

Math 1111 Final Exam Spring 2000

Instructions: Simplify all answers, leave no negative exponents, and reduce all fractions.

1. Simplify:

$$\frac{(x)^{-2}}{(xy)^2}$$

2. Perform the indicated operations:

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

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

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

4. Rationalize the denominator:

$$\frac{1}{\sqrt{7} + 1}$$

5. Simplify the expression. Assume that the variables are positive.

$$(25a^4b^2)^{\frac{1}{2}}$$

6. Solve for x :

$$\frac{3}{x} - \frac{1}{3} = \frac{1}{6}$$

7. Pat worked 55 hours in one week. He made a gross weekly wage of \$520.

What is his regular hourly rate if he gets time-and-a-half for overtime (over 40 hours)?

8. Find **all** solutions, whether pure real, pure imaginary, or a mix of both:

$$x^2 - x + 1 = 0$$

9. Solve for x :

$$\sqrt{x+2} + 4 = x$$

10. Solve the inequality:

$$4 - 2x \geq 16$$

11. Solve the inequality:

$$|x + 7| < 10$$

12. Solve the inequality:

$$x^2 - 9 < 0$$

13. Find the distance between the two points $(10, 4)$ and $(2, -2)$.

14. Graph the line that has a y -intercept at 3 and slope = -2 .

15. Find the slope of the line $x + 2y + 3 = 0$.

16. Write the equation of the line which has slope = 2 and passes through the point $(-1, 4)$. Express your answer in slope-intercept form or standard form.

17. Find the radius of the circle described by the equation:

$$x^2 + y^2 + 4x - 6y + 9 = 0$$

18. The price of a bag of coffee beans varies directly with its weight. If a 2.5 pound bag costs \$6, how much will a 4 pound bag cost?

19. Find the domain of the function f :

$$f(x) = \frac{x}{x-8}$$

20. Let $f(x) = 3x^2 + 2$ and let $g(x) = x + 2$.

Find $(f \circ g)(1)$.

21. Let $f(x) = 2x - 1$. Find f^{-1} , the inverse function of f .

22. Determine whether the quadratic function has a maximum or minimum value and find that value.

$$p(x) = -2x^2 + 20x + 19$$

23. Find the quotient when $x^4 - 2x^3 + 4x^2 - 4x + 3$ is divided by $x - 1$.

24. Multiply and write the expression in the standard form $a + bi$:

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

25. If George invests \$1200 at 9% compounded continuously, what will his investment be worth after 5 years? ($A = Pe^{rt}$)

26. Change the logarithmic expression to an equivalent exponential expression:

$$\log_9 w = 4$$

27. Write the expression as sums or differences of logarithms. Express the powers as factors:

$$\ln\left(\frac{xy^2}{z}\right)$$

28. Solve for x :

$$3^x = 10$$

29. Solve the system of equations:

$$\begin{cases} x + 2y = -1 \\ 3x - 4y = 17 \end{cases}$$

30. Maximize the function $z = 5x + 3y$ subject to the following:

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ 9x + 6y \leq 36 \end{cases}$$