Precalculus   Practice Problems for Test #1   Name:_____

Brewer   Fall 2010

1. Graph $x - 5y = 5$

2. Determine whether the relation $\{(2, 1), (3, 2), (-1, 1), (0, -2)\}$ is a function. Answer "yes" or "no."

3. Given that $f(x) = x^2 - 6x + 2$, find

a. $f(-1)$ b. $f(x + 3)$

4. Graph $f(x) = |x + 3| - 2$

5. Find the domain of $f(x) = \frac{2x}{\sqrt{3-x}}$ in both interval and set-builder notation.

6. Write an equation for the line that passes through $(-2, 1)$ and $(7, -3)$.

7. Find an equation of the line containing the point $(-3, 5)$ and parallel to the line $4x - y = 7$.

8. Graph the piecewise function and state on which intervals the function is increasing, decreasing, and constant.

$$f(x) = \begin{cases} 2, & x < -2 \\ \frac{x^2 - 1}{x - 1}, & x \geq -2, x \neq 1 \\ -3, & x = 1 \end{cases}$$

9. For $f(x) = \sqrt{x - 2}$ and $g(x) = x^2$, find $(f/g)(x)$ and write the domain in set-builder notation.

10. Construct and simplify the difference quotient for $f(x) = 2x^2 + 6$.

11. Given the functions $f(x) = 1 - x^2$ and $(x) = \sqrt{x^2 - 4}$,

a. Find $(g \circ f)(x)$.   b. Find $(g \circ f)(-2)$.

12. Determine whether the graph of $y = x^3 - 2x$ is symmetric with respect to the x-axis, y-axis, and/or the origin.

13. Test algebraically whether the function $f(x) = \frac{x^2}{x-1}$ is even, odd, or neither even nor odd. Show your work.

14. Write an equation for $y = \sqrt{x}$ but stretched vertically by 3 units and shifted down by 2 units.

15. If $(4, -2)$ is a point on the graph of $y = f(x)$, what point do you know is on the graph of $y = 3f(x)$?

16. Solve $x^2 + 4x = 9$ by completing the square. Find exact solutions. Show your work.

17. Find the zero(s) of each function using the quadratic formula. If complex, write in terms of i.

a. $f(x) = 3x^2 + 2x - 1$.

b. $f(x) = 4x^2 + x + 6$.

18. For the graph of the function $f(x) = 2x^2 - 12x + 20$,

a. find the vertex

b. find the axis of symmetry

c. state whether there is a maximum or minimum value and find that value

d. find the range

e. graph the function

19. A homeowner wants to fence a rectangular garden using 120 ft of fencing. The side of the garage will be used as one side of the rectangle. Find the dimensions for which the area is a maximum. Hint: write the area as a function of the length of the side of the garage, and find the vertex of the parabola.

20. Set up and solve the linear function that describes the following situation: I can screen-print 10 shirts per hour. The cost to set up a run of shirts is $20. I make $10 profit for each shirt I sell. Assuming I sell all of the shirts that I print, what will be my net profit (money earned less cost) if I spend 8 hours screen-printing? Hint: first write the linear equation for profit as a function of time.