

Solve: Check for extraneous solutions.

1. $\frac{4}{2x} = \frac{5}{x+6}$ $x \neq 0, -6$

$x = 4$

2. $\frac{9}{3x} = \frac{4}{x+2}$ $x = 0, -2$

$x = 6$

3. $\frac{6}{x-1} = \frac{9}{x+1}$ $x \neq 1, -1$

$x = 5$

4. $\frac{8}{3x-2} = \frac{2}{x-1}$ $x \neq \frac{2}{3}, 1$

$x = 2$

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

$x = 3$

6. $\frac{x-3}{x+5} = \frac{x}{x+2}$ $x \neq -5, -2$

$x = -1$

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

$x = \frac{1}{2}$

8. $\frac{4(x-4)}{x^2+2x-8} = \frac{4}{x+4}$ $x \neq -4, 2$
 $(x+4)(x-2)$

$4(x-4) = 4(x-2)$

$4x - 16 = 4x - 8$

$-16 \neq -8$

No solution

$$9. \quad \frac{2}{3x} + \frac{1}{6} = \frac{4}{3x} \quad x \neq 0$$

$$x = 4$$

$$10. \quad \frac{1}{2x} + \frac{3}{x+7} = \frac{-1}{x} \quad x \neq 0, -7$$

$$x = -7/3$$

$$11. \quad \frac{5}{x^2+x-6} = 2 + \frac{x-3}{x-2} \quad x \neq -3, 2$$

$$x = \frac{-1 \pm \sqrt{79}}{3}$$

$$12. \quad \frac{2}{x-3} + \frac{1}{x} = \frac{x-1}{x-3} \quad x \neq 3, 0$$

$$2(x) + 1(x-3) = x(x-1)$$

$$2x + x - 3 = x^2 - x$$

$$x^2 - 4x + 3 = 0$$

$$(x-3)(x-1) = 0$$

$$x = \cancel{3}, -1$$

extraneous

$$13. \quad \frac{10}{x} + 3 = \frac{x+9}{x-4} \quad x \neq 0, 4$$

$$x = -\frac{5}{2}, 8$$

$$14. \quad \frac{x+3}{x-3} + \frac{x}{x-5} = \frac{x+5}{x-5} \quad x \neq 3, 5$$

$$x = 0, 7$$

$$15. \frac{x-4}{x-2} - \frac{2x-1}{x-2} = 2 \quad x \neq 2$$

$$x = 1/3$$

$$16. \frac{3x+6}{x^2-4} = \frac{x+1}{x-2} \quad x \neq 2, -2$$

no solution

Perform the indicated operation and simplify.

$$17. \frac{x^2+12x+36}{x^2-8x+12} \div (x^2-36) \quad x \neq 6, 2$$

$$\frac{x+6}{(x-6)^2(x-2)}$$

$$18. \frac{4x+3}{x^2-16} + \frac{2}{x-4} \quad x \neq 4, -4$$

$$\frac{6x+11}{(x+4)(x-4)}$$

$$19. \frac{4}{x+5} - \frac{6x-1}{x^2+10x+25} \quad x \neq -5$$

$$\frac{-2x+21}{(x+5)^2}$$

$$20. \frac{2x}{x^2+4x+4} + \frac{x-1}{x(x+2)} \quad x \neq 0, -2$$

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

Find the least common denominator.

$$21. \frac{x}{x-3}, \frac{3}{x^2-9}, \frac{x+1}{2x}$$

$$2x(x+3)(x-3)$$

$$22. \frac{1}{x+4}, \frac{3x}{2(x-3)}, \frac{2x-5}{x^2+x-12}$$

$$2(x+4)(x-3)$$

$$23. \frac{1}{3x-3}, \frac{2}{x^2+x-6}, \frac{3}{x^2-3x+2}$$

$$3(x-1)(x-2)(x-3)$$

$$24. \frac{x}{3x(x-1)}, \frac{2x}{x^2-2x+1}, \frac{3x}{12x+12}$$

$$12x(x-1)^2(x+1)$$