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Exercise 3.6

Q.1 Let the cost of 1 pen be x and the cost of 1 pencil be y.

ATQ,

$$5x + 6y = 9 \quad \text{——} \quad (1)$$
$$3x + 2y = 5 \quad \text{——} \quad (2)$$

Multiply (2) by 3.

$$9x + 6y = 15 \quad \text{——} \quad (3)$$

Subtract (1) from (3),

$$\begin{array}{rrr} 9x + 6y & = & 15 \\ 5x + 6y & = & 9 \\ (-) \quad (-) & & (-) \\ \hline 4x & = & 6 \end{array}$$

$$x = \frac{\cancel{6}\,3}{\cancel{4}\,2}$$

$$\boxed{x = ₹1.5}$$

Putting value of x in (1),

$$5x + 6y = 9$$
$$5\left(\frac{3}{2}\right) + 6y = 9$$
$$6y = 9 - \frac{15}{2}$$
$$y = \frac{18 - 15}{2 \times 6}$$
$$y = \frac{\cancel{3}\,1}{\cancel{12}\,4} = \boxed{₹0.25}$$

Q.2 Let the cost of one audio cassette be x and the cost of one video cassette cassette be y.

ATQ,

$$7x + 3y = 1110 \quad \text{——— (1)}$$
$$5x + 4y = 1350 \quad \text{——— (2)}$$

Multiply (1) by 4 and (2) by 3.

$$28x + 12y = 4440 \quad \text{——— (3)}$$
$$15x + 12y = 4050 \quad \text{——— (4)}$$

Subtract (4) from (3),

$$28x + 12y = 4440$$
$$15x + 12y = 4050$$
$$(-) \quad (-) \quad (-)$$
$$13x = 390$$
$$x = \frac{390}{13} = 30$$

$$\boxed{x = ₹30}$$

Putting value of x in (1)

$$7x + 3y = 1110$$
$$7(30) + 3y = 1110$$
$$3y = 1110 - 210$$
$$y = \frac{900}{3} = 300$$

$$\boxed{y = ₹300}$$

Q-3 Let the no. of pens be x and the no. of pencils be y.

ATQ,

$$x + y = 40 \quad \text{——— (1)}$$

$$(y + 5) = 4(x - 5)$$

$$y + 5 = 4x - 20$$

$$4x - y - 20 - 5 = 0$$

$$4x - y = 25 \quad \text{——— (2)}$$

Add (1) & (2),

$$x + y = 40$$

$$(+)\ 4x - y = 25$$

$$5x = 65$$

$$x = \frac{65}{5}\ 13$$

$$\boxed{x = 13}$$

Putting value of x in (1),

$$x + y = 40$$

$$y = 40 - 13$$

$$\boxed{y = 27}$$

Q-4 Let the cost of 1 table be x and the cost of 1 chair be y.

ATQ,

$$4x + 3y = 2250 \quad \text{——— (1)}$$

$$3x + 4y = 1950 \quad \text{——— (2)}$$

Multiply ① by 4 and ② by 3.

$$16x + 12y = 9000 \quad \text{——} \quad ③$$
$$9x + 12y = 5850 \quad \text{——} \quad ④$$

Subtract ④ from ③,

$$16x + 12y = 9000$$
$$9x + 12y = 5850$$
$$(-) \quad (-) \quad (-)$$
$$7x = 3150$$
$$x = \frac{3150}{7} = 450$$

$$\boxed{x = ₹\,450}$$

Putting value of x in ①,

$$4x + 3y = 2250$$
$$4(450) + 3y = 2250$$
$$3y = 2250 - 1800$$
$$y = \frac{450}{3} = 150$$

$$\boxed{y = ₹\,150}$$

∴ Cost of 1 table & 2 chairs $= x + 2y$

$= 450 + (2 \times 150)$

$= 450 + 300$

$= \boxed{₹\,750}$

Q. 5 Let the cost of 1 bag be x and the cost of 1 pen be y.

ATQ,

$$3x + 4y = 257 \quad \text{——} \quad (1)$$
$$4x + 3y = 324 \quad \text{——} \quad (2)$$

