Circle the correct answer for each problem.

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

5. Solve

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

$x = -3$ or $x = 4$

6. Solve

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

$x = -\frac{7}{4}$ 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

$(-5, 3)$ and $(2, -4)$

$y = -x - 2$

15. Solve the system

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

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

16. Solve the system

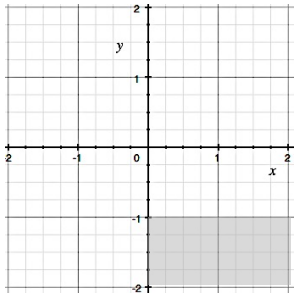
$$\begin{cases} 10x + 2y = 2 \\ y = -5x + 1 \end{cases}$$

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

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

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

$7\sqrt{3}$

21. Rationalize the denominator

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

$$\frac{5+\sqrt{2}}{23}$$

22. Rationalize the denominator

$$\frac{1}{4+3i}$$

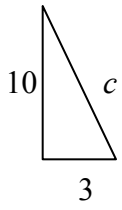
$$\frac{4-3i}{25}$$

23. Simplify

$$\sqrt[3]{\sqrt[5]{x^{60}}}$$

x^4

24. Find the length of the unknown side of the right triangle shown.



$c=\sqrt{109}$

25. Simplify.

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

x^3

26. Simplify.

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

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

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.

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

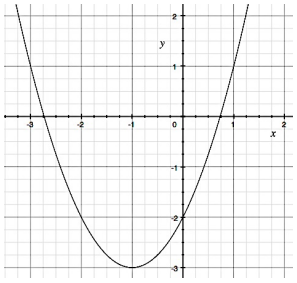
$\{-1 \pm i\sqrt{2}\}$

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}