

How do we solve equations that have fractions

I. Solving 2-step equations with fractions

- A) Steps: 1) Multiply both sides by the reciprocal of the denominator in order to get rid of the denominator
 * make sure to use () on both sides of the equation
 2) Solve the remaining equation

B) Examples: Solve for the variable

$$1) \frac{r+7}{4} = (5) \cdot 4$$

$$r+7=20$$

$$\begin{array}{r} -7 \\ -7 \end{array}$$

$$\boxed{r=13}$$

$$2) \frac{t-3}{2} = (75) \cdot 2$$

$$t-3=150$$

$$\begin{array}{r} +3 \\ +3 \end{array}$$

$$\boxed{t=153}$$

$$3) \frac{r-12}{7} = (-6) \cdot 7$$

$$r-12=-42$$

$$\begin{array}{r} +12 \\ +12 \end{array}$$

$$\boxed{r=-30}$$

$$4) \frac{x+7}{11} = (11) \cdot 11$$

$$x+7=121$$

$$\begin{array}{r} -7 \\ -7 \end{array}$$

$$\boxed{x=114}$$

$$*5) \frac{3y+5y}{3} = (8) \cdot 3$$

$$3y+5y=24$$

$$\frac{8y}{8} = \frac{24}{8}$$

$$\boxed{y=3}$$

II. Solving multi-step equations with fractions

- A) Steps: 1) Rewrite the problem by removing the variable from the fraction (when necessary)
 2) USE DCMS * use the Abc button *

B) Examples: Solve for the variable

$$1) \frac{3}{4}x - \frac{1}{5}x = 11$$

$$\left(\frac{20}{11} \right) \left(\frac{11}{20} \right) x = \left(\frac{11}{11} \right) \cdot 20$$

$$\boxed{x=20}$$

$$2) \frac{3}{7}x - \frac{2}{3} = \frac{10}{7}$$

$$\frac{1}{3} + \frac{2}{3}$$

$$\left(\frac{7}{3} \right) \left(\frac{3}{7} \right) x = \left(\frac{22}{21} \right) \left(\frac{7}{3} \right)$$

$$\boxed{x = \frac{48}{9}}$$

$$3) \frac{y}{4} + \frac{y}{3} = \frac{7}{12}$$

$$\frac{1}{4}y + \frac{1}{3}y = \frac{7}{12}$$

$$\left(\frac{12}{7}\right) \left(\frac{7}{12}y\right) = \left(\frac{7}{12}\right) \left(\frac{12}{7}\right)$$

$$y = 1$$

$$\frac{1 \cdot 3}{4 \cdot 3} \frac{3}{12}$$

$$\frac{1 \cdot 4}{3 \cdot 4} \frac{4}{12}$$

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

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

$$-\frac{5}{12}x + \frac{1}{2} = -\frac{1}{3}$$

$$\left(-\frac{12}{5}\right) \left(\frac{5}{12}x\right) = \left(-\frac{5}{6}\right) \left(-\frac{12}{5}\right)$$

$$x = 2$$

$$5) \frac{5x}{9} - \frac{x}{6} + \frac{1}{3} = \frac{3}{2}$$

$$\frac{5}{9}x - \frac{1}{6}x + \frac{1}{3} = \frac{3}{2}$$

$$\frac{7}{18}x + \frac{1}{3} = \frac{3}{2}$$

$$\left(\frac{18}{7}\right) \left(\frac{7}{18}x\right) = \left(\frac{1}{2}\right) \left(\frac{18}{5}\right)$$

$$x = 3$$

$$6) \frac{1}{2}x + 6(-2x) + \frac{1}{2} = \frac{7}{2}$$

$$-\frac{1}{2}x + 6\frac{1}{2} = \frac{7}{2}$$

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

$$-\frac{1}{2}x = -3 \text{ or } -1.5x = \frac{-3}{-1.5}$$

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

$$x = 2$$

$$x = 2$$

$$7) 2\frac{1}{3}x + 10 + 5\frac{2}{3}x - 9\frac{1}{2} = 12\frac{1}{2}$$

$$8x + \frac{1}{2} = 12\frac{1}{2}$$

$$\frac{8x}{8} = \frac{12}{8}$$

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

$$8) \frac{4}{5}k + \frac{7}{10} = \frac{13}{15}k - \frac{3}{5}$$

$$-\frac{4}{5}k - \frac{4}{5}k$$

$$\frac{7}{10} = \frac{1}{15}k - \frac{3}{5}$$

$$+\frac{3}{5} \quad +\frac{3}{5}$$

$$\frac{15}{1} \cdot \frac{7}{10} = \frac{1}{15}k \cdot \frac{15}{1}$$

$$k = 19\frac{1}{2}$$

$$9) \frac{3}{4} + \frac{4a}{7} = \frac{6a}{7} + \frac{7}{8}$$

$$\frac{3}{4} + \frac{4}{7}a = \frac{6}{7}a + \frac{7}{8}$$

$$-\frac{4}{7}a \quad -\frac{4}{7}a$$

$$\frac{3}{4} = \frac{2}{7}a + \frac{7}{8}$$

$$-\frac{7}{8} \quad -\frac{7}{8}$$

$$\left(\frac{7}{2}\right) \left(-\frac{1}{8}\right) = \left(\frac{2}{7}a\right) \left(\frac{7}{2}\right)$$

$$a = -\frac{1}{16}$$

$$10) \frac{1}{8} + \frac{6a}{5} = \frac{3}{8} + \frac{2a}{5} + \frac{7}{8}$$

$$\frac{1}{8} + \frac{6}{5}a = \frac{3}{8} + \frac{2}{5}a + \frac{7}{8}$$

$$\frac{1}{8} + \frac{6}{5}a = \frac{1}{4} + \frac{2}{5}a$$

$$-\frac{2}{5}a \quad -\frac{2}{5}a$$

$$\frac{1}{8} + \frac{4}{5}a = \frac{1}{4}$$

$$-\frac{1}{8} \quad -\frac{1}{8}$$

$$\left(\frac{5}{4}\right) \left(\frac{4}{5}a\right) = \left(\frac{1}{8}\right) \left(\frac{5}{4}\right)$$

$$a = \frac{1}{32}$$