End-of-Unit Test

Name: ____________ KEY __________________

1. Find the equation of the line parallel to $7x - 6y = 13$ that passes through the point (-42, -51). Express your answer in Slope-Intercept Form. Show your work!

$$-6y = 13 - 7x$$
$$y = \frac{7}{6}x - \frac{13}{6}$$

*If lines are parallel, then they have the same slope, which is $m = \frac{7}{6}$*

$$y + 51 = \frac{7}{6}(x + 42)$$
$$y + 51 = \frac{7}{6}x + 49$$
$$y = \frac{7}{6}x - 2$$

2. Find the equation of the line perpendicular to $3x + 8y = -15$ that passes through (-9, 14). Express your answer in Point-Slope Form. Show your work!

$$8y = -15 - 3x$$
$$y = -\frac{3}{8}x - \frac{15}{8}$$

*If two lines are perpendicular, their slopes are negative reciprocals of one another.*

$$m = \frac{8}{3}$$

$$y - 14 = \frac{8}{3}(x + 9)$$

3. Find the equation of the line parallel to the line $y = 6$ that passes through (-5, 2).

*The line $y = 6$ has a slope of zero.*

So, $y = 0x + (y - \text{intercept})$

*The $y - \text{intercept} = 2$ based on the point (-5,2)*

*Therefore the parallel line to $y = 6$ is $y = 2$.*
4. Find the equation of the line perpendicular to the line \( y = -1 \) that passes through \((7, 3)\).

The line \( y = -1 \) has a slope of zero and is horizontal. Therefore, a line which is perpendicular to a horizontal line is a vertical line, which has an undefined slope. Because the vertical line passes through \((7,3)\),

The equation for the line is \( x = 7 \).

5. Determine whether each of the relations below is a function and then, using proper set notation, state its domain and range.

(A) \{ (1, 7), (2, 5), (4, 5), (6, 6) \}  
Function

Domain: \{1,2,4,6\}  
Range: \{7,5,6\}

(B) \{ ( , ), ( , ), ( , ) \}  
Not a Function

Domain: \{\}  
Range: \{\}

(C) \{ (2, 8), (3, 10), (2, 5), (6, 17) \}  
Not a Function

Domain: \{2,3,6\}  
Range: \{8,10,5,17\}

6. \( y \) varies directly as \( x \). If \( y \) is 30 when \( x \) is 0.6, ...

(A) find the constant of direct variation, \( k \). Show some work!

\[
y = kx
\]

\[
30 = k(0.6)
\]

\[
k = \frac{30}{0.6}
\]

\[
k = 50
\]

(B) write an equation of direct variation in the form \( y = kx \).

\[
y = 50x
\]

(C) find \( y \) when \( x \) is 20. Show your work!

\[
y = 50(20)
\]

\[
y = 100
\]

7. Show your work as you find the slope of the line that passes through the following points:

(A) \((8, -13)\) and \((2, -6)\)

\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-6 + 13}{2 - 8} = \frac{7}{-4} = \frac{-7}{4}
\]

(B) \((9, 6)\) and \((-5, 3)\)

\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 6}{-5 - 9} = \frac{-3}{-14} = \frac{3}{14}
\]

8. Determine whether each statement is true or false. Write the entire word, not simply “T” or “F”.

_____F______ When read from left to right, a line with a positive slope will be decreasing.

_____T______ The slope of any horizontal line is zero.

_____F______ It is impossible for the slope of a line to be undefined.
When read from left to right, the line $y = \frac{1}{3}x$ increases more quickly than the line $y = \frac{1}{2}x$.

5. Match each term with its correct formula.

- (D) Slope-Intercept Form
- (C) Vertical Line
- (E) Standard Form
- (B) Point-Slope Form
- (A) Horizontal Line

6. Write the equation of the line (in Slope-Intercept Form) that passes through the points (8, -3) and (16, 4). Show your work!

\[ m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-3)}{16 - 8} = \frac{7}{8} \]

\[ y - 4 = \frac{7}{8}(x - 16) \]

\[ y - 4 = \frac{7}{8}x - 14 \]

\[ y = \frac{7}{8}x - 10 \]

7. Write the equation of the line (in Point-Slope Form) that passes through the points (-4, -3) and (-8, -9). Show your work!

\[ m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-9 - (-3)}{-8 - (-4)} = \frac{-6}{-4} = \frac{3}{2} \]

\[ y + 3 = \frac{3}{2}(x + 4) \]

8. Find the x and y intercepts of the line $-3x + 5y = -60$. Show your work! You can express your final answer as either a single number or an ordered pair.

For the equation above, when $x = 0$, $y = -12$ and when $y = 0$, $x = 20$.

\[ 5y = 3x - 60 \]

\[ y = \frac{3}{5}x - 12 \]

So, $m = \frac{3}{5}$, and if $x = 5$, then $y = -9$ so the point $(5, -9)$ is on the line.
9. Convert the equation $y - 8 = -3(x + 5)$ from Point-Slope Form to Slope-Intercept Form. Show your work!

\[
y - 8 = -3x - 15
y = -3x - 7
\]

10. Using the rectangular coordinate system below, graph each of the linear equations. Write each equation beside its corresponding graph.

\[
y = -5x + 7 \\
2x - 4y = 16 \\
y = -5 \\
y - 5 = \frac{1}{6}(x + 4) \\
x = 8
\]