Multiply (1) by 3 and (2) by 4.

$$9x + 12y = 771 \quad \text{——} \quad (3)$$
$$16x + 12y = 1296 \quad \text{——} \quad (4)$$

Subtract (3) from (4),

$$16x + 12y = 1296$$
$$9x + 12y = 771$$
$$(-) \quad (-) \quad (-)$$
$$7x = 525$$
$$x = \frac{525}{7} = 75$$
$$\boxed{x = ₹\,75}$$

Putting value of x in (1)

$$3x + 4y = 257$$
$$3(75) + 4y = 257$$
$$4y = 257 - 225$$
$$y = \frac{32}{4} = 8$$
$$\boxed{y = ₹\,8}$$

∴ Cost of 1 bag & 10 pens $= x + 10y = 75 + (8 \times 10)$

$$= 75 + 80$$
$$= \boxed{₹\,155}$$

Q.6 Let the cost of 1 book be x and the cost of 1 pen be y

ATQ,

$$5x + 7y = 79 \quad \text{——} (1)$$
$$7x + 5y = 77 \quad \text{——} (2)$$

Multiply (1) by 5 and (2) By 7.

$$25x + 35y = 395 \quad \text{——} (3)$$
$$49x + 35y = 539 \quad \text{——} (4)$$

Subtract (3) from (4),

$$49x + 35y = 539$$
$$25x + 35y = 395$$
$$(-) \quad (-) \quad (-)$$

$$24x = 144$$
$$x = \frac{144}{24}\ 6$$

$$\boxed{x = ₹6}$$

Putting value of x in (1)

$$5(6) + 7y = 79$$
$$7y = 79 - 30$$
$$y = \frac{49}{7}$$

$$\boxed{y = ₹7}$$

$\therefore$ Cost of 1 book & two pens $= x + 2y = 6 + (2 \times 7)$
$= 6 + 14 = \boxed{₹20}$

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Let the CP of a table be x and the CP of a chair be y.

Case I

SP of table $= x + 10\%$ of x

$= x + \frac{10x}{100}$

$= x + \frac{x}{10} = \frac{10x + x}{10}$

$= \frac{11x}{10}$

SP of chair $= y + 25\%$ of y

$= y + \frac{25y}{100}$

$= y + \frac{y}{4} = \frac{4y + y}{4}$

$= \frac{5y}{4}$

$\therefore \frac{11x}{10} + \frac{5y}{4} = 1050$

$44x + 50y = 1050 \times 40$

$44x + 50y = 42000$

$22x + 25y = 21000$ ——— (1)

Case II

SP of table $= x + 25\%$ of x

$= \frac{11x}{10} \quad \frac{5x}{4}$

SP of chair $= y + 11\%$ of y

$= \frac{11y}{10}$

$\therefore \frac{5x}{4} + \frac{11y}{10} = 1065$

$50x + 44y = 1065 \times 40$

$50x + 44y = 42600$

$25x + 22y = 21300$ ——— (2)

Multiply (1) by 25 and (2) by 22.

$550x + 625y = 525000$ ——— (3)

$550x + 484y = 468600$ ——— (4)

Subtract (4) from (3),

$$\begin{array}{rrrr} 550x & +625y & = & 525000 \\ 550x & +484y & = & 468600 \\ (-) & (-) & & (-) \\ \hline & 141y & = & 56400 \end{array}$$

$$y = \frac{56400}{141}400$$

$$\boxed{y = ₹400}$$

Putting value of y in (1),

$22x + 25(400) = 21000$

$22x = 21000 - 10000$

$x = \frac{11000}{22}500$

$$\boxed{x = ₹500}$$

Q. 8 Let the amount in scheme A be x and scheme B be y.

CASE I

$$\frac{P_1 R_1 T_1}{100} + \frac{P_2 R_2 T_2}{100} = 1860$$

$$\frac{x \times 8 \times 1}{100} + \frac{y \times 9 \times 1}{100} = 1860$$

$$8x + 9y = 1860 \times 100$$

$$8x + 9y = 186000 \quad \text{——— (1)}$$

CASE II

$$\frac{P_1 R_2 T_1}{100} + \frac{P_2 R_1 + T_2}{100} = 20 + 1860$$

$$\frac{x \times 9 \times 1}{100} + \frac{y \times 8 \times 1}{100} = 1880$$

$$9x + 8y = 1880 \times 100$$

$$9x + 8y = 188000 \quad \text{——— (2)}$$

Multiply (1) by 9 and (2) by 8.

