5 SIMPLE EQUATIONS IN ONE VARIABLE

LEARNING OBJECTIVES

In this topic, we will learn to:
- solve linear equations with integer coefficients in one variable

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5.1 SIMPLE LINEAR EQUATIONS IN ONE VARIABLE

WORKED EXAMPLE 1

Solve the equation $2x = 4$.

Worked Solution:

$$2x = 4$$

$$\frac{2x}{2} = \frac{4}{2}$$

$$x = 2$$

WORKED EXAMPLE 2

Solve the equation $x - 2 = 8$.

Worked Solution:

$$x - 2 = 8$$

$$x - 2 + 2 = 8 + 2$$

$$x = 10$$

5.2 EQUATIONS INVOLVING BRACKETS

◄ WORKED EXAMPLE 3 ►

Solve the equation $2(3x + 6) = 6$.

Worked Solution:

$$2(3x + 6) = 6$$
$$6x + 12 = 6$$
$$6x + 12 - 12 = 6 - 12$$
$$6x = -6$$
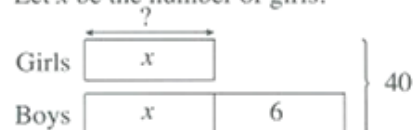$$\frac{6x}{6} = \frac{-6}{6}$$
$$x = -1$$

5.3 FORMING LINEAR EQUATIONS IN ONE VARIABLE

◄ WORKED EXAMPLE 4 ►

There are 6 more boys than girls in a party. If there are 40 children altogether, how many girls are there?

Worked Solution:

Let x be the number of girls.

Number of boys $= x + 6$

Total number of children $= x + x + 6$
$$= 2x + 6$$

$$2x + 6 = 40$$
$$2x = 40 - 6$$
$$= 34$$
$$x = 17$$

There are **17** girls.

PRACTICE QUESTIONS

1. Solve each of the following equations.

   (a) $x - 10 = 12$ (b) $x + 5 = 7$
   (c) $7x - 6 = 49$ (d) $-11p = 121$
   (e) $14y = 121$

2. Solve each of the following equations.

   (a) $3(x - 14) = 15$ (b) $2(x + 6) = 7$
   (c) $5(x + 6) = 31$ (d) $-22(p + 2) = 44$
   (e) $12(3y - 4) = 144$

3. Given that $P = \frac{1}{2}(2a + b) - c$, find
   (a) the value of P when $a = 4, b = 3$ and $c = 9$,
   (b) the value of c when $a = 5, b = 1$ and $P = 14$.

4. A telecom company charges mobile phone bills, B, using the formula $B = 12 + 0.5t$, where t represents the talk time in minutes.
   (a) Find the cost of the bill when the talk time is 20 minutes.
   (b) Find the duration of the talk time when the bill costs $29.

5. The three sides of a triangle are given as $(x - 3)$ cm, $(2x + 4)$ cm and $(4x - 1)$ cm.
   (a) Find the perimeter of the triangle in terms of x.
   (b) If the perimeter of the triangle is 21 cm, find the value of x.

6. In an arcade game, the winner scored 80 more points than twice the score of the other player. If both of them scored a total of 260 points, how many points did the winner score?

7. A fruit stall sells oranges and pears. The price of an orange is $0.90 less than three times the price of a pear. Mr Lee paid $5 for 3 oranges and 2 pears. Find the price of an orange and the price of a pear.

8. There are 50 pencils and pens in a box. The number of pens is 6 more than the number of pencils. Using algebraic method, find the number of pens in the box.

9. There are thrice as many blue beads as red beads in a box. There are 56 more blue beads than red beads in the box. Using algebraic method, find the number of red beads in the box.

10. Angela's age is 5 times her daughter's age. Let her daughter's age be x years.
    (a) Express Angela's age in terms of x.
    (b) If Angela is 20 years older than her daughter, find the age of Angela.