = 3x - 5$  and  $g(x) = f(x - 4)$ . Use graph if needed  
How do  $g(x)$  and  $f(x)$  differ? How are they alike?  
same slope  
 $f(x-4) = 3(x-4) - 5$   
 $3x - 12 - 5$   
 $3x - 17$

3) Which has the greatest rate of change? C Which has the greatest y-intercept? A

a.  $y = \frac{1}{2}x + 4$   
 $\frac{1}{2}$

b.  $\frac{3}{4}$   


c. 

x	y
0	3
2	11
4	19
6	27
8	35

  
 $\frac{8}{4} = 4$

## Section 3.4 B – Transforming a Function

**Solutions**

1) How does the graph  $f(x) = 2x$  differ from the graph  $g(x) = 2x - 4$ ?  
How are they alike?

Same slope,  $g(x)$  is down 4

2) If  $f(x) = 3x - 5$  and  $g(x) = f(x - 4)$ ,  
How do  $g(x)$  and  $f(x)$  differ? How are they alike?

Same slope,  $g(x)$  is right 4

Use graph if needed

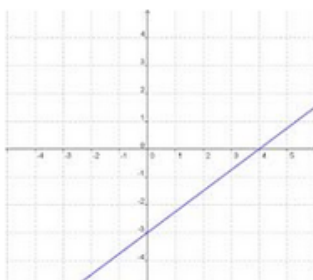


3) Which has the greatest rate of change? **C**

Which has the greatest y-intercept? **A**

a.  $y = 1/2x + 4$

b.



c.

$x$	$y$
0	3
2	11
4	19
6	27
8	35

correct 3.4 point-slope ws

Name key

HW 3.4 Point-Slope Form

Hour \_\_\_\_\_

In Exercises 1-6, write an equation in point-slope form of the line that passes through the given point and has the given slope.

+1

1.  $(7, 4)$   $m = 3$

$$y - 4 = 3(x - 7)$$

2.  $(-6, 1)$   $m = -4$

$$y - 1 = -4(x + 6)$$

3.  $(0, -2)$   $m = \frac{4}{5}$

$$y + 2 = \frac{4}{5}x$$

+1

4.  $(-1, -3)$   $m = -\frac{1}{3}$

$$y + 3 = -\frac{1}{3}(x + 1)$$

5.  $(4, 0)$   $m = 2$

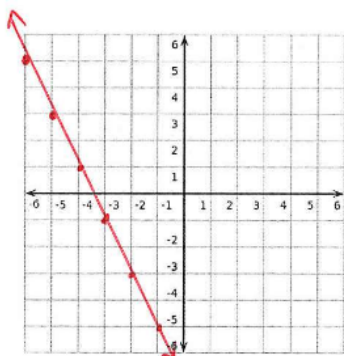
$$y = 2(x - 4)$$

6.  $(-1, 1)$   $m = \frac{1}{3}$

$$y - 1 = \frac{1}{3}(x + 1)$$

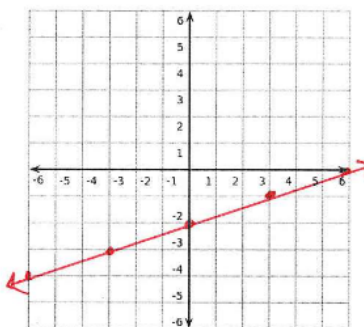
In exercises 7-9, graph the line given a point on the line and the slope.

7.  $(-6, 5)$   $m = -2$



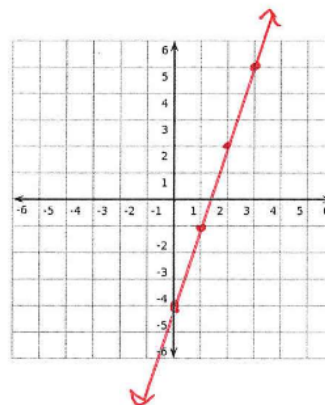
+1

8.  $(1, -1)$   $m = \frac{1}{3}$



+1

9.  $(0, -4)$   $m = 3$



In exercises 10-12, give the slope of the following lines, then name a point on each line.

