

M9

Solving Equation with Fractions

3.6 Part 1

Distributive Property with Fractions:

$$\begin{aligned}
 2 \cdot \left(5 + \frac{x}{4}\right) &= 10 + 2 \cdot \frac{x}{4} \\
 &= 10 + \frac{\cancel{2}x}{\cancel{4}2} \\
 &= 10 + \frac{x}{2}
 \end{aligned}$$

$$\begin{aligned}
 -1 \cdot \left(\frac{x}{7} - 3\right) &= \frac{-1x}{7} + 3 \\
 &= \frac{-x}{7} + 3
 \end{aligned}$$

$$\begin{aligned}
 6 \cdot \left(9x + \frac{2}{5}\right) &= 54x + 6 \cdot \frac{2}{5} \\
 &= 54x + \frac{12}{5}
 \end{aligned}$$

$$\begin{aligned}
 -4 \cdot \left(3y + \frac{9}{11}\right) &= (-4)(3y) + (-4)\left(\frac{9}{11}\right) \\
 &= -12y + \frac{(-36)}{11} \\
 &= -12y - \frac{36}{11}
 \end{aligned}$$

Removing Fractions from Equations

1. Equations with one fraction or with fractions that all have the same denominator.

- Put each side in brackets.
- Multiply each side by the denominator.
- Reduce and multiply.
- Solve

Examples: **Remove fractions. Do not solve.**

$\left(\frac{4}{1}\right)\left(2x + \frac{1}{4}\right) = (5)(4) \quad \frac{1}{1} = 1$ $(4)(2x) + \frac{4}{1} \cdot \frac{1}{4} = (5)(4)$ $8x + 1 = 20$	$6x - \frac{3}{10} = \frac{13}{10} \quad \frac{13}{1} = 13$ $\left(\frac{10}{1}\right)\left(6x - \frac{3}{10}\right) = \left(\frac{13}{10}\right)\left(\frac{10}{1}\right)$ $(10)(6x) - \frac{10}{1} \cdot \frac{3}{10} = 13$ $60x - 3 = 13$
$6x + 5 = \frac{4}{7} \quad \frac{4}{1} = 4$ $(7)(6x + 5) = \left(\frac{4}{7}\right)\left(\frac{7}{1}\right)$ $42x + 35 = 4$	$\frac{2x}{3} - 9 = -\frac{8}{3} \quad \frac{-8}{1} = -8$ $\left(\frac{3}{1}\right)\left(\frac{2x}{3} - 9\right) = \left(-\frac{8}{3}\right)\left(\frac{3}{1}\right)$ $\left(\frac{3}{1}\right)\left(\frac{2x}{3}\right) - (3)(9) = -8$ $2x - 27 = -8$

Examples: Solve Equations. Start with removing fractions from both sides.

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

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

$$-10x + \frac{10}{1} \cdot \frac{3}{10} = 20$$

$$-10x + 3 = 20$$

$$-\frac{10x}{-10} = \frac{17}{-10}$$

$$x = \frac{-17}{10} \text{ or } x = -1.7$$

$$\left(\frac{7}{1}\right)\left(4x - \frac{2}{7}\right) = \left(-\frac{5}{7}\right)\left(\frac{7}{1}\right)$$

$$28x - \frac{7}{1} \cdot \frac{2}{7} = -5$$

$$28x - 2 = -5$$

$$\frac{28x}{28} = \frac{-3}{28}$$

$$x = -0.10 \text{ or } \frac{-3}{28}$$

$$\left(3\right)\left(3x - 12\right) = \left(\frac{2}{3}\right)\left(\frac{3}{1}\right)$$

$$9x - 36 = 2$$

$$\frac{9x}{9} = \frac{38}{9}$$

$$x = 4.2 \text{ or } \frac{38}{9}$$

$$\left(\frac{15}{1}\right)\left(\frac{4x}{15} - 2\right) = \left(-\frac{8}{15}\right)\left(\frac{15}{1}\right)$$

$$4x - 30 = -8$$

$$\frac{4x}{4} = \frac{22}{4}$$

$$x = 5.5 \text{ or } \frac{11}{2}$$

$$\begin{aligned} -1\left(\frac{x}{7} - 3\right) &= (-1)\left(\frac{x}{7}\right) - (-1)(3) \\ &= \left(\frac{-1}{1}\right) \times \frac{x}{7} - (-3) \\ &= -\frac{x}{7} + 3 \end{aligned}$$