

10. Solve the equation $(x - \frac{10}{x})^2 - 6(x - \frac{10}{x}) - 27 = 0$ for x .
- a) $x = -3, 9$ b) $x = -5, -3, -1, 2, 9, 10$
- c) $x = -5, -1, 2, 10$ d) none of the previous
11. Solve the absolute value inequality $3 + |7 - \frac{x}{7}| \geq 21$.
- a) $(-\infty, -77] \cup (175, \infty)$ b) $[-77, 175]$
- c) $(-\infty, 77] \cup (-175, \infty)$ d) none of the previous
12. Find all of the possible rational zeros for $f(x) = 9x^6 - 5x^4 + 6x^2 + 4$.
- a) $\pm(1, 3, 9, \frac{1}{2}, \frac{3}{2}, \frac{9}{2}, \frac{1}{4}, \frac{3}{4}, \frac{9}{4})$ b) $\pm(1, 2, 4, \frac{1}{2}, \frac{3}{2}, \frac{9}{2}, \frac{1}{4}, \frac{3}{4}, \frac{9}{4})$
- c) $\pm(1, 2, 4, \frac{1}{3}, \frac{2}{3}, \frac{4}{3}, \frac{1}{9}, \frac{2}{9}, \frac{4}{9})$ d) none of the previous
13. Given the functions $f(x) = 3x^2 + 4x - 7$ and $g(x) = 6 - 5x$, find and simplify $(f \circ g) = f(g(x))$ (the composition of functions).
- a) $-15x^2 - 20x + 41$ b) $75x^2 - 200x + 125$
- c) $75x^2 - 20x + 125$ d) none of the previous
14. Given $f(x) = \frac{2x-3}{4x+5}$, find $f^{-1}(x)$ (the inverse function of f).
- a) $f^{-1}(x) = \frac{-5x+3}{4x-2}$ b) $f^{-1}(x) = \frac{-5x-3}{2-4x}$
- c) $f^{-1}(x) = \frac{5x+3}{2-4x}$ d) none of the previous

15. Divide $(x^4 - 3x^2 + 3x - 5)$ by $(x + 2)$.
- a) $x^3 - 2x^2 + x + 1 + \frac{-7}{x+2}$ b) $x^3 - 2x^2 + x - 1 + \frac{-3}{x+2}$
- c) $x^3 - 5x + 13 + \frac{-31}{x+2}$ d) none of the previous
16. Solve $\log_{10}(x - 6) + \log_{10}(x + 3) = 1$ for x .
- a) $x = -4, 7$ b) $x = -4$
- c) $x = 7$ d) none of the previous
17. A full-price ticket for a high school basketball game costs \$6, and a student ticket costs \$4. If 600 tickets were sold, and the total receipts were \$3326, then how many tickets were full-price tickets?
- a) 326 b) 463
- c) 137 d) none of the previous
18. Solve the equation $e^{2x} - e^x - 20 = 0$ for x rounded to two decimal places.
- a) $x \approx 1.61$ b) $x \approx 1.39$
- c) $x \approx 1.39, 1.61$ d) none of the previous
19. Given the equation $x^2 + y^2 + 4x - 10y + 20 = 0$, find the center $c = (a, b)$ and radius r of the circle.
- a) $(x + 2)^2 + (y - 5)^2 = 9; c = (-2, 5), r = 9$
- b) $(x + 2)^2 + (y - 5)^2 = 9; c = (-2, 5), r = 3$
- c) $(x + 2)^2 + (y - 5)^2 = 9; c = (2, -5), r = 3$
- d) none of the previous

