

Circle the correct answer for each problem.

<p>1. Factor.</p> $2a^2b + 2b^3 - 3a^3 - 3ab^2$ $(2b - 3a)(a^2 + b^2)$	<p>2. Factor.</p> $3x^2 - 16x - 12$ $(3x + 2)(x - 6)$
<p>3. Factor.</p> $x^3 - 343$ $(x - 7)(x^2 + 7x + 49)$	<p>4. Factor completely.</p> $10x^4 - 810$ $10(x^2 + 9)(x + 3)(x - 3)$

5. Solve

$$x^2 - x - 12 = 0$$

$$x = -3 \text{ or } x = 4$$

6. Solve

$$8x^2 + 34x + 35 = 0$$

$$x = -\frac{7}{4} \text{ or } x = -\frac{5}{2}$$

7. Determine the domain of this function.

$$f(x) = \frac{x^2 - x - 6}{x^2 - 4}$$

$$\{x \in \mathbb{R} : x \neq -2, 2\}$$

8. Simplify

$$\frac{x+2}{x^2-4}$$

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

9. Simplify

$$\frac{1}{x} - \left(\frac{x^2}{3} \div \frac{2}{x} \right)$$

$$\frac{6-x^4}{6x}$$

10. Simplify

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

$$\frac{2x}{x+3}$$

11. Solve

$$\frac{1}{4} + \frac{3}{x} = \frac{1}{2}$$

$$x = 12$$

12. Solve

$$\frac{1}{x+2} - \frac{1}{3} = \frac{1}{6}$$

$$x = 0$$

13. What is the slope of the line with the equation

$$2x + 7y = 28$$

$$-\frac{2}{7}$$

14. What is the equation of the line that passes through

$$(-5, 3) \text{ and } (2, -4)$$

$$y = -x - 2$$

15. Solve the system

$$\begin{cases} 3x + y = 1 \\ 3x - 2y = 10 \end{cases}$$

$$\left(\frac{4}{3}, 3\right)$$

16. Solve the system

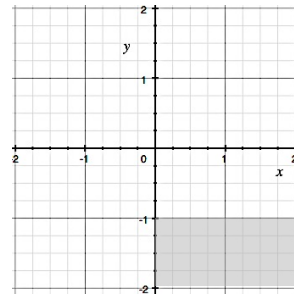
$$\begin{cases} 10x + 2y = 2 \\ y = -5x + 1 \end{cases}$$

$$\{(x, y) \mid y = -5x + 1\}$$

17. A friend invests \$1500 more at 6% than he invests at 8%. The interest from the two investments is the same. How much did he invested at 6%?

\$6000

18. The shaded region is the graph of which system?



$$\begin{cases} x \geq 0 \\ y \leq -1 \end{cases}$$

19. Simplify

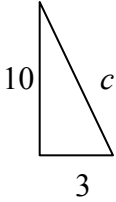
$$\sqrt[4]{16y^4}$$

$2y$

20. Simplify

$$\sqrt{27} + \sqrt{48}$$

$7\sqrt{3}$

<p>21. Rationalize the denominator</p> $\frac{1}{5 - \sqrt{2}}$ $\frac{5 + \sqrt{2}}{23}$	<p>22. Rationalize the denominator</p> $\frac{1}{4 + 3i}$ $\frac{4 - 3i}{25}$
<p>23. Simplify</p> $\sqrt[3]{5\sqrt{x^{60}}}$ x^4	<p>24. Find the length of the unknown side of the right triangle shown.</p>  <p>$c = \sqrt{109}$</p>

25. Simplify.

$$x^{\frac{2}{3}} \cdot x^{\frac{7}{3}}$$

$$x^3$$

26. Simplify.

$$\sqrt[4]{x} \cdot \sqrt{x}$$

$$\sqrt[4]{x^3}$$

27. Solve using the square root method.

$$(x - 2)^2 = 10$$

$$\{2 \pm \sqrt{10}\}$$

28. Solve by completing the square.

$$x^2 + 10x = -10$$

$$\{-5 \pm \sqrt{15}\}$$

29. Solve by using the quadratic formula.

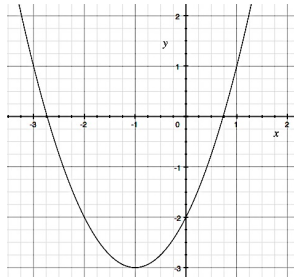
$$x^2 + 2x + 3 = 0$$

$$\{-1 \pm i\sqrt{2}\}$$

30. Solve.

$$x^2 - 3x - 10 > 0$$

$$(-\infty, -2) \cup (5, \infty)$$

31. Determine the equation of the parabola shown

$$y = (x + 1)^2 - 3$$

32. Determine the vertex of the parabola.

$$y = x^2 - 10x + 2$$

$$(5, -23)$$

33. The area of a rectangle is 198 square meters. Its length is five meters shorter than three times its width. What is the length?

22 meters

34. Find the inverse function.

$$f(x) = \frac{3x+3}{9}$$

$$f^{-1}(x) = 3x - 1$$

35. Solve.

$$16^{x+2} = 8$$

$$-\frac{5}{4}$$

36. Solve.

$$3^x = 12$$

$$x \approx 2.26$$

37. Solve.

$$e^{-3t} = 15$$

$$t \approx -0.903$$

38. Solve.

$$\log_6(x^2 - 6x + 15) = \log_6(5x - 13)$$

$$\{4, 7\}$$

39. Solve

$$3\log x = 6$$

$$x = 100$$

40. Solve.

$$\log_6(x) + \log_6(x + 1) = \log_6(12)$$

$$\{3\}$$