

1. Simplify the expression $\left(\frac{2x^3y^{-1}}{y^2}\right)^{-2}$ by eliminating any negative exponents.
2. Write the expression $\frac{\sqrt[3]{8x^2}}{\sqrt{x}}$ using rational exponents and simplify.
3. Write the expression $\frac{8}{\sqrt[3]{x^2}}$ with a rational denominator.
4. Find the product $(x + 3y)(2x - y)$ and simplify.
5. Find the product $(x + 2)(x^2 + 2x + 3)$ and simplify.
6. Factor $3x^3 - x^2 - 12x + 4$ completely.
7. Factor $8x^2 + 10x + 3$ completely.
8. Factor $6x^2 - 5x - 6$ completely.
9. Compute $\frac{x^2 + x - 6}{x^2 + 4x - 12} \div \frac{x + 3}{x - 1}$ and write your answer in lowest terms.
10. Compute $\frac{4x}{x + 2} - \frac{2 + 3x}{x + 2}$ and write your answer in lowest terms.
11. Compute $\frac{2x}{x^2 - 16} - \frac{3}{x^2 + 8x + 16}$ and write your answer in lowest terms.
12. Solve the equation $6 - 4x = 10$.

13. Find the distance between the points $(6, -2)$ and $(-4, 5)$.
14. Find the midpoint of the segment that joins the points $(5, -1)$ and $(3, 5)$.
15. Find an equation of the circle of radius 5 centered at $(-2, 3)$.
16. Find the center and radius of the circle with equation $x^2 + (y - 2)^2 = 36$.
17. Find the center and radius of the circle with equation $x^2 + y^2 + 6y + 2 = 0$.
18. Find an equation of the line with slope 7 that passes through $(4, -1)$.
19. Find an equation of the line that passes through $(6, 2)$ and $(-4, 3)$.
20. Find an equation of the line that passes through $(3, -1)$ that is parallel to $y = 6x + 1$.
21. Find an equation of the line that passes through $(1, 1)$ that is perpendicular to $2x + y = 4$.
22. Find all real and complex solutions to $x^2 + 14x = 32$.
23. Find all real and complex solutions to $2x^2 + 6x - 5 = 0$.
24. Find all real and complex solutions to $3x^2 - 2x + 1 = 0$.

25. Find all real solutions to $\frac{6}{x^2-1} - \frac{3}{2} = \frac{3}{x-1}$.

26. Find all real solutions to $\frac{2}{x+3} + \frac{3}{8} = \frac{5}{4x+12}$.

27. Find all real solutions to $x^6 - 2x^3 - 3 = 0$.

28. Find all real solutions to $x^{3/2} - 10x^{1/2} + 25x^{-1/2} = 0$.

29. Find all real solutions to $x^2\sqrt{x+3} = (x+3)^{3/2}$.

30. Find all real solutions to $x^5 - x^3 - 2x = 0$.

31. Solve the inequality $2 - 5x < 7$.

32. Solve the inequality $-4 < 2x - 4 \leq -2$.

33. Solve the equation $|8 - 3x| = 1$.

34. Solve the inequality $|4x + 1| \geq 21$.

35. Solve the inequality $x^2 + 5x + 6 > 0$.

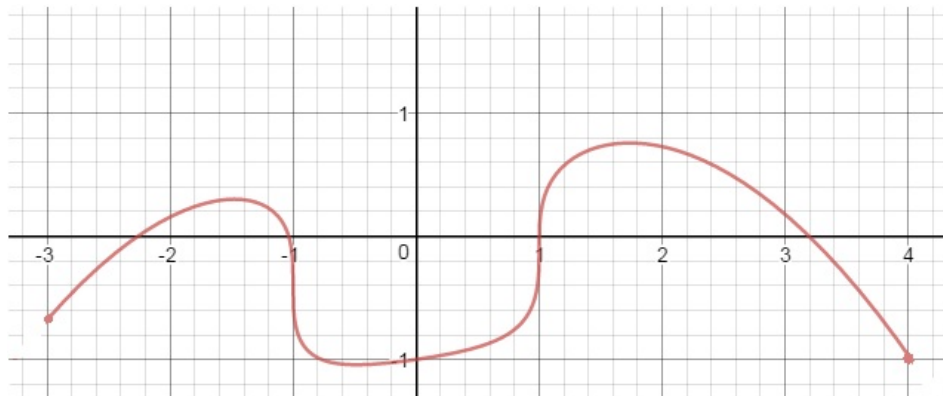
36. Solve the inequality $2x^2 + x \geq 1$.

37. Solve the inequality $(x-2)^2(x+1)(x+3) < 0$.

38. Solve the inequality $\frac{x^2-9}{x^3+x^2-4x-4} > 0$.

39. Consider the function $f(x) = x^2 - 4x$. Evaluate $f(x - 3)$ and simplify.
40. Find the domain of the function $f(x) = \sqrt{4 - x^2}$.
41. Find the domain of the function $f(x) = \frac{x - 1}{x^2 + 3x - 10}$
42. Find the domain of the function $f(x) = \frac{5x}{\sqrt{x - 1}}$.
43. Find the average rate of change of the function $f(x) = 6x - x^2$ from $x = 1$ to $x = 4$.
44. If $f(x) = 3\sqrt{x - 4}$ and $g(x) = x^2 - 1$, find the formula for $(f \circ g)(x)$.
45. If $f(x) = 3\sqrt{x - 4}$ and $g(x) = x^2 - 1$, find the formula for $(g \circ f)(x)$.
46. If $f(x) = 13x^{5/3} - 1$, find the formula for $f^{-1}(x)$.
47. If $f(x) = \frac{2x + 1}{3x - 7}$, find the formula for $f^{-1}(x)$.
48. Sketch a graph of the function $f(x) = (x + 1)^2 - 3$.
49. Sketch a graph of the function $f(x) = 3|x - 1| + 2$.
50. Sketch a graph of the function $f(x) = \frac{1}{3}\sqrt{x + 2}$.

