

ch - 3

Exercise 3.9

Let the present age of father and son be x and y .

ATQ,

$$x = 3y \quad \text{--- (1)}$$

$$x + 12 = 2(y + 12)$$

$$x + 12 = 2y + 24$$

$$x - 2y = 24 - 12$$

$$x - 2y = 12 \quad \text{--- (2)}$$

Putting value of x in (2),

$$x - 2y = 12$$

$$3y - 2y = 12$$

$$\boxed{y = 12}$$

Putting value of y in (1)

$$x = 3y$$

$$x = 3 \times 12$$

$$\boxed{x = 36}$$

2 Let the present age of man and his son be x and y .

ATQ,

$$x + 6 = 3(y + 6)$$

$$x + 6 = 3y + 18$$

$$x - 3y = 18 - 6$$

$$x - 3y = 12 \quad \text{--- (1)}$$

$$x - 3 = 9(y - 3)$$

$$x - 3 = 9y - 27$$

$$x - 9y = -27 + 3$$

$$x - 9y = -24 \quad \text{--- (2)}$$

Subtract ① from ②,

$$\begin{array}{r}
 x - 9y = -24 \\
 x - 3y = 12 \\
 (-) \quad (+) \quad (-) \\
 \hline
 -6y = -36 \\
 y = \frac{-36}{-6} \\
 \boxed{y = 6}
 \end{array}$$

Putting value of y in ①

$$\begin{aligned}
 x - 3y &= 12 \\
 x - 3(6) &= 12 \\
 x &= 12 + 18 \\
 \boxed{x = 30}
 \end{aligned}$$

$\therefore$ Present age of man = 30 years
 Present age of his son = 6 years

Q. 5 Let the present age of father and son be x and y .

ATQ,

$$\begin{aligned}
 x - 10 &= 12(y - 10) \\
 x - 10 &= 12y - 120 \\
 x - 12y &= -120 + 10 \\
 x - 12y &= -110 \quad \text{--- ①}
 \end{aligned}$$

$$\begin{aligned}
 x + 10 &= 2(y + 10) \\
 x + 10 &= 2y + 20 \\
 x - 2y &= 20 - 10 \\
 x - 2y &= 10 \quad \text{--- ②}
 \end{aligned}$$

Subtract ② from ①,

$$\begin{array}{r}
 x - 12y = -110 \\
 x - 2y = 10 \\
 (-) \quad (+) \quad (-) \\
 \hline
 -10y = -120
 \end{array}$$

$$10y = 120$$

$$y = \frac{120}{10}$$

$$\boxed{y = 12}$$

Putting value of y in ②,

$$x - 2y = 10$$

$$x - 2(12) = 10$$

$$x = 10 + 24$$

$$\boxed{x = 34}$$

$\therefore$ Present age of father = $\boxed{34 \text{ years}}$
Present age of son = $\boxed{12 \text{ years}}$

Q-7 Same as Q.1

Q-8 Let the present age of father be x and the sum of present ages of his two children be y .

ATQ,

$$x = 3y \quad \text{————— ①}$$

$$x + 5 = 2(y + 5 + 5)$$

$$x + 5 = 2(y + 10)$$

$$x + 5 = 2y + 20$$

$$x - 2y = 20 - 5$$

$$x - 2y = 15 \quad \text{————— ②}$$

Putting value of x in ②

$$x - 2y = 15$$

$$3y - 2y = 15$$

$$\boxed{y = 15}$$

Putting value of y in ①

$$x = 3y$$

$$x = 3 \times 15$$

$$\boxed{x = 45}$$

$\therefore$ Present age of father = $\boxed{45 \text{ years}}$

Q. 9 Let the present age of father and son be x and y .

ATQ,

$$x - 2 = 5(y - 2)$$

$$x - 2 = 5y - 10$$

$$x - 5y = -10 + 2$$

$$x - 5y = -8 \quad \text{--- (1)}$$

$$x + 2 = 3(y + 2) + 8$$

$$x + 2 = 3y + 6 + 8$$

$$x + 2 = 3y + 14$$

$$x - 3y = 14 - 2$$

$$x - 3y = 12 \quad \text{--- (2)}$$

Subtract (2) from (1),

$$x - 5y = -8$$

$$x - 3y = 12$$

$$\begin{array}{r} (-) \quad (+) \quad (-) \\ \hline \end{array}$$

$$+ 2y = -20$$

$$y = \frac{-20}{2} = -10$$

$$\boxed{y = 10}$$

Putting value of y in (1),

$$x - 5y = -8$$

$$x - 5(10) = -8$$

$$x = -8 + 50$$

$$\boxed{x = 42}$$

$\therefore$ Present age of father = 42 years

Present age of son = 10 years

Q. 12 Let the present age of Salim and his daughter be x and y .

ATQ,

$$x - 2 = 3(y - 2)$$

$$x - 2 = 3y - 6$$

$$x - 3y = -6 + 2$$

$$x - 3y = -4 \quad \text{--- (1)}$$

$$x + 6 = 2(y + 6) + 4$$

$$x + 6 = 2y + 12 + 4$$

$$x + 6 = 2y + 16$$

$$x - 2y = 16 - 6$$

$$x - 2y = 10 \quad \text{--- (2)}$$

Subtract (2) from (1),

$$x - 3y = -4$$

$$x - 2y = 10$$

$$\begin{array}{r} (-) \quad (+) \quad (-) \\ \hline \end{array}$$

$$+y = -14$$

$$\boxed{y = 14}$$

Putting value of y in (1)

$$x - 3y = -4$$

$$x - 3(14) = -4$$

$$x = -4 + 42$$

$$\boxed{x = 38}$$

Present age of Salim = $\boxed{38 \text{ years}}$ Present age of his daughter = $\boxed{14 \text{ years}}$

13. Let the present age of father be x and the sum of the present ages of his two children be y .

ATQ,

$$x = 2y \quad \text{--- (1)}$$

$$x + 20 = y + 20 + 20$$

$$x + 20 = y + 40$$

$$x - y = 40 - 20$$

$$x - y = 20 \quad \text{—————} \textcircled{2}$$

Putting value of x in $\textcircled{2}$

$$x - y = 20$$

$$2y - y = 20$$

$$\boxed{y = 20}$$

Putting value of y in $\textcircled{1}$

$$x = 2y$$

$$x = 2 \times 20$$

$$\boxed{x = 40}$$

$\therefore$ Present age of father = $\boxed{40 \text{ years}}$