

Equations with Fractions and Decimals

Objectives: I can solve multi-step equations with fractions and decimals.

Review Practice (Mental math)

- 1) $5 \cdot \frac{3}{5} = 3$ 2) $8 \cdot \frac{3}{4} = 6$ 3) $6 \cdot \frac{2}{3} = 4$ 4) $12 \cdot \frac{5}{6} = 10$
 5) $10 \cdot 3.4 = 34$ 6) $10 \cdot 0.6 = 6$ 7) $100 \cdot 0.4 = 40$ 8) $100 \cdot 0.03 = 3$
 9) $6\left(\frac{2}{3}x - \frac{5}{6}\right) = 4x - 5$ 10) $8\left(\frac{1}{8}x + \frac{3}{4}\right) = x + 6$ or $x + 6$ 11) $10(0.8x + 2) = 8x + 20$

We are going to learn to eliminate the rational numbers!

Examples:

1. $8\left(\frac{3}{2} - \frac{7}{4}\right) = \left(-\frac{9}{8}\right)8$

Multiply both sides by the LCD first

$$\begin{array}{r} 12 - 14 = -9 \\ -12 -12 \\ \hline -14 = -21 \div 7 \\ -14 -14 \div 7 \\ \hline v = \frac{3}{2} \text{ or } \frac{1}{2} \end{array}$$

2. $10(-0.7k + 2) = (0.5k + 0.4)10$

Multiply both sides by a power of 10 first

$$\begin{array}{r} -7k + 20 = 5k + 4 \\ -5k -5k \\ \hline -12k + 20 = 4 \\ +20 +20 \\ \hline -12k = 24 \\ \div -12 \div -12 \\ \hline k = -2 \end{array}$$

3. $20\left(\frac{3}{4}(2x + 5)\right) = \frac{7}{10} \cdot 20$

$$\begin{array}{r} 15(2x + 5) = 14 \\ 30x + 75 = 14 \\ -75 -75 \\ \hline 30x = 61 \\ \div 30 \div 30 \\ \hline x = \frac{61}{30} \text{ or } 2\frac{1}{30} \end{array}$$

4. $100(0.3x - 0.24) = (0.36 + 0.52x)100$

$$\begin{array}{r} 30x - 24 = 36 + 52x \\ -30x -30x \\ \hline -24 = 36 + 22x \\ -36 -36 \\ \hline -60 = 22x \\ \div 22 \div 22 \\ \hline -\frac{30}{11} = x \\ x = -\frac{30}{11} \text{ or } -2\frac{8}{11} \end{array}$$

5. $6 \cdot \frac{2}{3}(-2x - 5) = 6 \cdot \frac{5}{6}(2x - 3)$

$$\begin{array}{r} 4(-2x - 5) = 5(2x - 3) \\ -8x - 20 = 10x - 15 \\ -10x -10x \\ \hline -18x - 20 = -15 \\ +20 +20 \\ \hline -18x = 5 \\ \div -18 \div -18 \\ \hline x = -\frac{5}{18} \end{array}$$

6. $100(0.03x + 0.04) = (0.01x + 0.18)100$

$$\begin{array}{r} 3x + 4 = x + 18 \\ -1x -1x \\ \hline 2x + 4 = 18 \\ -4 -4 \\ \hline 2x = 14 \\ \div 2 \div 2 \\ \hline x = 7 \end{array}$$

Independent Practice

1. $12 \cdot \frac{3}{4}(5x - 4) = \frac{5}{6} \cdot 12$

2. $14\left(\frac{4}{7}x - \frac{3}{14}x\right) = 10 \cdot 14$

3. $10 \cdot 0.3(4x + 2) = (2x - 0.9x + 0.2) \cdot 10$

4. $6\left(\frac{1}{3}k + 48\right) = \left(\frac{1}{2}k + 12\right) \cdot 6$

5. $10 \cdot \frac{1}{5}(x - 2) = \frac{10^3}{10}(x + 6)$

6. $100(0.05)(x + 4) = (0.07x - 0.26) \cdot 100$

Review

7. $7x + 3x - 1 = 2(5x + 4)$

8. $2(3x + 8) = 2x + 16 + 4x$

9. $48x + 5 = 47x + 5$

10. $3(4x + 2) = 20x - 8x + 2$

11. $4(9x + 6) = 36x - 10 + 34$

12. $6(x - 5) - 2 = -2(3x + 4)$