Math 100
Midterm

Name __________________________ Section __________ Date __________ Score ______

Show Work!
1. Use order of operations to simplify.
   \[
   \frac{4[-3+(6)^2+2]}{6-2(3-6)}
   \]
   4 points

2. Write the set using (a) interval notation and (b) graph.
   \[\{x \mid x \leq -3\}\]
   a. ____________________________
   2 points
   b. ____________________________
   2 points

3. Identify the property that justifies the statements?
   A. Identity property   B. Associative property   C. Commutative property
   D. Distributive property   E. Multiplication Property of Zero
   a. \[6(5 + x) = 6(x + 5)\]
   b. \[-4 + 0 = -4\]
   a. ____________________________
   2 points
   b. ____________________________
   2 points

4. Solve the equation.
   \[
   \frac{3x - 1}{2} = \frac{x + 2}{5} + 3
   \]
   4 points

5. a.) Solve the equation and give the solution set.  b.) Identify the equation as a conditional, an identity, or a contradiction.
   4x - 3(5 - 2x) = 6(x - 3) + 2x + 1
   a. ____________________________
   3 points
   b. ____________________________
   2 points
6. **Solve** the formula.
   \[ B = cx + a \text{ for } c. \]  
   
   3 points

7. To make a profit, a baker’s sales of cookies must be greater than her costs to make them. The baker sells cookies at a price of $2 that cost her $1.50 to make. She also has basic costs of $5 on each batch of cookies. How many cookies must she sell in a batch in order to make a profit. **Write an inequality and solve.**
   
   5 points

8. a. **Solve** the inequality. Give the solution set in
   b. **interval and** c. **graph forms.** (3 points)
   
   \[-5 < 2x + 1 < 4\]
   
   b. ___________________________ 2 points
   
   c. [Graph diagram]
   
   2 points

9. For the compound inequality, a. **solve** and give the solution set in
   b. **interval form and** c. **graph form.** (3 points)
   
   \[ 3 + 2x \leq 11 \text{ or } x - 4 \geq 3 \]
   
   b. ___________________________ 2 points
   
   c. [Graph diagram]
   
   2 points

10. Let \( A = \{0, 2\} \ B = \{1, 2, 3, 4\} \text{ and } C = \{3, 4\}. \)
    a. Find. \( B \cup C \)
    
    a. ___________________________ 2 points
    
    b. Find. \( A \cap C \)
    
    b. ___________________________ 2 points
11. a. Complete the table of ordered pairs for the equation $3x - 2y = 9$.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>-3</td>
<td>3</td>
</tr>
</tbody>
</table>

b. Graph the equation. (4 points)

12. If two points are on the same horizontal line, they have the same ______ coordinate. (2 points)

13. a. Find the slope of the line $2x + 3y = 15$. slope: ________________ (2 points)

b. Find the y-intercept. y-intercept: ________________ (2 points)

c. Graph the equation. (4 points)
14. Find an equation in **standard form** of the line through the points (-1, 5) and (2, 2).

5 points

15. Write the equation of the line perpendicular to \( y = 4 \), through (2, 5).

4 points

16. **Graph** the inequality \( 3x - 4y > -12 \).

(5 points)

17. a. **Explain** why or why not that the relation is a **function**. Give b. the **domain** and c. the **range**.

\[ R = \{(3, 2), (5, 5), (-6, 2), (2, 5)\} \]

(5 points)

a. 

b. Domain:

   c. Range:
18. For \( f(x) = 3 - 4x \), find:
   a. \( f(-2) \)  
      2 points
   b. \( f(3b) \)  
      2 points
   c. \( f(x-1) \)  
      2 points

19. Solve the system by substitution or elimination and write the solution in the form \((x, y)\).
    \[
    \begin{align*}
    2x + 3y &= -8 \\
    x - 2y &= -4
    \end{align*}
    \]
    5 points

20. Select variables to represent the two unknowns, write two equations using the two variables, and solve the resulting system.
    A woman wishes to invest $8000 in two accounts. One account earns 4% interest and the other earns 7.5% interest. The interest for the first year needs to be $425. How much should she invest in each account?
    5 points