10.  $y + 6 = \frac{5}{6}(x + 1)$

Slope =  $\frac{5}{6}$

Point  $(-1, -6)$

11.  $y - 3 = -\frac{2}{5}(x + 2)$

Slope =  $-\frac{2}{5}$

Point  $(-2, 3)$

12.  $y = -\frac{1}{2}(x - 5)$

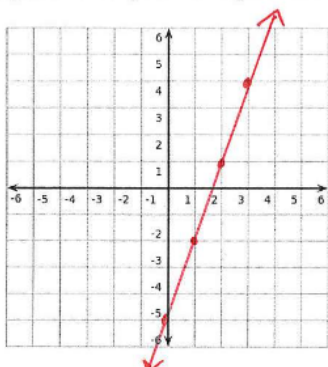
Slope =  $-\frac{1}{2}$

Point  $(5, 0)$

In exercises 13-14, graph the lines given the equation in point-slope form

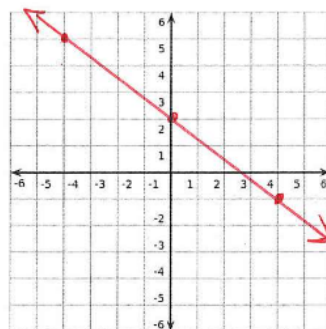
13.  $y + 2 = 3(x - 1)$

$(1, -2)$



14.  $y - 5 = -\frac{3}{4}(x + 4)$

$(-4, 5)$



In exercises 15-16, write an equation of the line in point-slope form that passes through the given points

15.  $(-1, -2)$  and  $(2, 4)$

$m = \frac{4 - (-2)}{2 - (-1)} = \frac{6}{3} = 2$

$y + 2 = 2(x + 1)$   
OR  
 $y - 4 = 2(x - 2)$

16.  $(3, 0)$  and  $(-8, 1)$

$m = \frac{1 - 0}{-8 - 3} = -\frac{1}{11}$

$y - 0 = -\frac{1}{11}(x - 3)$   
OR  
 $y - 1 = -\frac{1}{11}(x + 8)$

In Exercises 17-20, convert the equation from point-slope form to slope-intercept form.

17.  $y + 6 = -2(x - 4)$

$y + 6 = -2x + 8$   
 $-6$

$y = -2x + 2$

18.  $y + 7 = 4(x + 3)$

$y + 7 = 4x + 12$   
 $-7$

$y = 4x + 5$

19.  $y - 8 = \frac{1}{3}(x + 9)$

$y - 8 = \frac{1}{3}x + 3$   
 $+8$

$y = \frac{1}{3}x + 11$

20.  $y - 1 = \frac{2}{5}(x + 10)$

$y - 1 = \frac{2}{5}x + 4$   
 $+1$

$y = \frac{2}{5}x + 5$

21. Is  $y - 4 = 3(x + 1)$  an equation of a line through  $(-2, 1)$ ? Explain

$1 - 4 = 3(-2 + 1)$

$-3 = 3(-1)$

$-3 = -3$  ✓

Yes!

Plug in -2 for x and 1 for y.  
You get a true statement.

Hw tracker due Mon --> Week 5-6

3.1 #s 9-11 all, 15-37 odds

3.2 #s 9-15, 17, 18, 21, 23-26, 28, 31

3.3 #s 13-17 all, 21-25 odds, 41

3.4 - Pt-Slope Form ws

/50

3.4 - Transformation ws & 3.4 #22-23

due Monday:

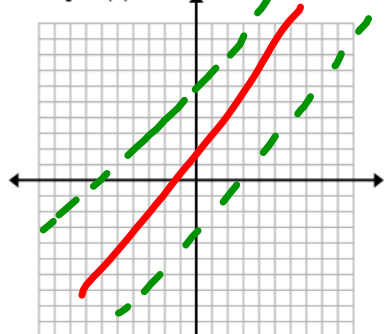
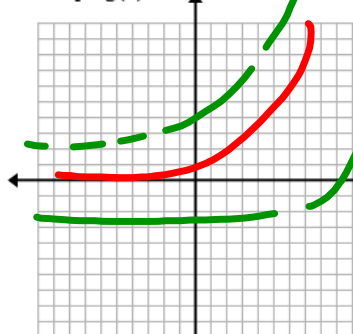
Transformation of functions blue ws &  
3.4 #s 22-23

