

6 Algebra with Decimals

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Math 9 Ch 6

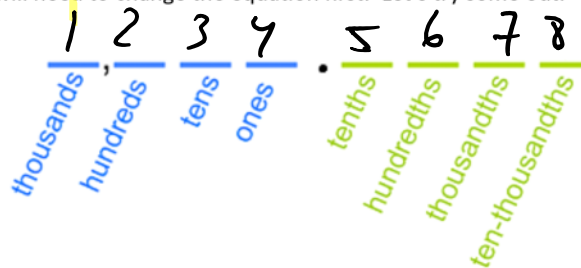
Level 6: Algebra with Decimals (Sec 6.1 & 6.2)

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Learning Outcome 6B: I can solve algebra equations with decimals.

Solving equations involving decimals algebraically uses the same techniques as before, or if you don't like decimals, you will need to change the equation first. Let's try some out.

Place Value:



Decimals: Write each decimal as a fraction. What you need to multiply it to make it a whole number?

	Decimal	Fraction & Name	Multiply it by ___ to get rid of the fraction?
a	0.9	$\frac{9}{10}$ 9 tenths	10
b	0.03	$\frac{3}{100}$ 3 hundredths	100
c	0.007	$\frac{7}{1000}$ 7 thousandths	1000

Example 1: a) Solve $0.002x + 0.05 = 0.03x - 0.006$

Method 1: Keep the decimals

$$\begin{aligned}
 0.002x + 0.05 &= 0.03x - 0.006 \\
 -0.002x &\quad -0.002x \\
 \hline
 0.05 &= 0.028x - 0.006 \\
 +0.006 &\quad +0.006 \\
 \hline
 0.056 &= 0.028x \\
 \frac{0.056}{0.028} &= \frac{0.028x}{0.028} \\
 2 &= x \\
 \boxed{x = 2}
 \end{aligned}$$

Method 2: Remove the decimals

Multiply both sides by the LCD (Lowest Common Denominator): use the largest denominator

$$\frac{2}{1000}x + \frac{5}{100} = \frac{3}{100}x - \frac{6}{1000}$$

LCD = 1000 (largest denominator!)

$$\begin{aligned}
 1000 \left(\frac{2}{1000}x \right) + 1000 \left(\frac{5}{100} \right) &= 1000 \left(\frac{3}{100}x \right) - 1000 \left(\frac{6}{1000} \right) \\
 2x + 10(5) &= 10(3x) - 6 \\
 2x + 50 &= 30x - 6 \\
 -2x &\quad -2x \\
 \hline
 50 &= 28x - 6 \\
 +6 &\quad +6 \\
 \hline
 56 &= 28x \\
 \frac{56}{28} &= \frac{28x}{28} \\
 \boxed{x = 2}
 \end{aligned}$$

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b) Solve $0.09x + 0.13(x+10) = 20$

Method 1: Keep the decimals

$$0.09x + 0.13x + 0.13(10) = 20$$

Method 2: Remove the decimals

$$100(0.09x + 0.13(x+10)) = 100(20)$$

b) Solve $0.09x + 0.13(x+10) = 20$

Method 1: Keep the decimals

$$0.09x + 0.13x + 0.13(10) = 20$$

$$0.09x + 0.13x + 1.3 = 20$$

$$0.22x + 1.3 = 20$$

$$-1.3 \quad -1.3$$

$$\begin{array}{r} 0.22x = 18.7 \\ \hline 0.22 \end{array}$$

$$\boxed{x = 85}$$

Method 2: Remove the decimals

$$\left(\frac{9x}{100} + \frac{13x}{100} + \frac{13}{10} \right) = (20) \frac{100}{100}$$

$$LCD = 100$$

$$9x + 13x + 130 = 2000$$

$$22x + 130 = 2000$$

$$-130 \quad -130$$

$$\begin{array}{r} 22x = 1870 \\ \hline 22 \end{array}$$

$$\boxed{x = 85}$$

Example 2: Solve $1.2(x + 7.5) = 2.5x - 17$ You choose whichever method you wish.

Method 1: Keep the decimals

$$1.2x + 9 = 2.5x - 17$$

$$-1.2x \quad -1.2x$$

$$\begin{array}{r} 9 = 1.3x - 17 \\ \hline \end{array}$$

$$+17 \quad +17$$

$$\begin{array}{r} 26 = 1.3x \\ \hline 1.3 \quad 1.3 \end{array}$$

$$\boxed{x = 20}$$

Method 2: Remove the decimals

Assignment: Algebra with Decimals Worksheet