Algebraic Equations

1   Linear Equations

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

$$12x - 3 = 14x - 35$$

$$38 = 2x$$

$$x = \boxed{16}$$

2   Linear Equations with Fractions

$$\frac{2p + 1}{6} - \frac{6 - 5p}{5} = \frac{12p - 15}{10}$$

$$5(2p + 1) - 6(6 - 5p) = 3(12p - 15)$$

$$10p + 5 - 36 + 30p = 36p - 45$$

$$40p - 31 = 36p - 45$$

$$4p = -14$$

$$p = \boxed{-\frac{7}{2}}$$

3 Word Problems

3.1 Example 1

When a number is added to two-fifths of itself, the result is 35. What is the number?

Let x be the number.

$$x + \frac{2}{5}x = 35$$

$$5x + 2x = 175$$

$$7x = 175$$

$$x = \boxed{25}$$

3.2 Example 2

The sum of 3 consecutive even numbers is 42. Find the smallest number.

Let the smallest number be x, so that the 3 consecutive even numbers are x, $x + 2$ and $x + 4$.

$$x + (x + 2) + (x + 4) = 42$$

$$x + x + 2 + x + 4 = 42$$

$$3x + 6 = 42$$

$$3x = 36$$

$$x = \boxed{12}$$