Consider the following graph of a function, $y = f(x)$.



51. Find the domain of f .
52. Find, approximately, the range of f .
53. Find, approximately, the intervals where f is increasing.
54. Find, approximately, the intervals where f is decreasing.
55. Find, approximately, the intervals on which $f(x) > 0$.
56. Find the approximate coordinates of any local maxima of f .
57. Find the approximate coordinates of any local minima of f .
58. Is f a one-to-one function?
59. Sketch the graph of $y = f(2 - x) + 1$.

60. Write the standard form of the quadratic function $f(x) = 2x^2 - 8x + 4$.
61. Find the coordinates of the vertex of the graph of $y = x^2 - 5x + 2$.
62. Find the maximum or minimum value of $f(x) = 3x^2 - 8x + 4$.
63. Determine the end behavior of the function $f(x) = 3x^4 - 4x^3 - 10x - 1$.
64. Consider the function $f(x) = x^4 + x^3 - 2x^2$. Find all real zeros of f , state their multiplicities, and sketch the graph of f .
65. Consider the function $f(x) = x - x^3$. Find all real zeros of f and their multiplicities, determine the end behavior of f , and sketch the graph of f .
66. Find the quotient and remainder of the division $\frac{x^4 - 2x^2 + 7x}{x^2 - x + 3}$.
67. Find the quotient and remainder of the division $\frac{x^2 - 5x + 4}{x - 3}$.
68. Let $f(x) = x^5 - 2x^4 - 9x^3 + 22x^2 + 4x - 24$. Suppose that you know that 2 is a zero of f of multiplicity 3. Use this information to completely factor f .
69. Find a polynomial of degree 3 with integer coefficients and zeros at $\frac{1}{2}$, -1 , and 2 .
70. Let $f(x) = \frac{1}{(x+2)^2}$. Find all zeros of f , vertical asymptotes of f , and horizontal asymptotes of f . Find the behavior of the graph near the vertical asymptotes, and use this to sketch a graph of f .
71. Let $f(x) = \frac{x^2 - 1}{x^2 - 2x - 8}$. Find all zeros of f , vertical asymptotes of f , and horizontal asymptotes of f . Find the behavior of the graph near the vertical asymptotes, and use this to sketch a graph of f .
72. Find the slant asymptote of $f(x) = \frac{x^3 + 3x + 4}{x^2 - 3x - 3}$.

73. Let $f(x) = 4e^{4-x}$. Use a calculator to find $f(-1)$, rounded to three decimal places.
74. Write the equation $\log_6(36) = 2$ in exponential form.
75. Write the equation $4^x = 20$ in logarithmic form.
76. Let $f(x) = 7\log_3(x + 2)$. Use the change of base formula and a calculator to find $f(2)$, rounded to three decimal places.
77. Find the domain of the function $f(x) = \ln(8 - 2x)$.
78. Find the domain of the function $f(x) = \frac{1}{\log_2(x)}$.
79. Use the log laws to expand $\log_3\left(\frac{(x + 4)\sqrt{2x}}{(x + 1)^7}\right)$.
80. Write as a single logarithm using the log laws: $\ln(4x) - 2\ln(x - 1) - 6\ln(x + 2)$.
81. Sketch the graph of $f(x) = 3^x - 4$.
82. Sketch the graph of $f(x) = \log_2(x + 3)$.
83. Solve the equation $3^{x-4} = 27$.
84. Solve the equation $e^{4x} + 4 = 9$.
85. Solve the equation $2^{2x} - 2^x - 12 = 0$.
86. Solve the equation $4^{5x-3} = 3^{4x-5}$.
87. Solve the equation $\log_{10}(2x - 3) + 1 = 0$.
88. Solve the equation $\log_3(x^2 - 4) + \log_3(x) = \log_3(x - 2)$.
89. Solve the equation $\log_8(x + 5) - \log_8(x - 2) = 1$.

90. Find two integers whose sum is 4542 and whose product is 1366632.
91. A field's perimeter is 72 feet and its length is 8 feet more than its width. What are the dimensions of the field?
92. An apartment has a rectangular bedroom with an area of 228 ft^2 that is 7 ft longer than it is wide. What is the width of the room?
93. A large box has a volume of 180 ft^3 . Its length is 9 ft greater than its height, and its width is 4 ft less than its height. What are the dimensions of the box?
94. You invest \$500 into an account with an annual interest rate of 8% that compounds monthly. How much money will be in your account after 2 years?
95. You invest \$800 into an account with an annual interest rate of 10% that compounds continuously. How much money will be in your account after 3 years?
96. You and your friend are each investing \$1000 into bank accounts. Your account has an annual interest rate of 6% and compounds continuously. Your friend's account compounds monthly, but you don't know the interest rate. At the end of 1 year, you end up with the exact same amount of money in your account as your friend has in her account. Find the annual interest rate of your friend's account.

97. Solve the system of equations

$$\begin{cases} x - 2y = 7 \\ 2x + 3y = -5 \end{cases}$$

98. Solve the system of equations

$$\begin{cases} x - 3y + z = -1 \\ 2x + 2y - 3z = 14 \\ 2z = -8 \end{cases}$$

99. Solve the system of equations

$$\begin{cases} x^2 - 2y = 6 \\ 2x^2 + 8y^2 = 32 \end{cases}$$