$$72x + 81y = 1674000 \quad \text{——— (3)}$$

$$72x + 64y = 1504000 \quad \text{——— (4)}$$

Subtract (4) from (3),

$$72x + 81y = 1674000$$

$$72x + 64y = 1504000$$

$$(-) \quad (-) \quad (-)$$

$$17y = 170000$$

$$y = \frac{170000}{17} = 10000$$

$\boxed{y = ₹10000}$

Putting value of y in (1)

$$8x + 9(10000) = 186000$$

$$8x = 186000 - 90000$$

$$8x = 96000$$

$$x = \frac{96000}{8} \quad 12000$$

$\boxed{x = ₹12000}$

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Let the cost of a pen be x and the cost a pencil box be y.

ATQ,

$$4x + 4y = 100$$
$$x + y = 25 \quad \text{——— (1)}$$

$$3x = y + 15$$
$$3x - y = 15 \quad \text{——— (2)}$$

Add (1) & (2),

$$x + y = 25$$
$$(+)\ 3x - y = 15$$
$$4x = 40$$
$$\boxed{x = ₹10}$$

Putting value of x in (1)

$$x + y = 25$$
$$y = 25 - 10$$
$$\boxed{y = ₹15}$$

Let the no. of bananas in lot A and B be x and y.

ATB,

CASE I : $\frac{2}{3}x + y = 400$

$$2x + 3y = 1200 \quad \text{——— (1)}$$

CASE II : $x + \frac{4}{5}y = 460$

$$5x + 4y = 2300 \quad \text{——} (2)$$

Multiply (1) by 4 and (2) by 3

$$8x + 12y = 4800 \quad \text{——} (3)$$
$$15x + 12y = 6900 \quad \text{——} (4)$$

Subtract (3) from (4)

$$15x + 12y = 6900$$
$$8x + 12y = 4800$$
$$(-) \quad (-) \quad (-)$$
$$7x = 2100$$
$$x = \frac{2100}{7} \; 300$$
$$\boxed{x = 300}$$

Putting value of x in (1),

$$2x + 3y = 1200$$
$$2(300) + 3y = 1200$$
$$3y = 1200 - 600$$
$$y = \frac{600}{3} \; 200$$
$$\boxed{y = 200}$$

Total no. of bananas $= x + y$

$= 300 + 200 = \boxed{500}$

Q.5 Let the price of TV and fridge be x and y.

ATQ,

CASE I : 5% of x + 10% of y = ₹ 2000

$$\left(\frac{5}{100} \times x\right) + \left(\frac{10}{100} \times y\right) = 2000$$

$$\frac{x}{20} + \frac{y}{10} = 2000$$

$$x + 2y = 40000 \quad \text{——} \quad (1)$$

CASE II : 10% of x − 5% of y = ₹ 1500

$$\left(\frac{10}{100} \times x\right) - \left(\frac{5}{100} \times y\right) = 1500$$

$$\frac{x}{10} - \frac{y}{20} = 1500$$

$$2x - y = 30000 \quad \text{——} \quad (2)$$

Multiply (2) by 2.

$$4x - 2y = 60000 \quad \text{——} \quad (3)$$

Add (1) & (3),

$$x + 2y = 40000$$
$$(+)\ 4x - 2y = 60000$$
$$5x = 100000$$
$$x = \frac{100000}{5} = 20000$$

$\boxed{x = ₹\ 20000}$

Putting value of x in (1)

$$x + 2y = 40000$$
$$2y = 40000 - 20000$$
$$y = \frac{20000}{2} = 10000$$

$\boxed{y = ₹\ 10000}$