

## Warm-up 10/3

Write an equation in slope intercept and point slope form given the following information.

1.  $(-3, 4); (2, 24)$

2. Michael started a savings account with \$310. After 4 weeks, he had \$350 dollars, and after 9 weeks, he had \$400.

# Warm-up 10/3

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

Write an equation in slope intercept and point slope form given the following information.

1.  $(-3, 4); (2, 24)$

$$\frac{24 - 4}{2 - (-3)} = \frac{20}{2 + 3} = \frac{20}{5} = 4$$

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

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

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

$$y = 4x + 16$$

2. Michael started a savings account with \$310. After 4 weeks, he had \$350 dollars, and after 9 weeks, he had \$400.

weeks - X  $(4, 350)$   $(9, 400)$

money - y  $\frac{\$400 - 350}{9 - 4} = \frac{50}{5} = 10$

$$y = 10x + b$$

$$y - 350 = 10(x - 4)$$

$$350 = 10(4) + b$$

$$350 = 40 + b$$

$$\begin{array}{r} 350 = 40 + b \\ -40 \quad -40 \\ \hline 310 = b \end{array}$$

$$y = 10x + 310$$

$$310 = b$$

# Warm-up 10/2

Write an equation in slope intercept and point slope form given the following information.

1.  $(-3, 4); (2, 24)$

$$\frac{24-4}{2-(-3)} = \frac{24-4}{2+3} = \frac{20}{5} = 4$$

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

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

$$\begin{array}{r} y-4 = 4x+12 \\ +4 \quad +4 \\ \hline y = 4x+16 \end{array}$$

$$\begin{array}{r} y = 4x + b \\ 4 = 4(-3) + b \\ 4 = -12 + b \\ +12 \quad +12 \\ \hline 16 = b \end{array}$$

$$y = 4x + 16$$

2. Michael started a savings account with \$310. After 4 weeks, he had \$350 dollars, and after 9 weeks, he had \$400.

$x_1, y_1$        $x_2, y_2$   
 $(4, 350)$        $(9, 400)$

$x$  - weeks  
 $y$  - \$

$$\frac{400-350}{9-4} = \frac{50}{5} = \$10$$

$$y-350 = 10(x-4)$$

$$\begin{array}{r} y-350 = 10x-40 \\ +350 \quad +350 \\ \hline \end{array}$$

$$y = 10x + 310$$

$$\begin{array}{r} y = mx + b \\ y = 10x + b \\ 350 = 10(4) + b \\ 350 = 40 + b \\ -40 \quad -40 \\ \hline 310 = b \end{array}$$

## ***Section 4.5***

### ***Today's Goal***

I can identify, write, and graph direct variation equations.

I can identify parallel and perpendicular lines.

## Section 4.5: Direct Variation

Direct Variation ~ a special type of linear function written in the form  $y = kx$  where  $k$  is the constant of variation

$$y = mx + b$$

$$k = m$$

Identifying Direct Variation Equations (if a direct variation equation identify the constant of variation)

**YES**

$$y = 6x$$

$$k = 6$$

**YES**

$$\frac{10x}{-12} = \frac{-12y}{-12}$$

$$-\frac{5}{6}x = y \quad k = -\frac{5}{6}$$

**NO**

$$2x + 7y = 10$$



**Try These!**

Determine if the following are direct variation equations.

$$18y = 54x - 26$$

**NO**

$$\frac{20x}{4} = \frac{4y}{4}$$

**YES**

$$5x = y$$
$$k = 5$$



Determine if the tables below represent a direct variation function

$y = 3x$

x	2	4	6	8
y	6	12	18	24

$\frac{12-6}{4-2} = \frac{6}{2} = 3$

x	1	3	7
y	-2	0	4

No

Remember: In order to be a direct variation function it MUST have a constant rate of change AND y intercept of (0,0)

$$y = 3x + b$$

$$6 = 3(2) + b$$

$$6 = 6 + b$$

$$\frac{-6 \quad -6}{0 = b}$$

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**Parallel lines**-lines that do not intersect (same slope, different intercepts)

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

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

$$(-3, 5)$$

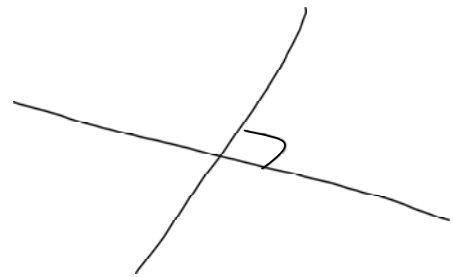
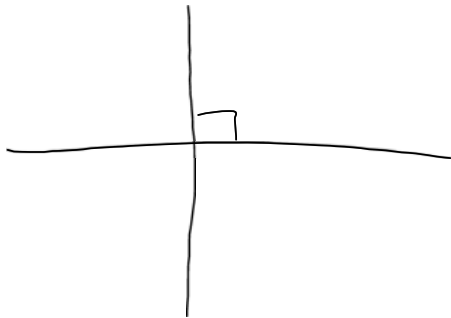
$$5 = -\frac{2}{3}(-3) + b$$

$$5 = 2 + b$$

$$\begin{array}{r} 5 \\ -2 \\ \hline 3 \end{array}$$

$$3 = b$$

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



Perpendicular lines intersect  
at a  $90^\circ$  angle

(slope: negative reciprocal)

$$m = \frac{1}{2} \quad m = -\frac{2}{1} \quad m = -3 \quad m = \frac{1}{3}$$

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

$$y = \underline{2}x - 3$$

$$y = -\frac{1}{2}x + b \quad (4, 5)$$

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

$$\begin{array}{r} y - 5 = -\frac{1}{2}x + 2 \\ +5 \qquad \qquad +5 \\ \hline y = -\frac{1}{2}x + 7 \end{array}$$

$$5 = -\frac{1}{2}(4) + b$$

$$\begin{array}{r} 5 = -2 + b \\ +2 \quad +2 \\ \hline 7 = b \end{array}$$

$$\begin{array}{r} 25x + 5y = 1 \\ -25x \qquad -25x \\ \hline 5y = -25x + 1 \\ \frac{5y}{5} = \frac{-25x}{5} + \frac{1}{5} \\ y = -5x + \frac{1}{5} \end{array}$$

## Linear Function "I can" learning targets

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

I can...

- |   |           |
|---|-----------|
| 1. identify linear functions and linear equations.                        | 1. _____  |
| 2. give the domain and range of a linear function.                        | 2. _____  |
| 3. graph linear functions that represent real-world situations.           | 3. _____  |
| 4. find x- and y-intercepts   | 4. _____  |
| 5. interpret the x- and y-intercepts meanings in real-world situations.   | 5. _____  |
| 6. graph linear functions.  | 6. _____  |
| 7. find rates of change/slopes  | 7. _____  |
| 8. determine the meaning of rates of change/slope                         | 8. _____  |
| 9. find slope by using the slope formula                                  | 9. _____  |
| 10. identify, write, and graph direct variation equations                 | 10. _____ |
| 11. write a linear equation in slope intercept form                       | 11. _____ |
| 12. write a linear equation in point-slope form                           | 12. _____ |
| 13. write a linear equation given two points                              | 13. _____ |
| 14. determine if lines are parallel, perpendicular, or neither            | 14. _____ |
| 15. write the equations of lines parallel or perpendicular to other lines | 15. _____ |