

MATH 1111 FINAL EXAM

SPRING SEMESTER 2011

1. Simplify the following expression, assuming the variables are positive.

$$\left(\frac{Y^2}{X^3Y^{-4}}\right)^2$$

2. Perform the indicated operation and simplify the result.

$$(2x + 3)(x + 4)(x - 4)$$

3. Combine the following rational expressions and simplify.

$$\frac{x}{x^2 - x - 2} - \frac{x + 3}{x^2 - 1}$$

4. Doug left a \$3.50 tip for his server at a restaurant. If the tip was 18% of his meal price, how much did Doug pay for his meal?

5. Rationalize the denominator of the following.

$$\frac{3}{\sqrt{5} - 1}$$

6. Perform the indicated operation and express the result in the form $a + bi$.

$$(1 - 2i)(3 + 4i)$$

7. Find all real solutions of the following.

$$\frac{5}{x + 7} = \frac{3}{x - 1}$$

8. Solve for all real and/or complex solutions.

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

9. Solve the following equation.

$$2x^3 + 3x^2 - 5x = 0$$

10. Solve the following inequality.

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

11. Solve the following inequality.

$$|x - 4| + 2 > 5$$

12. Lucy has \$7500 to invest. She can invest part of it in bonds which pay 3% simple interest and part in a stock that pays 5% simple interest. How much should she invest at 3% to make \$345 in interest each year?

13. Find the distance between the points P(-1,3) and Q(4, -2).

14. Sketch the graph of the equation $y = \frac{1}{3}x - 1$.

15. Find the equation in slope-intercept form of the line that passes through the point (1,3) and is parallel to the line with equation $x + y = 2$.

16. The cost of gasoline varies directly with the number of gallons of gasoline purchased. If you can purchase 5.94 gallons of gasoline for \$20, how much will it cost to purchase 20 gallons of gasoline?

17. Find the domain of the following function.

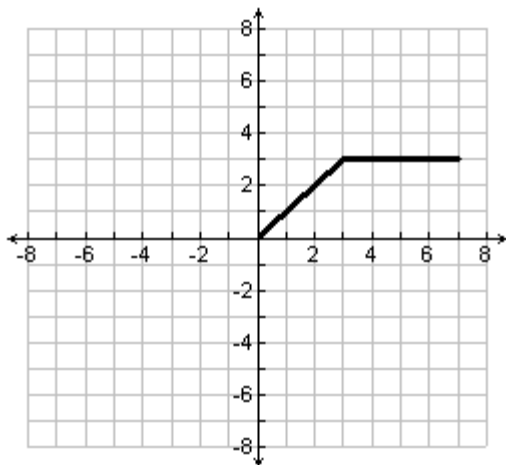
$$f(x) = \frac{3x + 1}{x^2 - 4}$$

18. The cost C, in dollars, of renting a car for a day is given by the function

$$C(x) = 0.35x + 20$$

where x is the number of miles driven. If the cost of renting the car is \$83.35, how many miles was the car driven?

19. Given the graph of the function f, find f(4):



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

$$y = x^2 - 6x + 5$$

21. Solve the following inequality.

$$\frac{x-3}{x+1} > 0$$

22. Find the x-intercepts of the graph of the function $q(x) = x^2 + 9x + 14$.

23. Given $f(x) = \sqrt{x+1}$ and $g(x) = 2x+1$ find $(f \circ g)(2)$.

24. A cell phone company offers a plan which charges customers monthly according to the following piecewise-defined function:

$$C(x) = \begin{cases} 30 & 0 \leq x \leq 300 \\ 0.35x - 90 & x > 300 \end{cases}$$

where x is the number of minutes used for the month.

What would the monthly charge be for a customer using 365 minutes?

25. Find the inverse of the following function.

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

26. Write the following expression as a sum and/or difference of logarithms. Express powers as factors.

$$\ln \left(x^3 \sqrt{x+2} \right)$$

27. Solve the following equation. Leave your answer in exact form or express it correct to three decimal places.

$$7e^{3x} = 2$$

28. Solve the following equation for x .

$$\log_2(x+5) + \log_2(x-2) = 3$$

29. Find the amount that results from investing \$250 at 4% compounded quarterly for 5 years. Round your answer to the nearest cent.

(The formula for compounding is $A = P\left(1 + \frac{r}{n}\right)^{nt}$.)

30. Solve the system of equations.
$$\begin{cases} 2x - y = -6 \\ 3x + 2y = 5 \end{cases}$$