Fractions in Equations

Some think working with fractions in equations is much easier than working with fractions in expressions. (I do.)

To prepare the equation, just multiply every term in the equation by the Least Common Denominator of all the fractions. If you select the correct LCD, all the denominators will simplify to 1 and the equation will no longer contain fractions!

Example: Solve $\frac{3}{8}x = 6$ for x.

$\frac{3}{8}x = 6$ $8(\frac{3}{8}x) = 8(6)$	Multiply both sides by 8. Simplify.
$3x = 48$ $\frac{3x}{3} = \frac{48}{3}$	Use the division property to isolate the variable. Simplify.
$x = 16$	Check the solution. $\frac{3}{8}(16) = 6;\ 3(2) = 6;\ 6 = 6$ is true. The solution is: $\{16\}$

Example: Solve $\frac{1}{2}x - 1 = \frac{1}{8}x + \frac{7}{8}$ for x.

$\frac{1}{2}x - 1 = \frac{1}{8}x + \frac{7}{8}$	Since there are multiple fractions, multiply each term by the LCD – even the terms without fractions. The LCD is 8.
$8\cdot\frac{1}{2}x - 8\cdot 1 = 8\cdot\frac{1}{8}x + 8\cdot\frac{7}{8}$	Simplify. $8\cdot\frac{1}{2}x - 8\cdot 1 = 8\cdot\frac{1}{8}x + 8\cdot\frac{7}{8};\ 4x - 8 = 1x + 7$
$4x - 8 = 1x + 7$	Use the addition or subtraction property to combine like variables on one side and the constants on the other.
$4x - 8 + 8 = 1x + 7 + 8$ $4x = 1x + 15$ $4x - 1x = 1x - 1x + 15$	Simplify.
$3x = 15$	Use the division property of equality to isolate the variable.
$\frac{3x}{3} = \frac{15}{3}$	Simplify. $\frac{3x}{3} = \frac{15}{3};\ x = 5$
$x = 5$	Check the solution. $\frac{1}{2}\cdot 5 - 1 = \frac{1}{8}\cdot 5 + \frac{7}{8};\ \ \frac{5}{2} - 1 = \frac{5}{8} + \frac{7}{8};\ \ \frac{5}{2}\cdot 8 - 1\cdot 8 = \frac{5}{8}\cdot 8 + \frac{7}{8}\cdot 8;$ $5\cdot 4 - 8 = 5 + 7;\ \ 20 - 8 = 5 + 7;\ \ 12 = 12$ is true. The solution is: $\{5\}$

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TRY:

$\frac{2}{3}x = -10$

$\frac{7}{4}x = 42$

$\frac{1}{3}x = \frac{11}{15}$ (This could be written as $\frac{x}{3} = \frac{11}{15}$)

$-\frac{4}{9}x = -\frac{5}{6}$

$\frac{4}{9}x - 11 = 1$

$\frac{5}{3}x + 6 = 41$

When more than one term contains a fraction, multiply ALL terms by the common denominator.

$\frac{1}{5}x + 1 = \frac{3}{10}x + \frac{1}{4}$

$\frac{2}{9}x - \frac{1}{2} = \frac{1}{18}x + \frac{2}{3}$