

Unit 8 Solving Equations & Inequalities

8.2 Two-Step Equations

When solving two-step equations with fractions we can use either:

A) Regular equation solving steps

$$3x + 5 = 3$$

Ex. Solve:

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

- $\frac{1}{10}$ Method A

$$2x = \frac{6}{10} - \frac{1}{10}$$

$$\frac{2x}{2} = \frac{5}{2} \times \frac{1}{2}$$

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

$$\boxed{x = \frac{1}{4}}$$

$$\frac{k}{3} - \frac{1}{2} = -\frac{7}{4} - \frac{3}{4}$$

$$+\frac{1}{2} \quad +\frac{1}{2}$$

$$\frac{k}{3} = -\frac{7}{4} + \frac{2}{4}$$

$$\frac{3}{1} \left(\frac{k}{3} \right) = \left(-\frac{5}{4} \right) \frac{3}{1}$$

$$\boxed{k = -\frac{15}{4}}$$

$$4 \left(2y \right) + \left(\frac{1}{2} \right) \left(\frac{3}{4} \right) \quad \text{LCD} = 4$$

$$8y + 2 = 3$$

$$\frac{8y}{8} = \frac{1}{8}$$

$$\boxed{y = \frac{1}{8}}$$

$$\frac{n}{2} - \frac{3}{4} = 2\frac{3}{8}$$

B) Denominator elimination

★ multiply ~~all~~ terms by the LCD

Method B

$$10 \left(2x \right) + \left(\frac{1}{10} \right) \left(\frac{3}{5} \right) \frac{10^2}{1} \quad \text{LCD} = 10$$

$$20x + 1 = 6$$

$$\frac{20x}{20} = \frac{5}{20}$$

$$\boxed{x = \frac{1}{4}}$$

$$4 \left(\frac{k}{3} \right) - \left(\frac{1}{2} \right) \left(\frac{3}{4} \right) = \left(-\frac{7}{4} \right) \frac{12}{1} \quad \text{LCD} = 12$$

$$4k - 6 = -21$$

$$+6 \quad +6$$

$$\frac{4k}{4} = \frac{-15}{4}$$

$$\boxed{k = -\frac{15}{4}}$$

$$\left(\frac{n}{2} \right) \frac{4}{1} - \left(\frac{3}{4} \right) \frac{4}{1} = \left(\frac{19}{8} \right) \frac{8}{1}$$

$$4n - 6 = 19$$

$$+6 \quad +6$$

$$\frac{4n}{4} = \frac{25}{4}$$

$$\boxed{n = \frac{25}{4}}$$

Equations with decimals just use regular equation solving process and a calculator for assistance.

Ex. Solve:

$$\frac{a}{2.8} - 2.5 = -3.7$$

$$+2.5 \quad +2.5$$

$$\cancel{2.8} \left(\frac{a}{\cancel{2.8}} \right) = (-1.2) 2.8$$

$$a = -3.36$$

Ex. A long-distance plan costs \$4.95 a month plus 5 cents per minute. If the bill for one month was \$18.75, how many minutes of long distance calls were made? Solve using a linear equation.

Let $m = \#$ of
minutes

$$\text{flat rate} + \frac{\text{cost}}{\text{minute}} = \text{total}$$

$$\begin{array}{rcl} 4.95 + \cancel{5} 0.05m & = & 18.75 \\ -4.95 & & -4.95 \end{array}$$

$$\frac{0.05m}{0.05} = \frac{13.80}{0.05}$$

$$m = \boxed{276 \text{ minutes}}$$