Name \_\_\_\_\_ Hour \_\_\_\_\_ Date \_\_\_\_\_ Score \_\_\_\_\_

## Transformations of Functions

$$f(x) = 3x + 2$$

$$g(x) = 2^x + 3$$

1. Graph  $f(x)$ .2. Graph  $g(x)$ .

3. Compare and contrast the 2 graphs.

---



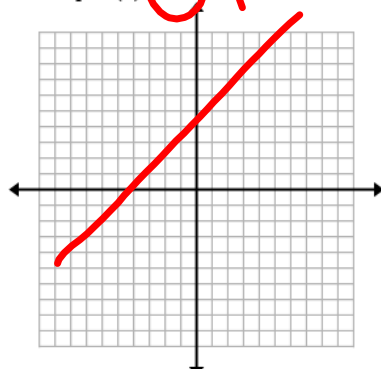
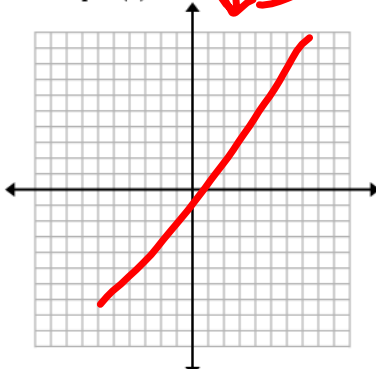
---



---



---

4. Graph  $f(x) + 3$ .5. Graph  $f(x) - 3$ .6. Compare and contrast the 2 graphs with the graph of  $f(x)$ .

---



---

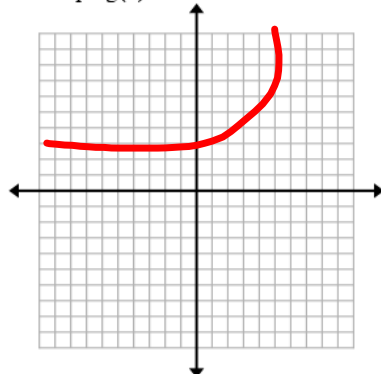
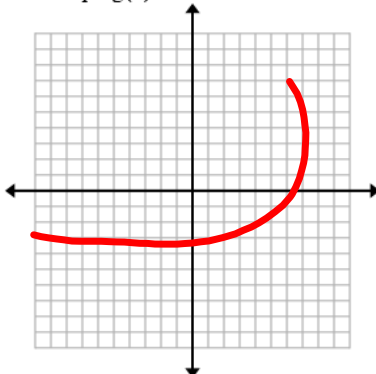


---



---

moves up 3  
or down 3

7. Graph  $g(x) + 3$ .8. Graph  $g(x) - 3$ .9. Compare and contrast the 2 graphs with the graph of  $g(x)$ .

---



---



---



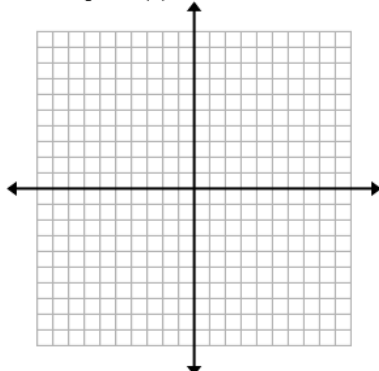
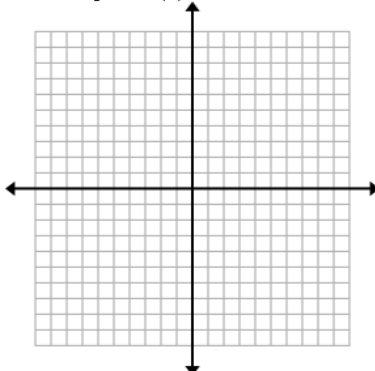
---

