

MATH 1111 Practice FINAL EXAM #2

1. Simplify: $\frac{14x^5y^{-1}}{(2xy^{-3})^{-1}}$

2. Perform the indicated operations and simplify.

$$(5x^2 - 4x + 1) - (2x^2 - 5x + 3)$$

3. Perform the indicated operations and simplify. Leave your answer in factored form.

$$\frac{27x^3}{x^2 - 9} \div \frac{18x^2}{2x^3 + 12x^2 + 18x}$$

4. Simplify:

$$4\sqrt{56x^3y^2}, \text{ where } x, y \geq 0$$

5. Rationalize the denominator:

$$\frac{4}{\sqrt{3} - 1}$$

6. Solve the equation.

$$-\frac{2}{x} = \frac{3}{x-1}$$

7. A red car takes off from a certain intersection one hour before a blue car. If the red car's speed is 65 m.p.h and the blue car's speed is 75 m.p.h., how long does it take the blue car to catch the red car?

8. Solve the equation.

$$|3x - 7| = 21$$

9. Solve the equation in the complex number system.

$$x^2 + 58 = 6x$$

10. Solve the equation in the complex number system.

$$x^4 - 3x^2 + 2 = 0$$

11. Solve the equation.

$$2\sqrt{x-1} = x$$

12. Perform the indicated operation. Express your answer in the form $a + bi$.

$$\frac{3 + 2i}{3 + 4i}$$

13. Solve the inequality.

$$1 - x^2 > 0$$

14. Find the length of the line segment in the coordinate plane having endpoints $(3, -1)$ and $(7, 4)$.

15. Find the slope of the line passing through the points $(-2, -1)$ and $(-1, 1)$.

16. A line is perpendicular to the line represented by the equation $y = \frac{1}{2}x + 3$ and contains the point $(0, 7)$. What is the equation of this line? Express your answer using either the general form or the slope intercept form of the equation.

17. List the x -intercept(s) of the graph representing the function $f(x) = 2x^2 + x - 6$

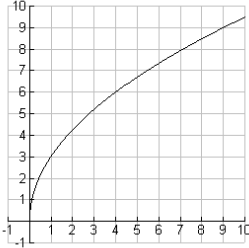
18. A ball is thrown vertically upward with an initial velocity of 48 feet per second. The distance s (in feet) of the ball from the ground after t seconds is $s = 48t - 16t^2$. At what time will the ball strike the ground?

19. P varies directly with x^2 and inversely with y . $P = 8$ when $y = 1$ and $x = 2$. determine the value of P when $x = 3$ and $y = 2$.

20. Find the domain of the function f .

$$f(x) = \frac{1}{\sqrt{x-2}}$$

21. Given the graph of f shown below find $f(4)$.



22. Let $f(x) = \frac{x+1}{x-3}$ and $g(x) = x-2$. Find $(f \circ g)(x)$.

23. Let $f(x) = \frac{x}{x-3}$. Find f^{-1} , the inverse function of f .

24. Determine the vertex of the parabola represented by $f(x) = 3x^2 - 18x + 23$.

25. Find the exact value of the expression $\log_5 25$.

26. A student takes out a student loan in the amount of \$5000. The interest on this loan is deferred until graduation, meaning the student pays nothing until they graduate, but interest on the debt will continue to accrue and compound in the meantime. If the student is being charged an interest rate of 8% per year compounded monthly, how much will they owe upon graduating 5 years later (i.e., 5 years after borrowing the \$5000)? $A = P \left(1 + \frac{r}{n}\right)^{nt}$?

27. Solve for x . Express your answer using the exact value or a three decimal place approximation.

$$e^{x+2} = 11$$

28. What is the quotient when $f(x) = x^5 - x^4 + x^3 - x^2 + x - 1$ is divided by $x - 1$?

29. Solve the system of equations.

$$\begin{cases} 2x + 3y = 2 \\ 3x + 4y = 2 \end{cases}$$

30. Sketch a graph of the piecewise defined function given by:

$$f(x) = \begin{cases} -x & \text{if } -4 \leq x < -1 \\ 2 & \text{if } -1 \leq x \leq 1 \\ x-1 & \text{if } 1 < x \leq 3 \end{cases}$$

