

# Two Step Equations

(Rational Numbers)

When equations have one or more fractions in them, the easiest way to solve them is to clear all the fractions. To do this...

1) Clear all double signs and change all mixed numbers to improper fractions.

2) Multiply every term by the Least Common Denominator.

## Clearing Fractions

$$\frac{1}{2}x + 5 = \frac{3}{4}$$

$$4\left(\frac{1}{2}x + 5\right) = 4 \cdot \frac{3}{4}$$

$$2x + 20 = 3$$

Solve.

$$8\frac{1}{2} - \left(-\frac{1}{4}x\right) = \frac{3}{5}$$

$$\frac{17}{2} + \frac{1}{4}x = \frac{3}{5}$$

$$\frac{20}{1}\left(\frac{17}{2} + \frac{1}{4}x\right) = \frac{20}{1}\left(\frac{3}{5}\right)$$

$$\frac{340}{2} + \frac{20}{4}x = \frac{60}{5}$$

$$\frac{170}{1} + 5x = 12$$

$$\begin{array}{r} 170 + 5x = 12 \\ -170 \quad -170 \\ \hline 5x = -158 \\ \frac{5x}{5} = \frac{-158}{5} \\ x = \frac{-158}{5} \end{array}$$

Solve.

$$\frac{2}{5}x - \frac{3}{4} = -1\frac{1}{8}$$

$$\frac{2}{5}x - \frac{3}{4} = -\frac{9}{8}$$

$$\frac{40}{1}\left(\frac{2}{5}x - \frac{3}{4}\right) = \frac{40}{1}\left(-\frac{9}{8}\right)$$

$$\frac{80}{5}x - \frac{120}{4} = -\frac{360}{8}$$

$$16x - 30 = -45$$

$$\begin{array}{r} 16x - 30 = -45 \\ +30 \quad +30 \\ \hline 16x = -15 \\ \frac{16x}{16} = \frac{-15}{16} \\ x = \frac{-15}{16} \end{array}$$

Solve.

$$-\frac{1}{2}x - \left(\frac{2}{5}\right) = \frac{3}{10}$$

$$-\frac{1}{2}x + \frac{2}{5} = \frac{3}{10}$$

$$\frac{10}{1}\left(-\frac{1}{2}x + \frac{2}{5}\right) = \frac{10}{1}\left(\frac{3}{10}\right)$$

$$-\frac{10}{2}x + \frac{20}{5} = \frac{30}{10}$$

$$-5x + 4 = 3$$

$$\begin{array}{r} -5x + 4 = 3 \\ -4 \quad -4 \\ \hline -5x = -1 \\ \frac{-5x}{-5} = \frac{-1}{-5} \\ x = \frac{1}{5} \end{array}$$

## Clearing Decimals

$$2.3x + 7 = 5.4$$

$$10(2.3x + 7) = 10 \cdot 5.4$$

$$23x + 70 = 54$$

When equations have a lot of decimals, you may be able to solve it as it is written, but it might be easier to clear the decimals first.

To do this...

1) Multiply each term on both sides by the power of ten that will make all the decimals whole numbers.

Solve.

$$-1.2 + 0.3x = -0.8$$

$$10(-1.2 + 0.3x) = 10(-0.8)$$

$$\begin{array}{r} -12 + 3x = -8 \\ +12 \quad \quad +12 \end{array}$$

$$\frac{3x}{3} = \frac{4}{3}$$

$$x = \frac{4}{3} \text{ or } 1.\bar{3}$$

Solve.

$$-9.5 = -4.3x - 9.8$$

$$10(-9.5) = 10(-4.3x - 9.8)$$

$$\begin{array}{r} -95 = -43x - 98 \\ +98 \quad \quad +98 \end{array}$$

$$\frac{3}{-43} = \frac{-43x}{-43}$$

$$-\frac{3}{43} = x$$

Solve.

$$-1.5 - (-2.5x) = 11$$

$$10(-1.5 + 2.5x) = 10(11)$$

$$\begin{array}{r} -15 + 25x = 110 \\ +15 \quad \quad +15 \end{array}$$

$$\frac{25x}{25} = \frac{125}{25} \quad x=5$$

$$x = \frac{628}{125}$$