Find the domain of the expression

1. \( y - 17 \)
   \( y^2 - 9y - 22 \)
   a) \((-\infty, -2) \cup (-2, 1) \cup (1, 17) \cup (17, \infty)\)
   b) \((-\infty, 17) \cup (17, \infty)\)
   c) \((-\infty, \infty)\)
   d) \((-\infty, -2) \cup (-2, 1) \cup (1, 11) \cup (11, \infty)\)

2. \( \frac{5}{x - 4} \)
   a) \( \{x \mid x \neq 4\} \)
   b) \( \{x \mid x = 4\} \)
   c) \( \{x \mid x \neq -4\} \)
   d) \( \{x \mid x \neq 4, x \neq -5\} \)

3. \( \frac{3y^2 - 12}{y^2 + 4} \)
   a) \((-\infty, -2) \cup (-2, 2) \cup (2, \infty)\)
   b) \((-\infty, \infty)\)
   c) \((-\infty, -2) \cup (-2, \infty)\)
   d) \((-\infty, 2) \cup (2, \infty)\)

4. \( g(y) = \sqrt[4]{6y - 24} \)
   a) \([4, \infty)\)
   b) \((4, \infty)\)
   c) \((-\infty, \infty)\)
   d) \((-\infty, 4]\)

Reduce the expression

5. \( \frac{-15(9x - 3)(x + 10)}{3(x + 10)^3} \)
   a) \( \frac{-5(9x - 3)}{(x + 10)} \)
   b) \( \frac{-15(9x - 3)}{3} \)
   c) \(-5(9x - 3)\)
   d) \( \frac{5(9x - 3)}{(x + 10)} \)

Find all solutions to the equation

6. \( 3t^2 + 11t - 20 = 0 \)
   a) \( t = \frac{5}{3}, t = 4 \)
   b) \( t = \frac{4}{3}, t = -5 \)
   c) \( t = -\frac{4}{3}, t = 5 \)
   d) \( t = \frac{5}{3}, t = -4 \)

7. \(-17w + 40 = 8w^2 + 5w\)
   a) \( w = 8, w = \frac{5}{8} \)
   b) \( w = 20, w = \frac{29}{4} \)
   c) \( w = -3, w = \frac{6}{5} \)
   d) \( w = \frac{5}{4}, w = -4 \)

Solve the equation by using the square root property

8. \( r^2 = 81 \)
   a) \( r = 9 \)
   b) \( r = \pm 9 \)
   c) No Solution
   d) None of the Above

Solve using the quadratic formula

9. \( 11y - 6 + 30y^2 = 0 \)
   a) \( y = 0.3 + 3.7i, y = 0.3 - 3.7i \)
   b) \( y = \frac{1}{3}, y = \frac{2}{5} \)
   c) \( y = -\frac{2}{3}, y = \frac{3}{10} \)
   d) \( y = \frac{3}{2}, y = -\frac{10}{3} \)

10. \( 7x(x - 2) = 5 \)
    a) \( x = \frac{14 \pm 2i\sqrt{21}}{7} \)
    b) \( x = \frac{7 \pm \sqrt{21}}{2} \)
    c) \( x = 1 \pm 4\sqrt{21} \)
    d) \( x = \frac{7 \pm 2\sqrt{21}}{7} \)
11. Find the discriminant, \( b^2 - 4ac \), and determine the number and type of solutions. Choose from two rational solutions, one rational solution, two irrational solutions, or two imaginary solutions.

\( 6n^2 = 8 \)

a) -192: Two imaginary solutions 

b) 192: Two imaginary solutions 

c) 192: Two irrational solutions 

d) None of the above

Solve the equation

12. \( \frac{z^2}{8} - \frac{1}{4} = \frac{17z}{24} \)

a) No solution 

b) \( z = 3, z = \frac{-2}{3} \)

c) \( z = 6 \)

d) \( z = -\frac{1}{3}, z = 6 \)

