

1. y varies inversely as x , and $y = 12$ when $x = 4$. Write an equation for the relationship. Find x when $y = 20$.
2. y varies jointly as x and z and inversely as the cube root of w . $y = 1.2$ when $x = 4$, $z = 3$, and $w = 8$. Write an equation for the relationship. Find y when $x = 10$, $z = 4$, and $w = 27$.

Simplify. Give domain restrictions if necessary.

$$3. \frac{x+3}{x^2+8x+15}$$

$$4. \frac{-x^3+x^2}{x^2+x-2}$$

$$5. \frac{x^2-5x}{x^2-6x+9} - \frac{2}{x-3}$$

$$6. \frac{4}{x} + \frac{5}{x+2} - \frac{1}{3}$$

$$7. \frac{x^2-25}{x^3-5x^2+6x} \cdot \frac{x^2-4}{x^2+2x-15}$$

$$8. \frac{x^2+11x+24}{x+1} \div \frac{x^2+4x+3}{7}$$

$$9. \frac{x}{x+4} \div \frac{\frac{x^2}{2x+20}}{\frac{x^2+6x+8}{x+10}}$$

$$10. \frac{2x}{5} \cdot \frac{x^2-16}{4x-12} \cdot \frac{x^2-2x-3}{x^2-3x-4}$$

$$11. \frac{1}{x} - \frac{5}{6x} + \frac{2}{3}$$

Solve each equation. Check your solutions.

$$12. \frac{x+2}{x-2} = \frac{x}{-4}$$

$$13. \frac{x}{x+1} + \frac{2x}{x-1} = \frac{2}{x^2-1}$$

$$14. 5 - \frac{26}{x+2} = \frac{27}{x^2-4}$$

$$15. \frac{x+5}{x-2} = \frac{28}{x^2-4}$$

$$16. \frac{x-7}{x+1} - \frac{x-4}{3x-2} = 0$$

Answers:

1. $y = \frac{48}{x}; x = 2.4$

2. $y = \frac{0.2xz}{\sqrt[3]{w}}; y = \frac{8}{3}$

3. $\frac{1}{x+5}; x \neq -3, -5$

4. $\frac{-x^2}{x+2}; x \neq -2, 1$

5. $\frac{x^2-7x+6}{(x-3)^2}; x \neq 3$

6. $\frac{-x^2+25x+24}{3x(x+2)}; x \neq 0, -2$

7. $\frac{(x-5)(x+2)}{x(x-3)(x-3)}; x \neq 0, 3, 2, -5$

8. $\frac{7(x+8)}{(x+1)^2}; x \neq -3, -1$

9. $\frac{2(x+2)}{x}; x \neq -10, -4, -2, 0$

10. $\frac{x(x+4)}{10}; x \neq -1, 3, 4$

11. $\frac{1+4x}{6x}; x \neq 0$

12. $x = -1 \pm i\sqrt{7}$

13. $x = \frac{2}{3}$

14. $x = \{5, \frac{1}{5}\}$

15. $x = -9$

16. $x = \{1, 9\}$