


Equations with Fractions

When solving equations involving fractions, we will begin by multiplying both sides by the least common denominator, to eliminate all the fractions.

After removing the fractions, we will solve the equations applying the addition and multiplication properties of equality.

Examples

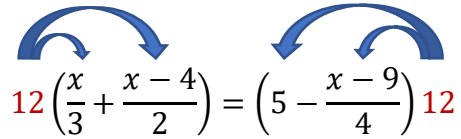
Examples:	Explanation:
<p>Solve the equation:</p> $\frac{x}{5} + \frac{1}{2} = 7$ <p>Solution</p>  $10 \left(\frac{x}{5} + \frac{1}{2} \right) = (7)10$ $2x + 5 = 70$ $\quad -5 \quad -5$ $2x = 65$ $\frac{2x}{2} = \frac{65}{2}$ $x = \frac{65}{2}$	<p>The least common denominator (LCD) of 5 and 2 is 10.</p> <p>Multiply both sides of the equation by 10.</p> <p>Use distributive property on the left side, to remove the parentheses.</p> $10 \cdot \frac{x}{5} = 2x \qquad 10 \cdot \frac{1}{2} = 5$ <p>Subtract 5 from both sides.</p> <p>Divide both sides by 2.</p>

Examples:	Explanation:
<p>Solve the equation:</p> $\frac{x-1}{4} + \frac{1}{2} = \frac{x+3}{8}$ <p>Solution</p> $8\left(\frac{x-1}{4} + \frac{1}{2}\right) = \left(\frac{x+3}{8}\right)8$ $2(x-1) + 4 = x+3$ $2x - 2 + 4 = x + 3$ $2x + 2 = x + 3$ $\begin{array}{r} -x \\ -x \end{array}$ $x + 2 = 3$ $\begin{array}{r} -2 \\ -2 \end{array}$ $x = 1$	<p>The least common denominator (LCD) of 4, 2 and 8 is 8.</p> <p>Multiply both sides of the equation by 8.</p> <p>Use distributive property on the left side, to remove the parentheses.</p> $8 \cdot \frac{x-1}{4} = 2(x-1) \qquad 8 \cdot \frac{1}{2} = 4$ <p>Use distributive property to multiply $2(x-1)$</p> <p>Combine -2 and 4 on the left side.</p> <p>Subtract x from both sides.</p> <p>Subtract 2 from both sides.</p>
<p>Solve the equation:</p> $\frac{3}{4}x = \frac{1}{7}$ <p>Solution</p> $28 \cdot \frac{3}{4}x = \frac{1}{7} \cdot 28$ $21x = 4$ $\frac{21x}{21} = \frac{4}{21}$ $x = \frac{4}{21}$	<p>The least common denominator (LCD) of 4 and 7 is 28.</p> <p>Multiply both sides of the equation by 28.</p> <p>Divide both sides by 21.</p>

Solve the equation:

$$\frac{x}{3} + \frac{x-4}{2} = 5 - \frac{x-9}{4}$$

Solution



$$12\left(\frac{x}{3} + \frac{x-4}{2}\right) = \left(5 - \frac{x-9}{4}\right)12$$

$$4x + 6(x-4) = 60 - 3(x-9)$$

$$4x + 6x - 24 = 60 - 3x + 27$$

$$\begin{array}{r} 10x - 24 = 87 - 3x \\ +3x \qquad \qquad +3x \end{array}$$

$$\begin{array}{r} 13x - 24 = 87 \\ +24 \quad +24 \end{array}$$

$$13x = 111$$

$$\frac{13x}{13} = \frac{111}{13}$$

$$x = \frac{111}{13}$$

The least common denominator (LCD) of 3, 2, and 4 is 12.

Multiply both sides of the equation by 12.

Use distributive property on the both sides to remove the parentheses.

Use distributive property once more to remove the rest of the parentheses.

Combine like terms on each side.

Add $3x$ to each side.

Add 24 to each side.

Subtract 5 from both sides.

Divide both sides by 13.