Show all work for full credit!

1. Given the set \( \left\{ -1, 0, \frac{1}{4}, 1, 11.6, \sqrt{7}, 3\pi \right\} \), list the numbers in this set that belong to the following:
   a. set of **irrational numbers**. 2 points
   b. set of **whole numbers** 2 points

2. Simplify the expression.

\[
\frac{6(-2)^2 + 2(3 - 8)}{1 + 2 \cdot 3 - \sqrt{36}}
\]

5 points

3. Identify the property illustrated.
   a) \( 8 + 0 = 8 \) 2 points
   b) \( 6(8 + 5) = 6 \cdot 8 + 6 \cdot 5 \) 2 points

4. Solve \( \frac{3x - 1}{4} + \frac{x + 3}{6} = 3 \) 4 points

5. a) Solve: \( 4(x - 5) = 5x - (x - 20) \) 4 points
   b) Classify the equation in a) as a conditional, an identity or a contradiction. 1 point
6. Let \( A = \{1,2,3,4,5,6\} \) \( B = \{4,6,8\} \) \( C = \{8, 9\} \)
   a. Find \( B \cup C \)  
      \[ 2 \text{ points} \]
   b. Find \( A \cap C \)  
      \[ 2 \text{ points} \]
   c. Find \( A \cap B \)  
      \[ 2 \text{ points} \]

7. Solve this equation for \( a \): \( 3a + 10 = 6c \) 
   \[ 3 \text{ points} \]

8. Write an equation or inequality that represents the problem, then solve: (4 points)

   *When 2 is added to two-thirds of a number the result is 7 less than the number.*

   Equation/inequality:  
   Solution:  

9. Solve the compound inequality. Graph and give the solution set in *interval notation*. (4 points)

   \[ 1 - 2x > 7 \text{ and } 8 + 3x \geq -10 \]

10. Find the x-intercept and the y-intercept for the equation \( 4x + 3y = -12 \). State each intercept as an ordered pair. Graph the equation. (5 points)

    x-intercept: \( \quad \) y-intercept: \( \quad \)
11. a. Find the slope of the line through (-6, 5) and (-4, -1) if it exists.

b. Write the equation of the line in slope-intercept form.

c. Find the midpoint of the segment with the above endpoints.

12. Find the slope of the line and use the slope to sketch the graph. (5 points)

\[ x + 2y = -4 \]

13. Find an equation in slope-intercept form of the line perpendicular to \(3x - y = 6\) and passing through the point (2, -4).
14. Graph the inequality \( 2x - 5y < -10 \) (5 points)

![Graph of the inequality \( 2x - 5y < -10 \)](image)

15. Determine whether the relation is a **function or not a function. Explain.** (3 points)

\[ \{(3, 4), (1, 2), (3, 7)\} \]

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Domain: __________________ _______ 1 point

Range: __________________ _______ 1 point

16. Let \( f(x) = -2x + 3 \) and \( g(x) = -x^2 + 4x + 1 \) Find the following:

a. \( g(-4) \) __________________ _______ 2 points

b. \( f(a - 4) \) __________________ _______ 2 points

17. Solve the system by **substitution.** Write your answer as an ordered pair.

\[
\begin{align*}
x + 4y &= 13 \\
3x - 2y &= 18
\end{align*}
\]

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5 points
18. Solve the system by **elimination**. Write your answer as an ordered pair.

\[
\begin{align*}
3x - 2y &= 0 \\
9x + 8y &= 7
\end{align*}
\]

20. Complete the following statements:

a. The sum of two negative numbers is ____________________________

b. The slope of a horizontal line is ____________________________

c. The domain of \( y = \sqrt{x+5} \) is ____________________________

d. Write \(-5 < x \leq 3\) in interval notation. ____________________________