13. \( \frac{3}{x} \cdot \frac{3}{x-6} = \frac{3x-15}{x-6} \)

a) \( x = 1 \)

b) \( x = 6, x = 1 \)

c) \( x = \frac{-5}{2}, x = \frac{1}{3} \)

d) No solution

14. Multiply: \( \frac{12}{2x-y} \cdot \frac{3y-6x}{4} \)

a) \( \frac{y-2x}{2x-y} \)

b) \( \frac{16}{-4x^2 + 4xy - y^2} \)

c) \( \frac{-3(3y-6x)}{2x-y} \)

d) -9

15. Divide: \( \frac{x-3}{x+3} \div \frac{x^2-3x}{5x} \)

a) \( \frac{5}{3x} \)

b) \( \frac{x^3-6x^2+9x}{5x^2 + 9x} \)

c) \( \frac{5}{x+3} \)

d) \( \frac{x+3}{5x^2 - 3x} \)

16. Multiply: \( \frac{7x-28}{x} \cdot \frac{x^2+3x}{4x-16} \)

a) \( \frac{7x^3-84x}{4x^2-16x} \)

b) \( \frac{7(x+3)}{4} \)

c) \( \frac{7x^2+21x}{4x^2-16} \)

d) \( \frac{4(x-4)}{x} \)

17. Divide: \( \frac{z^4}{12} \)

a) \( \frac{3}{2z^3} \)

b) \( \frac{216}{z^5} \)

c) \( \frac{18+z}{z^4+z} \)

d) \( \frac{3z^3}{2} \)

18. Subtract: \( \frac{7n+14}{n^2-5} - \frac{-3+2n}{n^2-5} \)

a) \( 5n+17 \)

b) \( \frac{5n+17}{n^2-5} \)

c) \( \frac{9n+17}{n^2-5} \)

d) \( \frac{9n+11}{n^2-5} \)
Perform the indicated operations

19. \[ \frac{4y}{y^2 - 3y - 10} + \frac{y + 1}{y - 5} - \frac{2y - 7}{y + 2} \]
   a) \[ \frac{-y^2 + 24y - 33}{y^2 - 3y - 10} \]  
   b) \[ \frac{-y^2 - 10y + 37}{y^2 - 3y - 10} \]  
   c) \[ \frac{3y + 8}{y^2 - 4y - 13} \]  
   d) \[ \frac{3y + 8}{(y^2 - 3y - 10)(y - 5)(y + 2)} \]

20. \[ \frac{8}{x + 5} - \frac{3}{x - 5} + \frac{5}{x^2 - 25} \]
   a) \[ \frac{8x + 3}{x^2 - 25} \]  
   b) \[ \frac{25x + 25}{x - 5} \]  
   c) \[ \frac{5x - 50}{x^2 - 25} \]  
   d) \[ \frac{3x - 5}{x^2 - 5} \]

21. If \( z(t) = 2t^2 + 7t - 4 \), find \( z(-1) \) and \( z(4) \).
   a) \( z(-1) = -13 \); \( z(4) = 56 \)  
   b) \( z(-1) = -9 \); \( z(4) = 56 \)  
   c) \( z(-1) = 5 \); \( z(4) = 35 \)  
   d) \( z(-1) = -7 \); \( z(4) = 88 \)

22. If \( f(x) = 3x^2 + 7x - 10 \), find and simplify \( f(2 + x) \)
   a) \( 16 + x \)  
   b) \( 3x^2 + 2x + 16 \)  
   c) \( 3x^2 + 19x + 16 \)  
   d) \( 3x^2 + 7x - 12 \)

23. Use the graph of the function \( f(x) \) to find the \( x \)-value for which \( f(x) = 3 \)

   ![Graph of the function f(x)]
   a) -1  
   b) 2  
   c) 3  
   d) -2

24. Which of the following is a linear function?
   a) \( f(x) = \frac{11}{x} + 7 \)  
   b) \( f(x) = 11 + x + x^2 \)  
   c) \( f(x) = \sqrt{11x + 7} \)  
   d) \( f(x) = 11 - 7x \)
25. What is the range of the relation whose graph is below?

![Graph showing the range of a relation]

a) \( \{x | -20 \leq x \leq 15\} \)  
   b) \( \{-20, -10, 0, 10, 15\} \)  
   c) \( \{y | -40 \leq y \leq 20\} \)  
   d) \( \{0, -20, -40, 20\} \)

26. Find the \( x \)- and \( y \)-intercepts of the function: \( g(x) = -8x - 6 \)

a) \((0,0)\)  
   b) \((0, -6)\) and \(\left(-\frac{3}{4}, 0\right)\)  
   c) \((-6, 0)\) and \(\left(0, -\frac{3}{4}\right)\)  
   d) \((0, -6)\) and \((14, 0)\)