up 3  
down 3

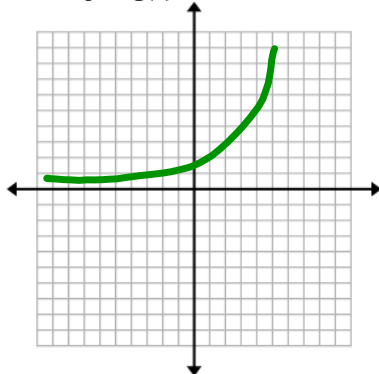
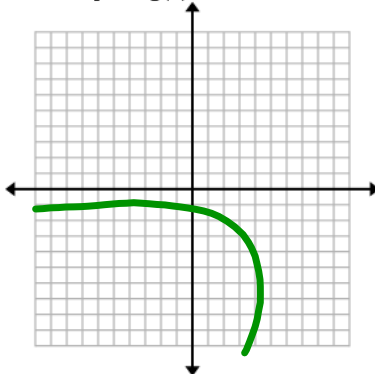
10. What does adding or subtracting a constant from the output of a function do to the graph of the function? \_\_\_\_\_

moves it up or down



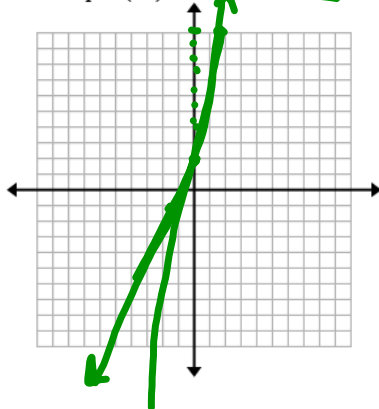
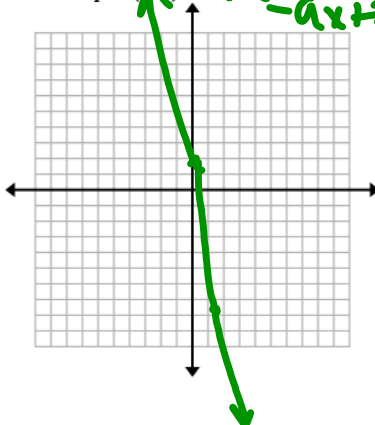
11. Graph  $3 \cdot f(x)$ .12. Graph  $-3 \cdot f(x)$ .13. Compare and contrast the 2 graphs with the graph of  $f(x)$ .

steeper slope  
reflect over  
x-axis

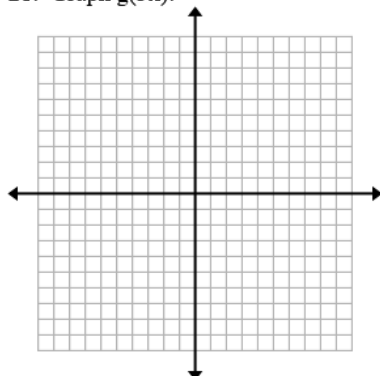
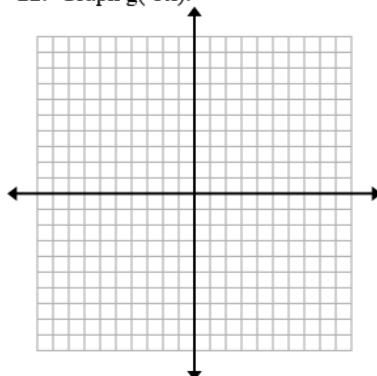
14. Graph  $3 \cdot g(x)$ .15. Graph  $-3 \cdot g(x)$ .16. Compare and contrast the 2 graphs with the graph of  $g(x)$ .

17. What does multiplying a constant to the output of a function do to the graph of the function?

stretches, steeper neg  $\rightarrow$  reflects over  
x-axis

18. Graph  $f(3x)$ .19. Graph  $f(-3x)$ .20. Compare and contrast the 2 graphs with the graph of  $f(x)$ .

reflect over y

21. Graph  $g(3x)$ .22. Graph  $g(-3x)$ .23. Compare and contrast the 2 graphs with the graph of  $g(x)$ .

---



---



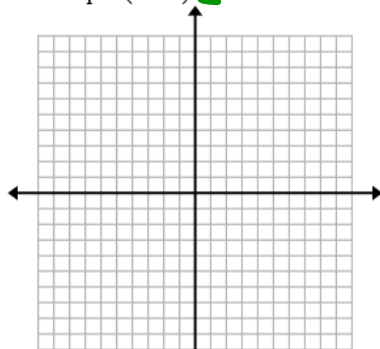
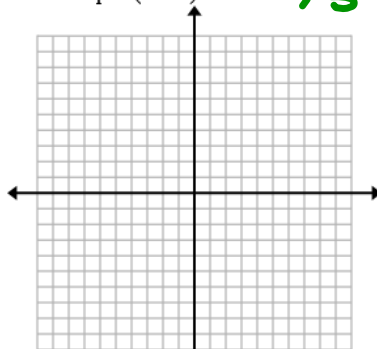
---



