MAT 210 READINESS EVALUATION

This sheet contains typical college algebra problems and situations that you need to be able to handle to succeed in MAT 210. You don’t have to turn this in, and there will be no extra credit if you do.

1. Find all x values that satisfy \( x^3 - 5x^2 + 6x = 0 \).

2. Mark all correct answers. \( x^{-\frac{1}{4}} = \)
   a. \( \sqrt[4]{x} \)
   b. \( \frac{1}{\sqrt[4]{x}} \)
   c. \( -\frac{1}{x^4} \)
   d. \( x - \frac{1}{4} \)
   e. \( \frac{1}{x^4} \)
   f. \( -\frac{1}{4}x \)

3. True or False? Mark each statement T or F.
   a. \( \sqrt{a + b} = \sqrt{a} + \sqrt{b} \)
   b. \( \frac{1}{a+b} = \frac{1}{a} + \frac{1}{b} \)
   c. \( 2^{xy} = 2^x 2^y \)
   d. \( 2^{x+y} = 2^x 2^y \)
   e. \( \frac{x+a}{a} = x \)
   f. \( \ln(x + y) = \ln(x) + \ln(y) \)

4. Evaluate the expression \( -x^2 \) at \( x=2 \) and \( x=-2 \).
5. If \( f(x) = x^2 + x \), evaluate and simplify the expression \( \frac{f(x+h)-f(x)}{h} \).

6. Identify the geometric curve given by the equation \( x^2 + y^2 = 9 \).

7. Identify the geometric curve given by the equation \( y = \sqrt{9 - x^2} \).

8. Let \( f(x) = \begin{cases} x - 1, & x < 1 \\ x^2, & x \geq 1 \end{cases} \). Find \( f(0), f(1), f(2) \).

9. Find the inverse function of \( f(x) = e^x + 1 \) and its domain and range.

10. Find the horizontal asymptotes of the indicated functions.
    a. \( e^x \) for \( x < 0 \).
    b. \( \frac{x^3-x^4}{x^2+2x^4} \)
    c. \( e^{-x} + 2 \) for \( x > 0 \).

11. Mark all correct answers: \( \frac{\sqrt[3]{x}}{\sqrt{x}} = \)
    a. \( \sqrt[3]{x} \)
    b. \( \frac{\sqrt[3]{x}}{x} \)
    c. \( x^{-\frac{1}{6}} \)
    d. \( \frac{x^2}{x^3} \)

12. Find two functions \( f \) and \( g \) such that \( \sqrt{x^2 + 5} = f(g(x)) \).

13. If a straight line goes through the point \((2, 3)\) and has a slope of \( \frac{1}{2} \), what is the equation of this line?