

Final Exam 2006

1. Simplify: $(3x^{-1})^{-1}(6x^2)$

2. Perform the indicated operation and simplify.

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

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

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

4. Simplify:

$$(8x^3y^9)^{\frac{1}{3}}$$

5. Rationalize the denominator.

$$\frac{2}{1+\sqrt{5}}$$

6. Solve the equation.

$$\frac{x}{x+1} = \frac{x+1}{x}$$

7. Rudy has \$10,000 to invest. He wants to invest the money in two different funds. Fund A pays 4% (simple) interest this year. Fund B pays 10% (simple) interest this year. Since Fund B might carry a little more risk, he does not want to put all of his money there. If Rudy wants to earn \$500 in interest this year on this \$10,000, what amount should be invested in Fund B?

8. Solve the equation.

$$|4x-1|=11$$

9. Solve the equation in the complex number system.

$$4x^2+5x-6=0$$

10. Find the real solutions.

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

11. Solve the equation.

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

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

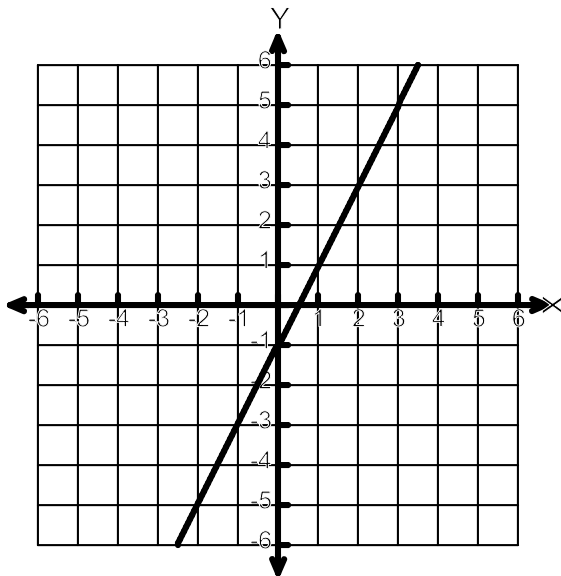
$$\frac{1 - 2i}{2 + i}$$

13. Solve the inequality.

$$x^2 - 9 > 0$$

14. Find the distance between the points $(1, -1)$ and $(-3, 2)$.

15. Find the slope of the line passing through the points $(0, -1)$ and $(-1, -3)$. The graph of the line is provided as additional information.

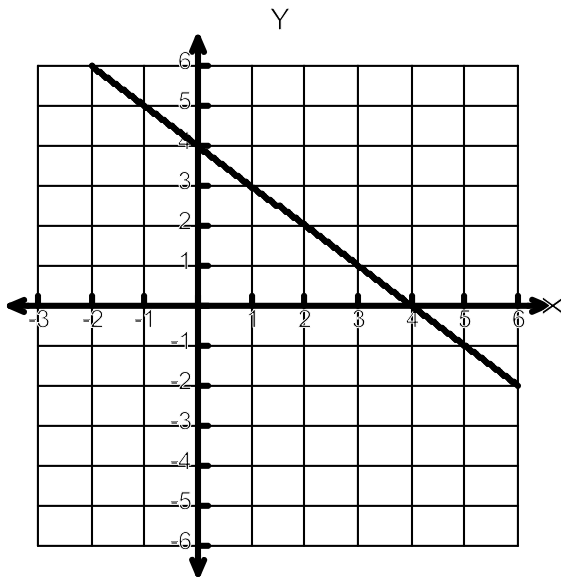


16. Find an equation of the line having slope $\frac{3}{2}$ and passing through $(1, 1)$.

17. List the x -intercept(s) of the graph representing the function: $f(x) = 5x^2 + 2x - 3$.
18. Find the radius of the circle described by the equation: $x^2 - 2x + y^2 + 6y = 0$.
19. The velocity v of a falling object varies directly with the time t of the fall. If after 3 seconds, the velocity of the object is 96 feet per second, what will its velocity be after 4 seconds?
20. Find the domain of the function f .

$$f(x) = \sqrt{9 - x}$$

21. Given the graph representing the function f , find $f(1)$.



22. Let $f(x) = x^2 + 2x$ and $g(x) = x + 1$. Find $(f \circ g)(4)$.
23. Let $f(x) = \frac{1}{2x} + 1$. Find f^{-1} , the inverse function of f .
24. Determine the vertex of the parabola represented by $f(x) = -16x^2 + 96x - 97$.
25. Find the exact value of the logarithm.

$$\log_3 3^2$$

26. Find the amount that results from investing \$5,000 at 3% compounded continuously after five years.
27. Solve for x . Express your answer using the exact value or a three decimal place approximation.

$$\log_2(x+3) + \log_2(x+1) = 3$$

28. What is the remainder when $f(x) = x^4 - 2x^3 + x - 3$ is divided by $x + 1$?
29. Solve the system of equations.

$$\begin{cases} 2x + 3y = 8 \\ x - 4y = -7 \end{cases}$$

30. Maximize the function $z = 3x - 2y$ subject to the following constraints:

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ x \leq 3 \\ y \leq 4 \\ x + y \geq 4 \end{cases}$$