---

24. What does multiplying a constant to the input of the function do to the graph of the function? \_\_\_\_\_

*compresses graphs*

25. Graph  $f(x+3)$ .26. Graph  $f(x-3)$ .27. Compare and contrast the 2 graphs with the graph of  $f(x)$ .

---



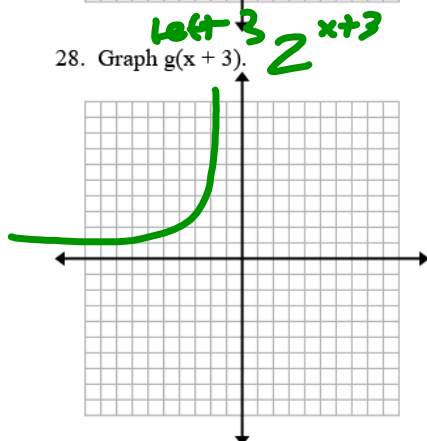
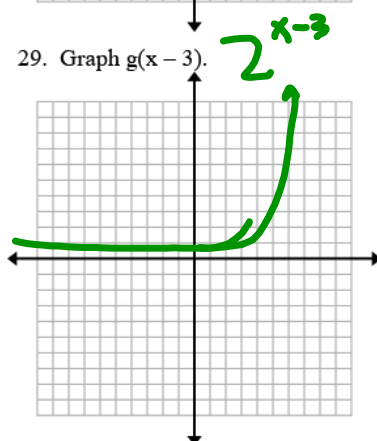
---



---



---

28. Graph  $g(x+3)$ .29. Graph  $g(x-3)$ .30. Compare and contrast the 2 graphs with the graph of  $g(x)$ .

---



---



---



---

31. What does adding or subtracting a constant to the input of the function do to the graph of the function? \_\_\_\_\_

*left & right  
(+) (-)*

22. Using a graphing calculator, graph  $f(x) = 3x + 2$ .

- a. If  $f(x) = 3x + 2$  and  $g(x) = 4f(x)$ , write the equation for  $g(x)$ . Graph  $g(x)$  and compare it to the graph of  $f(x)$ .   
 $g(x) = 4(f(x)) = 4(3x + 2)$   
 $g(x) = 12x + 8$
- b. If  $f(x) = 3x + 2$  and  $h(x) = f(4x)$ , write the equation for  $h(x)$ . Graph  $h(x)$  and compare it to the graph of  $f(x)$ .   
 $f(4x) = 3(4x) + 2$   
 $h(x) = 12x + 2$
- c. Compare how multiplying a function by a number and multiplying the  $x$ -value of a function by a number change the graphs of the functions.   
 $y$ -int changes only in a

23. Using a graphing calculator, graph  $f(x) = 2x - 5$ .

- a. If  $f(x) = 2x - 5$  and  $j(x) = f(x) + 3$ , write the equation for  $j(x)$ . Graph  $j(x)$  and compare it to the graph of  $f(x)$ .   
 $j(x) = 2x - 5 + 3$   
 $j(x) = 2x - 2$
- b. If  $f(x) = 2x - 5$  and  $k(x) = f(x + 3)$ , write the equation for  $k(x)$ . Graph  $k(x)$  and compare it to the graph of  $f(x)$ .
- c. Compare how adding a number to a function and adding a number to the  $x$ -value of a function change the graphs of the functions.

