

MATH 1111 Practice FINAL EXAM #3

1. Perform the indicated operation:

$$(2x - 3) \cdot (x^2 + x + 1)$$

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

$$\frac{x}{x^2 - 1} - \frac{1}{x^2 + x - 2}$$

3. Simplify: $(25x^6y^4)^{1/2}$. Assume all variables are positive.

4. Solve the equation:

$$0.14x + 1.87 = 0.04x + 1.98$$

5. A car dealership has 75 cars in stock that are blue, black, or red. One third of the cars are blue and one fifth are black. How many of the dealer's cars are red?

6. Solve the equation over the complex number system:

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

7. Solve the equation:

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

8. Solve the inequality:

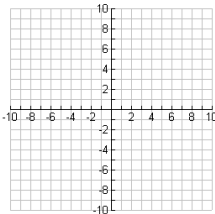
$$1 - x \geq 11 - 3x$$

9. Solve the inequality:

$$|2x + 3| < 10$$

10. How much antifreeze should be added to a gallon of 70% antifreeze solution to make a 90% antifreeze solution?

11. Sketch the graph of the line described by the equation $x + y = 4$.



12. Find the slope of the line containing the points $(0, 1)$ and $(4, 4)$.

13. A manufacturer of motor scooters has found that when the unit price is p dollars, the revenue R (in dollars) is $R(p) = -4p^2 + 12000p$. At what price is the revenue the largest?

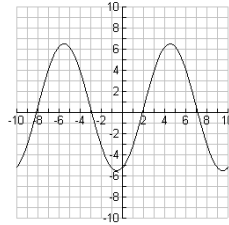
14. Find the equation of a line parallel to the line $y = 3$ and containing the point $(0, 6)$.

15. The frequency at which a string vibrates varies inversely with the length of the string. If a 30 inch string vibrates at 128 times per second, how fast will a 24 inch string vibrate?

16. Find the domain of the function:

$$f(x) = \frac{x + 3}{x - 5}$$

17. Given the graph of f below, find $f(3)$.



18. Given $f(x) = x^2 + 2x + 3$ and $g(x) = 3x^2 + 2x + 1$, find $(f - g)(x)$.

19. Find the x -intercept(s) for the graph of the function given by

$$q(x) = x^2 - 21x + 20$$

20. Find the vertex of the parabola that is the graph of the equation

$$y = x^2 + 8x - 21$$

21. Solve the inequality:

$$(x + 1)(x - 2)(x + 4) \leq 0$$

22. Find the remainder when $x^4 + x^2 - 5$ is divided by $x^2 + 2$.

23. Let $f(x) = x^2 - 4x + 5$ and $g(x) = x - 4$. Find $(f \circ g)(9)$.

24. Suppose that $f(x) = x^3 + 4$. Find $f^{-1}(x)$ where f^{-1} is the inverse of f .

25. Change the following exponential expression to an equivalent expression involving a logarithm.

$$5^{-2} = 0.04$$

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

$$27^{x+1} = 9$$

27. Solve the equation:

$$\log_2 x + \log_2(x + 2) = 3$$

28. How many years will it take an initial investment of \$1,000 to grow to \$1,500 if it is invested at 3% compounded continuously? Use one of the formulas given. Round your answer to one decimal place.

$$A = P \left(1 + \frac{r}{n}\right)^{nt} \quad \text{OR} \quad A = Pe^{rt}$$

29. Solve the system of equations: $\begin{cases} x + y = 100 \\ 2x - 3y = 40 \end{cases}$

30. The function f is defined by: $f(x) = \begin{cases} x & \text{if } -3 \leq x < -2 \\ x^2 & \text{if } -2 \leq x < 2 \\ -x & \text{if } 2 \leq x \leq 4 \end{cases}$ Sketch the graph of f .