Find and write the equation of the line

27. Slope = \(-\frac{1}{5}\) and \( y \)-intercept \(\left(0, \frac{9}{8}\right)\)

a) \( y = \frac{1}{5}(x - \frac{9}{8}) \)  
   b) \( y = \frac{1}{5}x + \frac{9}{8} \)  
   c) \( x = -\frac{1}{5}y - \frac{9}{8} \)  
   d) \( y = -\frac{1}{5}(x + \frac{9}{8}) \)

28. Slope = 12, goes through the point \((-1, 4)\)

a) \( y = 12x + 4 \)  
   b) \( y = 12x - 1 \)  
   c) \( y = 12x + 16 \)  
   d) \( y = -3x + 12 \)

29. Through the point \((1, 10)\) that is parallel to the line \(2y - 4x = 12\)

a) \( y = 4x + 6 \)  
   b) \( y = 2x + 8 \)  
   c) \( 2y - 4x = 10 \)  
   d) \( y = 2x + 6 \)

30. Solve the system using the substitution method:

\[
\begin{align*}
y &= -29 - 3x \\
4x + 7y &= -50
\end{align*}
\]

a) \((9, -9)\)  
   b) \((-9, -2)\)  
   c) \((-2, -9)\)  
   d) \((-2, 10)\)

Solve the system using the addition method:

31. \[
\begin{align*}
11x + y &= 69 \\
13x - y &= 99
\end{align*}
\]

a) \((7, -8)\)  
   b) \((4, -7)\)  
   c) \((-8, 7)\)  
   d) There is no solution
32. \(-11x - 2y = 8\)
   \[11x + 2y = 121\]
   a) There is no solution  
   b) \(\{(x, y) | 11x + 2y = 121\}\)  
   c) \(\left(\frac{1}{2}, -\frac{3}{4}\right)\)  
   d) (1,8)

33. At one store, 5 pairs of jeans and 2 sweatshirts costs $230, while 3 pairs of jeans and 4 sweatshirts costs $208. Find the cost of one sweatshirt.
   a) $25  
   b) $36  
   c) $22  
   d) $38

34. Solve the inequality. Write the answer in interval notation
   \[8 > 3x \text{ and } -9 + 2x \geq -14\]
   a) \((-\infty, -\frac{5}{2}) \cup \left[\frac{8}{3}, \infty\right)\)  
   b) No solution  
   c) \(\left[-\frac{8}{3}, \frac{5}{2}\right]\)  
   d) \(\left[-\frac{5}{2}, \frac{8}{3}\right]\)

35. \(-11 < 9 - 11z \leq 10\)
   a) \(\left[-\frac{1}{11}, \frac{20}{11}\right]\)  
   b) \(\left[\frac{20}{11}, -\frac{1}{11}\right]\)  
   c) \(-\infty, \frac{20}{11}\)  
   d) \((-20, 1)\)

36. Solve the inequality, graph the solution, and write the answer in interval notation
   \[12y - 6 \geq 18 \text{ or } y < -2\]
   a) \((-\infty, -2) \cup [2, \infty)\)  
   b) \((-\infty, -2) \cup (2, \infty)\)  
   c) \((-\infty, -2) \cup [2, \infty)\)  
   d) None of the above

37. Solve the equation
   \[2 - |3w - 18| = 8\]
   a) \(w = 8, w = 4\)  
   b) \(w = 4\)  
   c) \(w = 6, w = 2\)  
   d) No solution

38. \[-\frac{11}{4} + \frac{2}{3}|3y - 6| = -2\]
   a) \(y = \frac{13}{8}, y = \frac{19}{8}\)  
   b) \(y = 2, y = -\frac{5}{2}\)  
   c) \(y = \frac{1}{3}, y = -\frac{11}{2}\)  
   d) No solution

39. Solve the inequality. Write the answer in interval notation
   \[|4w - 7| \geq 5\]
   a) \(\left[\frac{1}{2}, 3\right]\)  
   b) \((-\infty, -3] \cup \left[\frac{1}{2}, \infty\right)\)  
   c) \((-\infty, \frac{1}{2}] \cup [3, \infty)\)  
   d) \(-3, -\frac{1}{2}\)

40. Solve the inequality
   \[-11 \geq |2b - 23|\]
   a) \(6 \leq b \leq 17\)  
   b) \(b \leq 6 \text{ or } b \geq 17\)  
   c) All real numbers  
   d) No solution
Solve the inequality. Write the answer in interval notation
41. \(-2z + 4 \leq 4\)
   a) \([0,4]\)   b) \((-\infty, -2)\)   c) All real numbers   d) No solution