- 22. a.**  $g(x) = 12x + 8$  Sample: The graph of  $g(x)$  has a much steeper slope. The  $y$ -intercept for  $f(x)$  is 2 and the  $y$ -intercept for  $g(x)$  is 8.
- b.**  $h(x) = 12x + 2$  Sample: The graph of  $h(x)$  has a much steeper slope. Both graphs have the same  $y$ -intercept, 2.
- c.** Sample: Multiplying a function by a number increases the slope and changes the  $y$ -intercept. Multiplying the  $x$ -value of a function increases the slope, but the  $y$ -intercept remains the same.
- 23. a.**  $j(x) = 2x - 2$  Sample: Both graphs have the same slope, but different  $y$ -intercepts.
- b.**  $k(x) = 2x + 1$  Both graphs have the same slope, but different  $y$ -intercepts.
- c.** Sample: Adding a number to a function changes the  $y$ -intercept, while the slope remains the same. Adding a number to the  $x$ -value of a function changes the  $y$ -intercept, while the slope remains the same.

kahoot



$$\begin{array}{rcl} y + 2 & = & 4(x - 1) \\ \uparrow & & \uparrow \\ x_2 & & 4x - 4 \\ & & -2 \\ & & \hline & & 4x - 6 \end{array}$$

1-8 ~~all~~, 10-36 evens  
evens

SM1

Name \_\_\_\_\_ ID: 1

Slope-intercept and point-slope Forms

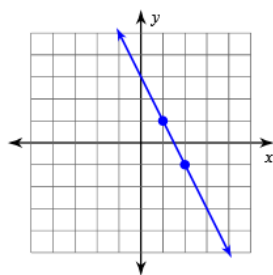
Date \_\_\_\_\_ Period \_\_\_\_\_

Find the slope of each line.

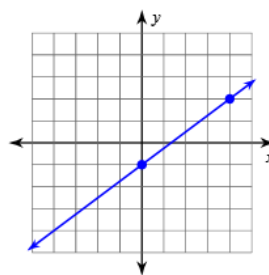
1)  $y = 5x - 2$

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

3)



4)



Find the slope of the line through each pair of points.

5)  $(20, 9), (4, -7)$

6)  $(-17, -11), (13, 11)$

**Write the slope-intercept form of the equation of each line given the slope and y-intercept.**

7) Slope =  $\frac{1}{2}$ , y-intercept = 1

8) Slope =  $-\frac{1}{5}$ , y-intercept = 0

**Write the slope-intercept form of the equation of the line through the given points.  $y = mx + b$**

9) through: (3, -5) and (1, 4)

10) through: (4, -5) and (2, -1)

11) through: (2, -5) and (-5, -3)

12) through: (-4, -4) and (2, 4)

13) through: (1, 1) and (4, -4)

14) through: (0, -5) and (2, -3)

15) through: (3, -1) and (2, -1)

16) through: (-1, -1) and (1, 0)

17) through:  $(2, 1)$  and  $(-2, 2)$ 18) through:  $(3, -2)$  and  $(5, 3)$ 19) through:  $(-3, 4)$  and  $(3, 3)$ 20) through:  $(1, -1)$  and  $(-1, -3)$ **Write the Point-slope form of the equation of the line through the given points.  $y - y_1 = m(x - x_1)$** 21) through:  $(4, -2)$ , slope = 022) through:  $(-3, -5)$ , slope =  $\frac{4}{3}$ 23) through:  $(-5, -5)$ , slope =  $\frac{2}{5}$ 24) through:  $(-4, 1)$ , slope =  $\frac{1}{4}$ 25) through:  $(4, -4)$ , slope =  $-\frac{3}{2}$ 26) through:  $(-1, 5)$ , slope =  $-4$



27) through:  $(2, -3)$ , slope  $= -2$

28) through:  $(-5, 1)$ , slope  $= -\frac{2}{5}$

29) through:  $(2, -1)$ , slope  $= \frac{1}{2}$

30) through:  $(-1, -1)$ , slope  $= -3$

**Write the slope-intercept form of the equation of the line through the given point with the given slope.  $y = mx + b$**

31) through:  $(2, 2)$ , slope  $= \frac{7}{2}$

32) through:  $(-5, -4)$ , slope  $= \frac{9}{5}$

33) through:  $(-1, -2)$ , slope  $= 5$

34) through:  $(-2, 0)$ , slope  $= 2$

35) through:  $(-2, -1)$ , slope  $= -4$

36) through:  $(5, -3)$ , slope  $= \frac{1}{10}$

SM1

Name \_\_\_\_\_ ID: 1

## Slope-intercept and point-slope Forms

Date \_\_\_\_\_ Period \_\_\_\_

Find the slope of each line.