25. Give the domain and the range of the quadratic function whose graph is described. The vertex is $(7, -5)$ and the parabola opens up.
- a) $D : (-\infty, \infty); R : [7, \infty)$ b) $D : (-\infty, \infty); R : [-5, \infty)$
- c) $D : (-\infty, \infty); R : (-\infty, -5]$ d) none of the previous
26. What is the product of $7 - 13i$ and its complex conjugate?
- a) $7 + 13i$ b) 218
- c) -120 d) none of the previous
27. Evaluate the expression $\log_3\left(\frac{1}{2187}\right)$.
- a) -7 b) $\frac{1}{7}$ seconds
- c) $-\frac{1}{7}$ d) none of the previous
28. If $f(x) = \begin{cases} x^2 - 3x & \text{if } x < -2 \\ 2 - x^3 & \text{if } x > -2 \end{cases}$, then evaluate $f(-2)$.
- a) 10 b) -6
- c) -2 d) none of the previous
29. Let $C(x) = 20x + 18,000$ be the cost function and $R(x) = 80x$ be the revenue function. What is the break-even point?
- a) $(0, 0)$ b) $(300, 48000)$
- c) $(300, 24000)$ d) none of the previous
30. A rectangular parking lot has a length that is 3 yards greater than the width. The area of the rectangular lot is 180 square yards. Find the length of the lot in yards.
- a) 15 yards b) 12 yards
- c) 18 yards d) none of the previous

31. Which of the following functions has $x - 1$ as a factor?
- a) $f(x) = x^4 - x^3 + x + 2$ b) $f(x) = x^4 - 2x^3 + x^2 - 4x + 4$
- c) $f(x) = x^4 - x^3 - x - 26$ d) none of the previous
32. When the system of linear equations $\begin{cases} 6x + 7y = -10 \\ -2x - 8y = -8 \end{cases}$ is solved, what is the x -value of the solution?
- a) -4 b) $-\frac{26}{17}$
- c) 2 d) none of the previous
33. Find the slope of the line that is perpendicular to $5x + 7y - 9 = 0$.
- a) $\frac{5}{7}$ b) $\frac{7}{5}$
- c) $\frac{9}{7}$ d) none of the previous
34. State the domain of the function: $f(x) = \frac{x^2+5x+6}{x^2-8x-20}$.
- a) $(-\infty, -2) \cup (-2, 10) \cup (10, \infty)$
- b) $(-\infty, 10) \cup (10, \infty)$
- c) $(-\infty, -3) \cup (-3, -2) \cup (-2, 10) \cup (10, \infty)$
- d) none of the previous
35. If $-2x + 4y = 8$ and $3x - 5y = 6$, find $x - y$.
- a) 14 b) -1
- c) 0 d) none of the previous
36. What is the square of $4 + 6i$?
- a) $16 + 36i$ b) $-20 + 48i$
- c) $52 + 48i$ d) none of the previous

43. Use the leading coefficient test to determine the end behavior of the polynomial: $f(x) = 3x^3 - 4x^2 + 5x - 4x^4$.
- a) rises to the left and falls to the right
 - b) falls to the left and rises to the right
 - c) falls to the left and falls to the right
 - d) none of the previous
44. Describe the behavior of the roots at the x -axis of the following polynomial: $f(x) = -x^2(x - 5)(x^2 - 4)$.
- a) 0 touches and turns and 5, 2, -2 crosses the x -axis
 - b) 0, 5, -2, 2 cross the x -axis
 - c) 0, -2, 2 touches and turns and 5 crosses the x -axis
 - d) none of the previous
45. Two cars leave a city and head in the same direction. After 3 hours, the faster car is 30 miles ahead of the slower car. The slower car has traveled 120 miles. Find the speeds of the two cars.
- a) 40 *mph* and 50 *mph* b) 30 *mph* and 40*mph*
 - c) 100 *mph* and 110 *mph* d) none of the previous
46. An object is tossed from a platform 10 meters above the ground. The distance, d , represents the height above the ground and varies with the time in seconds, t , from when the object was tossed. The equation that models this is $d = -2t^2 + 3t + 10$. What is the maximum height that the object will reach? (round to the nearest whole meter)
- a) 10 meters b) 11 meters
 - c) 12 meters d) none of the previous

