

1. $\frac{x}{x+1} + \frac{2x}{x-1} = \frac{15}{4}$
2. $\frac{1}{3x} + \frac{1}{x^2} = \frac{5}{12}$
3. $x + \frac{8}{2x} = 5$
4. $\frac{5}{4x^2} - \frac{1}{3} = \frac{3}{6x^2}$
5. $\frac{x}{x+1} - \frac{16}{6} = \frac{x+1}{x}$
6. $\frac{1}{x} + \frac{1}{x^2} - \frac{1}{x^3} = \frac{7}{8}$
7. $\frac{2x}{3} + \frac{2x+3}{x-1} = \frac{11}{3x-3}$
8. $\frac{2x}{x-2} + \frac{3x}{x+2} = \frac{11}{3x-3}$
9. $2x + \frac{1}{x+3} = \frac{9}{4}$
10. $\frac{x-3}{x^2-x} - \frac{x+3}{x^2+x} = \frac{2-3x}{x^2-1}$



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SOLUCIONES:

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

$$\begin{aligned} m.c.m. &\rightarrow (x+1) \cdot (x-1) \cdot 4 \\ \frac{4x(x-1)}{(x+1) \cdot (x-1) \cdot 4} + \frac{8x(x+1)}{(x+1) \cdot (x-1) \cdot 4} &= \frac{60(x+1)(x-1)}{(x+1) \cdot (x-1) \cdot 4} \\ 4x(x-1) + 8x(x+1) &= 60(x+1)(x-1) \\ 4x^2 - 4x + 8x^2 + 8x &= 60(x^2 - 1) \\ 12x^2 + 4x &= 60x^2 - 60 \\ -48x^2 + 4x + 60 &= 0 \rightarrow x = \left\{ \begin{array}{l} -5/3 \\ 3 \end{array} \right. \end{aligned}$$

$$2. \quad \frac{1}{3x} + \frac{1}{x^2} = \frac{5}{12}$$

$$\begin{aligned} m.c.m. &\rightarrow 12x^2 \\ \frac{4x}{12x^2} + \frac{12}{12x^2} &= \frac{5x^2}{12x^2} \\ 4x + 12 &= 5x^2 \\ -5x^2 + 4x + 12 &= 0 \rightarrow \left\{ \begin{array}{l} -6/5 \\ 2 \end{array} \right. \end{aligned}$$

$$3. \quad x + \frac{8}{2x} = 5$$

$$\begin{aligned} m.c.m. &\rightarrow 2x \\ \frac{2x^2}{2x} + \frac{8}{2x} &= \frac{10x}{2x} \\ 2x^2 - 10x + 8 &= 0 \rightarrow x = \left\{ \begin{array}{l} 1 \\ 4 \end{array} \right. \end{aligned}$$

$$4. \quad \frac{5}{4x^2} - \frac{1}{3} = \frac{3}{6x^2}$$

$$\begin{aligned} m.c.m. &\rightarrow [4x^2, 3, 6x^2] \rightarrow 12x^2 \\ \frac{30}{12x^2} - \frac{8x^2}{12x^2} &= \frac{12}{12x^2} \\ 30 - 8x^2 &= 12 \\ -8x^2 &= -18 \\ x^2 &= \frac{9}{4} \\ x &= \pm \frac{3}{2} \end{aligned}$$

$$5. \quad \frac{x}{x+1} - \frac{16}{6} = \frac{x+1}{x}$$

$$\begin{aligned} m.c.m. &\rightarrow [x+1, 6, x] \rightarrow 6x(x+1) \\ \frac{6x^2}{6x(x+1)} - \frac{16x(x+1)}{6x(x+1)} &= \frac{6(x+1)^2}{6x(x+1)} \\ 6x^2 - 16x(x+1) &= 6(x^2 + 2x + 1) \\ 6x^2 - 16x^2 - 16x &= 6x^2 + 12x + 6 \\ -16x^2 - 28x - 6 &= 0 \rightarrow x = \left\{ \begin{array}{l} -3/2 \\ -1/4 \end{array} \right. \end{aligned}$$



$$6. \quad \frac{1}{x} + \frac{1}{x^2} - \frac{1}{x^3} = \frac{7}{8}$$

$$m. c. m. \rightarrow [x, x^2, x^3, 8] \rightarrow 8x^3$$

$$\frac{8x^2}{8x^3} + \frac{8x}{8x^3} - \frac{8}{8x^3} = \frac{x^3}{8x^3}$$

$$\frac{8x^2 + 8x - 8}{8x^3} = \frac{x^3}{8x^3}$$

$$-x^3 + 8x^2 + 8x - 8 = 0 \rightarrow RUFFINI$$

$$7. \quad \frac{2x}{3} + \frac{2x+3}{x-1} = \frac{11}{3x-3}$$

$$m. c. m. \rightarrow [3, x-1, 3x-3] \rightarrow [3, x-1, 3(x-1)] \rightarrow 3(x-1)$$

$$\frac{2x(x-1)}{3(x-1)} + \frac{3(2x+3)}{3(x-1)} = \frac{11}{3(x-1)}$$

$$2x(x-1) + 3(2x+3) = 11$$

$$2x^2 - 2x + 6x + 9 = 11$$

$$2x^2 + 4x - 2 = 0 \rightarrow x^2 + 2x - 1 = 0$$

$$8. \quad \frac{2x}{x-2} + \frac{3x}{x+2} = \frac{11}{3x-3}$$

$$m. c. m. \rightarrow [(x-2), (x+2), 3(x-1)]$$

$$\frac{2x(x+2)3(x-1)}{(x-2)(x+2)3(x-1)} + \frac{3x(x-2)3(x-1)}{(x-2)(x+2)3(x-1)} = \frac{11(x+2)(x-2)}{(x-2)(x+2)3(x-1)}$$

$$6x(x+2)(x-1) + 9x(x-2)(x-1) = 11(x+2)(x-2)$$

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

$$m. c. m. \rightarrow [4(x+3)]$$

$$\frac{2x \cdot 4 \cdot (x+3) + 1 \cdot 4}{4(x+3)} = \frac{9(x+3)}{4(x+3)}$$

$$8x \cdot (x+3) + 4 = 9x + 27$$

$$8x^2 + 24x + 4 = 9x + 27$$

$$8x^2 + 15x - 23 = 0$$

$$10. \quad \frac{x-3}{x^2-x} - \frac{x+3}{x^2+x} = \frac{2-3x}{x^2-1}$$

$$m. c. m. \rightarrow [x(x-1), x(x+1), (x+1)(x-1)] \rightarrow x(x+1)(x-1)$$

$$\frac{(x-3) \cdot (x+1) - (x+3)(x-1)}{x(x+1)(x-1)} = \frac{(2-3x)x}{x(x+1)(x-1)}$$

$$(x-3) \cdot (x+1) - (x+3)(x-1) = 2x - 3x^2$$





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