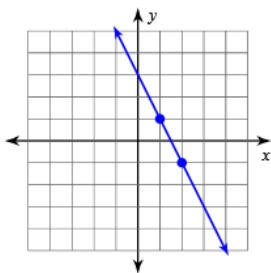
1)  $y = 5x - 2$

5

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

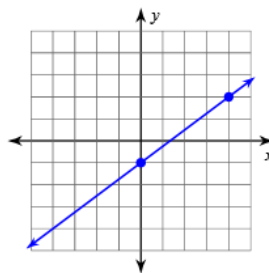
 $\frac{1}{4}$ 

3)



-2

4)

 $\frac{3}{4}$ 

Find the slope of the line through each pair of points.

5)  $(20, 9), (4, -7)$

1

6)  $(-17, -11), (13, 11)$

 $\frac{11}{15}$

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

7) Slope =  $\frac{1}{2}$ , y-intercept = 1

$$y = \frac{1}{2}x + 1$$

8) Slope =  $-\frac{1}{5}$ , y-intercept = 0

$$y = -\frac{1}{5}x$$

Write the slope-intercept form of the equation of the line through the given points.  $y = mx + b$

9) through: (3, -5) and (1, 4)

$$y = -\frac{9}{2}x + \frac{17}{2}$$

10) through: (4, -5) and (2, -1)

$$y = -2x + 3$$

11) through: (2, -5) and (-5, -3)

$$y = -\frac{2}{7}x - \frac{31}{7}$$

12) through: (-4, -4) and (2, 4)

$$y = \frac{4}{3}x + \frac{4}{3}$$

13) through: (1, 1) and (4, -4)

$$y = -\frac{5}{3}x + \frac{8}{3}$$

14) through: (0, -5) and (2, -3)

$$y = x - 5$$

15) through: (3, -1) and (2, -1)

$$y = -1$$

16) through: (-1, -1) and (1, 0)

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

17) through: (2, 1) and (-2, 2)

$$y = -\frac{1}{4}x + \frac{3}{2}$$

18) through: (3, -2) and (5, 3)

$$y = \frac{5}{2}x - \frac{19}{2}$$

19) through: (-3, 4) and (3, 3)

$$y = -\frac{1}{6}x + \frac{7}{2}$$

20) through: (1, -1) and (-1, -3)

$$y = x - 2$$

**Write the Point-slope form of the equation of the line through the given points.  $y - y_1 = m(x - x_1)$** 

21) through: (4, -2), slope = 0

$$y + 2 = 0$$

22) through: (-3, -5), slope =  $\frac{4}{3}$ 

$$y + 5 = \frac{4}{3}(x + 3)$$

23) through: (-5, -5), slope =  $\frac{2}{5}$ 

$$y + 5 = \frac{2}{5}(x + 5)$$

24) through: (-4, 1), slope =  $\frac{1}{4}$ 

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

25) through: (4, -4), slope =  $-\frac{3}{2}$ 

$$y + 4 = -\frac{3}{2}(x - 4)$$

26) through: (-1, 5), slope = -4

$$y - 5 = -4(x + 1)$$

27) through:  $(2, -3)$ , slope  $= -2$

$$y + 3 = -2(x - 2)$$

28) through:  $(-5, 1)$ , slope  $= -\frac{2}{5}$

$$y - 1 = -\frac{2}{5}(x + 5)$$

29) through:  $(2, -1)$ , slope  $= \frac{1}{2}$

$$y + 1 = \frac{1}{2}(x - 2)$$

30) through:  $(-1, -1)$ , slope  $= -3$

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

**Write the slope-intercept form of the equation of the line through the given point with the given slope.  $y = mx + b$**

31) through:  $(2, 2)$ , slope  $= \frac{7}{2}$

$$y = \frac{7}{2}x - 5$$

32) through:  $(-5, -4)$ , slope  $= \frac{9}{5}$

$$y = \frac{9}{5}x + 5$$

33) through:  $(-1, -2)$ , slope  $= 5$

$$y = 5x + 3$$

34) through:  $(-2, 0)$ , slope  $= 2$

$$y = 2x + 4$$

35) through:  $(-2, -1)$ , slope  $= -4$

$$y = -4x - 9$$

36) through:  $(5, -3)$ , slope  $= \frac{1}{10}$

$$y = \frac{1}{10}x - \frac{7}{2}$$