MATH 116
QUIZ 1

Name: _______________________

Show all work for full credit on any problem. Clearly indicate all answers.

1. Find the distance between the two points (3, 2) and (-8, -2).
   1. ________________

2. Find the midpoint of the line segment connecting the two points (3, 2) and (-8, -2).
   2. ________________

3. Find the value of y such that the distance between the points is 15 for points (y, 8) and (-9, -4)
   3. ________________

4. Find the x-intercept(s) and y-intercept(s) for the function \( f(x) = x^2 - 2x - 8 \) if they exist.
   x-intercept = ________________
   y-intercept = ________________

5. Check the equation for all types of symmetry: \( x - y^2 = 0 \)
   Symmetry is to: ____________________________

6. Sketch the graph of the equation. Use a table of values.
   \[ y = -x^2 - 4x \]
7. Use the vertical line test to determine which of the following is a function. Circle all that are functions.

(A) 
\[ \begin{array}{c}
\bullet \\
\bullet
\end{array} \]

(B) 
\[ \begin{array}{c}
\bullet \\
\bullet
\end{array} \]

(C) 
\[ \begin{array}{c}
\bullet \\
\bullet
\end{array} \]

(D) 
\[ \begin{array}{c}
\bullet \\
\bullet
\end{array} \]

8. Determine the intervals on which the function is increasing or decreasing.

a. Increasing on (-7, -5) and (-1, 1); Decreasing on (-5, -1)
b. Decreasing on (-7, -1); Increasing on (-1, 1)
c. Increasing on (-7, -1); Decreasing on (-1, 1)
d. Decreasing on (-7, -5) and (-1, 1); Increasing on (-5, -1)
e. Other: 

9. Use a graphing utility to graph the equations. Use the standard viewing window. Sketch the graphs on the windows below. (2 points)

a. \( y = |x + 3| \)

\[ \begin{array}{c}
\begin{array}{c}
\bullet \\
\bullet
\end{array}
\end{array} \]

b. \( y = 2(x - 2)^2 + 6 \)

\[ \begin{array}{c}
\begin{array}{c}
\bullet \\
\bullet
\end{array}
\end{array} \]
10. Find the slope of the line containing the two points (3, 2) and (-8, -2).

11. Identify the function that is neither even nor odd.
   a. $f(x) = 2x^2 - |x^2| + 12$
   b. $f(x) = x^5 - x^3 + 2x$
   c. $f(x) = x^4 - x + 2 + |x - 2|$
   d. $f(x) = x^3 - x$

12. Given a function $f(x)$, describe the transformation of the function: $-f(x - 2) + 5$
   a. flips across x-axis, moves 2 to left and up 5
   b. flips across y-axis, moves 2 to right and up 5
   c. flips across x-axis, moves 5 to right and down 2
   d. flips across x-axis, moves 5 to left and down 2.
   e. Other: ________________

13. Find the domain of the function: $f(x) = \sqrt{x + 5}$

14. Find the slope intercept form of the equation of the line that
   passes through the point (2, -1) and is perpendicular to the line
   $2x - 3y = 5$.

15. An item that sells for $145.99 has a sales tax of $10.22 in a certain state. Find
   the mathematical model that gives the amount of sales tax $T$, in terms of the retail price $P$.

   $T = ________________$

16. Use the mathematical model in the problem above to find the sales tax on a purchase
   that has a retail price of $540.50.

   Tax = ________________
17. Fill in the table of value below for the function \( f(x) = |x + 2| \)

<table>
<thead>
<tr>
<th>x</th>
<th>-7</th>
<th>-5</th>
<th>-3</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>3</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. Given \( f(x) = \begin{cases} 7x - 10, & x \leq 2 \\ x^2 + 6, & x > 2 \end{cases} \), find \( f(2) \).

19. For the problem above, find \( f(4) \).

20. Does the function in the problem 18 above have an inverse? 
   YES  NO 
   Explain why.

21. If \( f(x) = x - 2 \) and \( g(x) = 6 - 2x \), find \( (f + g)(x) \).

22. If \( f(x) = \frac{1}{x} \) and \( g(x) = x^3 \), find \( (f \circ g)(x) \).

23. If \( f(x) = 5x + 5 \) and \( g(x) = x + 2 \), find \( (f \circ g)(9) \).

24. Find the inverse of the function: \( f(x) = \frac{1+3x}{-4-3x} \)