Write the expression by using rational exponents rather than radical notation
42. \(13\sqrt[3]{x^7}\)
   a) \(13x^{\frac{3}{7}}\)   b) \((13x)^{\frac{3}{7}}\)   c) \(13x^\frac{7}{3}\)   d) \(\frac{13}{x^{\frac{7}{3}}}\)

Simplify the expression by using the properties of rational exponents. Write the final answer using positive exponents only.
43. \(h^{\frac{10}{3}} \cdot h^{\frac{2}{3}}\)
   a) \(h^{\frac{9}{2}}\)   b) \(h^{\frac{20}{3}}\)   c) \(h^2\)   d) \(h^4\)

44. \(\left(\frac{81s^{12}r^{-4}}{16s^{-4}r^{4}}\right)^{\frac{3}{4}}\)
   a) \(\frac{27s^6}{8}\)   b) \(\frac{3s^{16}r^8}{2}\)   c) \(\frac{3s^{12}}{2r^6}\)   d) \(\frac{27s^{12}}{8r^6}\)

Simplify the radical. Assume that all variables represent positive real numbers
45. \(\frac{\sqrt{27z}}{\sqrt{3z}}\)
   a) 3   b) 3z   c) 9   d) \(\sqrt{3z}\)

46. \(\sqrt[3]{52x^5}\)
   a) \(2x^2\sqrt[3]{13x}\)   b) \(2\sqrt[3]{13x^5}\)   c) \(2x\sqrt[3]{13x^3}\)   d) \(4x^2\sqrt[3]{13x}\)

47. \(\sqrt[3]{72y^8}\)
   a) \(y^2\sqrt[3]{72y^2}\)   b) \(2y\sqrt[3]{9y^5}\)   c) \(2y^2\sqrt[3]{9y^2}\)   d) \(8y^\frac{5}{3}\sqrt[3]{9y^2}\)

48. \(\sqrt[4]{\frac{8b^2}{2b^{12}}}\)
   a) \(\frac{2}{b^5}\)   b) \(\sqrt[4]{\frac{4}{b^{10}}}\)   c) \(2\sqrt[4]{b^{10}}\)   d) \(\frac{2}{b\sqrt[4]{b^8}}\)

Add, if possible
49. \(7\sqrt{2} + \sqrt{98}\)
   a) 28   b) 70   c) \(14\sqrt{2}\)   d) Cannot simplify
Multiply
50. \( \sqrt{3} \cdot \sqrt{24} \)
   a) \( \sqrt{27} \)  
   b) \( 6\sqrt{2} \)  
   c) \( 2\sqrt{6} \)  
   d) \( 36\sqrt{2} \)

51. \(-4\sqrt{4} \cdot 6\sqrt{6} \)
   a) \(-48\sqrt{3} \)  
   b) \(-48\sqrt{6} \)  
   c) \(2\sqrt{10} \)  
   d) \(-192\sqrt{3} \)

52. \( \sqrt{2}(\sqrt{8} - \sqrt{3}) \)
   a) \(4 - \sqrt{6} \)  
   b) \(4 - \sqrt{3} \)  
   c) \(2\sqrt{8} - 6 \)  
   d) \(4 + \sqrt{6} \)

53. \( (\sqrt{12} - 1)(\sqrt{3} + 5) \)
   a) \(1 \)  
   b) \(1 + 9\sqrt{3} \)  
   c) \(31 + 5\sqrt{12} - \sqrt{3} \)  
   d) \(\sqrt{33} - 5 \)

54. \( \sqrt[4][]{p^2q^3} \cdot \sqrt[3][]{p^5q^2} \)
   a) \(\sqrt[12]{p^10q^6} \)  
   b) \(p \sqrt[7]{q^6} \)  
   c) \(p^2q \sqrt[13]{p^2q^5} \)  
   d) \(pq \sqrt[7]{p^3q} \)

Rationalize the denominator
55. \( \frac{-14}{\sqrt{10}} \)
   a) \(\frac{-7\sqrt{100}}{5} \)  
   b) \(\frac{5\sqrt{100}}{-7} \)  
   c) \(\frac{-7\sqrt{10}}{5} \)  
   d) Cannot simplify
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