Math 116 Pre-Test

1. **Find the domain of the indicated function. Express the answer using set builder notation or interval notation.**

   $M(x) = \dfrac{\sqrt{4-x}}{x+1}$

2. **For the given function *f* find and simplify $\dfrac{f(x+h)-f(x)}{h}$.**

   $f(x) = 3x - 4$

3. **Sketch the graph of $y = f(x)$.**

   $$f(x) = \begin{cases} -x-1 & \text{if } x \le 2 \\ -x+5 & \text{if } x > 2 \end{cases}$$

4. **A plant can manufacture 80 golf clubs per day for a total daily cost of \$8,147 and 100 golf clubs per day for a total daily cost of \$9,647.**
   a) Assuming that the daily cost function is linear, find the total daily cost of producing *x* golf clubs.
   b) What is the slope of the graph of the equation found in part a? Interpret verbally. **(4 pts)**

5. **Solve.** $\dfrac{2x}{x-3} = 7 + \dfrac{6}{x-3}$

6. **Complete the square and find the vertex form of the quadratic function, then write the vertex and the axis.** $n(x) = 3x^2 + 6x - 2$

7. **Find all zeros exactly (rational, irrational, and imaginary) for the polynomial equation.**

   $x^4 - 2x^2 - 16x - 15 = 0$

8. **Solve the rational inequality.** $\dfrac{x^2 + 4x - 20}{3x} \ge 4$

9. **Solve algebraically. Round to three decimal places if needed.**

   $3^x = 20$

10. **Solve algebraically. Round to three decimal places if needed.**

    $\log(x+3) + \log x = 1$

11. **How many years, to the nearest year, will it take a sum of money to double if it is invested at 15% compounded annually?**

12. **Suppose you have \$12,000 to invest. If part is invested at 10% and the rest at 15%, how much should be invested at each rate to yield 12% on the total amount invested.**

13. Graph the solution region for the following system of linear inequalities.

$$x + 2y \le 8$$
$$3x - 2y > 0$$
$$x \ge 0$$

14. Write the system as a matrix equation and solve using inverses. You may use a calculator but label A, A^{-1}, B, and X. **Also make sure you write what you used to find the answer.**

$$11x_1 + 4x_2 = -1$$
$$3x_1 + x_2 = 9$$

15. Solve the system using Cramer's Rule. Make sure to clearly label all parts including what you used to find your answer.

$$x + 2y = 3$$
$$x + 3y = 5$$

16. Sketch a graph of the equation and find the coordinates of the foci

$$16y^2 - 9x^2 = 144$$

17. Determine whether the equation given is a parabola, circle, ellipse, or hyperbola.

a) $3x^2 + 3y^2 = 12$ b) $4x^2 - 3y = 24$ c) $2x^2 + y^2 = 4$

d) $4x - 7y^2 = 28$ e) $3x^2 - 5y^2 = 15$

18. Solve the system.

$$x^2 + 3xy + y^2 = 20$$
$$xy - y^2 = 0$$

19. Let $a_1, a_2, a_3, \text{K}, a_n, \text{K}$ **be an arithmetic sequence. If** $a_1 = 3, a_{20} = 117$ **, find** d and a_{101}**.**

20. Expand the binomial using the binomial formula.

$$(3p - 2q)^4$$