Solving Equations with Decimals

Objective 1

Solving Equations by Clearing Decimals

Suppose we are asked to solve the equation

$$0.10x + 0.05x = 2.1.$$

We could rewrite the decimal values as fractions and then clear them using the LCD. This approach is demonstrated below.

$$0.1x + 0.05x = 2.1$$

$$\frac{1}{10}x + \frac{5}{100}x = 2.1 \qquad \text{LCD}=100$$

$$(100)\frac{1}{10}x + (100)\frac{5}{100}x = (100)2.1$$

$$10x + 5x = 210$$

$$15x = 210$$

$$\boxed{x = 14}$$

If we think of the decimals as fractions with denominators of powers of 10, we can then simply clear or "Kung Fu" the decimals just as we would fractions. Compare the technique below with the solution above.

$$0.1x + 0.05x = 2.1 \qquad \text{LCD}=100$$

$$100(0.1)x + 100(0.05)x = 100(2.1)$$

$$10x + 5x = 210$$

$$15x = 210$$

$$\boxed{x = 14}$$

Example 1: Solve the equation.

$$0.25t - 0.88 = 0.03t \quad \text{LCD}=100$$

$$100(0.25)t - 100(0.88) = 100(0.03)t$$

Example 2: Solve the equation.

$$5t + 0.6 = t + 1 \quad \text{LCD}=10$$

$$10(5t) - 10(0.6) = 10(t) + 10(1)$$

Example 3: Solve the equation.

$$0.02+0.5a=-0.3 \qquad \text{LCD}=100$$

$$100(0.02)+100(0.5a)=100(0.03)$$

Example 4: Solve the equation.

$$0.5x+0.1(x+30)=4.8 \qquad \text{LCD}=10$$

$$10(0.5)x+10(0.1)(x+30)=10(4.8)$$

Answer the following homework questions.

In Exercises 1 - 10, solve each equation for the unknown.

1) $0.2x + 5.7 = 9.3$

2) $0.5m - 4.9 = 2.6$

3) $0.5 - 0.4p = 0.2$

4) $0.5 - 0.2k = 0.15$

5) $5.7a + 1.2 = 6.3a + 5.4$

6) $1.4x + 0.73 = 1.8x + 1.61$

7) $1.3c + 0.67 = 1.37c + 2.31$

8) $0.1(y + 4) - 2 + 2.4y = -5$

9) $0.5b - 1 + 0.3(-2 - b) = 1.2$

10) $-0.01(a + 4) - 0.02(-2a + 4) = 0.12$