

Name:

Date:

Period:

## 2.3 Linear Functions Review (Day 2) Notes

<p>Writing Linear Equations Given a <u>POINT &amp; SLOPE</u></p>	<p>To write a linear equation given the slope (<math>m</math>), and a point <math>(x_1, y_1)</math> that it passes through, use the <u>point-slope formula</u>:</p> $y - y_1 = m(x - x_1)$	
<p><u>Examples</u></p>	<p>Ex1: <math>(-1, 7)</math> <math>m = -4</math></p> <p><math>x_1</math> <math>y_1</math></p> $y - 7 = -4(x - (-1))$ $y - 7 = -4(x + 1)$ $y - 7 = -4x - 4$ $\begin{array}{r} y - 7 \\ + 7 \\ \hline y = -4x + 3 \end{array}$	<p>Ex2: <math>(-6, -5)</math> <math>m = \frac{2}{3}</math></p> $y - (-5) = \frac{2}{3}(x - (-6))$ $y + 5 = \frac{2}{3}(x + 6)$ $y + 5 = \frac{2}{3}x + 4$ $\begin{array}{r} y + 5 \\ - 5 \\ \hline y = \frac{2}{3}x - 1 \end{array}$
<p>Writing Linear Equations Given <u>TWO POINTS</u></p>	<p>To write a linear equation given two points <math>(x_1, y_1)</math> and <math>(x_2, y_2)</math> use the <u>slope formula</u> followed by the <u>point-slope formula</u>:</p> <p>calculate <math>m = \frac{y_2 - y_1}{x_2 - x_1}</math>      choose one point and write in point-slope</p> $y - y_1 = m(x - x_1)$	
<p><u>Examples</u></p> <p>same <math>m = \frac{-2 - 8}{-2 - (-6)}</math>  <math>= \frac{-10}{4} = -\frac{5}{2}</math></p>	<p>Ex3: <math>(-2, -2)</math> <math>(-6, 8)</math></p> $m = \frac{8 - (-2)}{-6 - (-2)}$ $= \frac{8 + 2}{-6 + 2} = \frac{10}{-4}$ $m = -\frac{5}{2}$ $y - (-2) = -\frac{5}{2}(x - (-2))$ $y + 2 = -\frac{5}{2}(x + 2)$ $y + 2 = -\frac{5}{2}x - 5$ $y = -\frac{5}{2}x - 7$	<p>Ex4: <math>(-8, -3)</math> <math>(-2, -3)</math></p> $m = \frac{-3 - (-3)}{-2 - (-8)}$ $= \frac{-3 + 3}{-2 + 8} = \frac{0}{6}$ $m = 0$ $y - (-3) = 0(x - (-8))$ $y + 3 = 0$ $\begin{array}{r} y + 3 \\ - 3 \\ \hline y = -3 \end{array}$ <p>Note: The points have the same y coordinate. We know then horizontal line.</p>

$$y = mx + b$$

↑ rate

← constant (starting value)

2.3

## LINEAR EQUATION APPLICATIONS: Slope-Intercept Form

Ex5: A cab ride costs \$4 plus \$1.75 per mile driven.

a) Write an equation to represent the cab fare. Define your variables.

$x$ : miles driven

$y$ : total cost

The total cost depends ( $y$  or output) on the miles ( $x$  or input)

$$y = 1.75x + 4$$

b) If Clay's destination is 17 miles away and he has \$30, will he make it?

↳ to spend

$$y = 1.75x + 4$$

$$= 1.75(17) + 4$$

$$= 29.75 + 4$$

$$y = 33.75$$

He does not have enough money for the ride. It costs \$33.75 and he has \$30.

Ex6: The Jones' are purchasing a new home. The closing costs are \$249 plus 3% of the purchase price of the home.

a) Write an equation to represent the total closing costs. Define your variables.

$C$ : total of closing costs

$p$ : purchase price

$$C = 0.03p + 249$$

b) The purchase price of their home is \$195,000. The sellers offered \$5,000 in closing cost assistance. Will this cover all their closing costs? If not, how much will the Jones' need to pay out of pocket?

$$C = 0.03(195000) + 249$$

$$C = \$6099$$

$$6099 - 5000$$

\$1099 needs to pay of closing costs

Ex7: A 225-ounce candle burns at the rate of one ounce every five hours.

a) Write an equation to represent the amount of candle left. Define your variables.

$y$ : amount of candle left

$x$ : hours

$$y = -\frac{1}{5}x + 225$$

$\frac{1 \text{ oz}}{5 \text{ hrs.}}$   
decreasing

b) How many hours will the candle last?

$$y = -\frac{1}{5}x + 225$$

← when  $y=0$

112.5 hours

$$\begin{array}{r} 0 = -\frac{1}{5}x + 225 \\ -225 \quad -225 \end{array}$$

$$(-5)(-225) = -\frac{1}{5}x(-5)$$

$$1125 = x$$

### LINEAR EQUATION APPLICATIONS: Standard Form $Ax + By = C$

Ex8: Josh bought 3 bags of potting soil and 10 bags of mulch from Home Depot.

a) Write an equation to represent the total cost. Define your variables.

$x$ : cost of bag of soil  
 $y$ : cost of bag of mulch

$$\text{Total cost} = 3x + 10y$$

b) If Josh spent \$40.91 and mulch cost \$2.75 per bag, how much was a bag of potting soil?

$$40.91 = 3x + 10(2.75)$$

$$\begin{array}{r} 40.91 = 3x + 27.5 \\ -27.50 \end{array}$$

$$\frac{13.41}{3} = \frac{3x}{3}$$

$$x = 4.47$$

\$4.47 per bag of mulch

Ex9: The baseball concession stand sells soft pretzels for \$4.50 and bags of popcorn for \$3.25

a) Write an equation to represent the total sales from pretzels and popcorn on a given day. Define your variables.

$T$ : total sales  
 $x$ : # of soft pretzels  
 $y$ : # of bags of popcorn

$$T = 4.50x + 3.25y$$

b) If the concession stand sold 137 soft pretzels, how many bags of popcorn would they need to sell to make at least \$1,000?

$$1000 = 4.5(137) + 3.25y$$

$$1000 = 616.5 + 3.25y$$

$$\begin{array}{r} 616.5 - 616.5 \end{array}$$

$$\begin{array}{r} 383.5 = 3.25y \\ \underline{3.25} \quad \underline{3.25} \end{array}$$

$y = 118$  bags of popcorn