8 Commercial Mathematics

Exercise 8.1

1. (a) 6 months : $1\frac{1}{2}$ years

or 6 months : $1\frac{3}{2} \times 12$ months

or 6 months : 18 months

1 : 3

(b) 3 hrs : 2 days

or 3 hrs : 2×24 hrs

3 hrs : 48 hrs

1 : 16

2. Divide 270 in the ratio :

(a) 1 : 2 : 3

Sum $= 1 + 2 + 3 = 6$

First part $= \frac{1}{6} \times 270 = 45$

Second part $= \frac{2}{6} \times 270 = 90$

Third part $= \frac{3}{6} \times 270 = 135$

(b) 4 : 5

Sum $4 + 5 = 9$

First part $= \frac{4}{9} \times 270 = 120$

Second part $= \frac{5}{9} \times 270 = 150$

(c) 1 : 4 : 5

Sum $= 1 + 4 + 5 = 10$

First part $= \frac{1}{10} \times 270 = 27$

Second part $= \frac{4}{10} \times 270 = 108$

Third part $= \frac{5}{10} \times 270 = 135$

3.

$$\text{Ratio} = 7:4$$

$$\text{Sum of ratio} = 7 + 4 = 11$$

$$\text{First number} = \frac{7}{11} \times 55 = 35$$

$$\text{Second number} = \frac{4}{11} \times 55 = 20$$

4.

$$\text{Ratio} = 25:13$$

$$\text{Sum of ratio} = 25 + 13 = 38$$

Let length of whole line segment $= x$

So, smaller one $= \frac{13}{38} \times x = 6.5$

or $x = \frac{6.5 \times 38}{13 \times 10}$

$x = 19\,\text{cm}$

So, the length of line segment is 19 cm

5. Given B earns = ` 1260

So, A earns = ` $3 \times 1260 = 3780$

Ratio $B : A = 1260 : 3780 = 1 : 3$

6. (a) $30 : x :: 18 : 27$

So, $x \times 18 = 30 \times 27$

$$x = \frac{30 \times 27}{18}$$

$$x = 45$$

(b) $x : 64 :: 30 : 24$

$x \times 24 = 64 \times 30$

$$x = \frac{64 \times 30}{24}$$

$$x = 80$$

(c) $42 : 18 :: x : 15$

So, $18 \times x = 42 \times 15$

$$x = \frac{42 \times 15}{18}$$

$$x = 35$$

(d) $14 : 12 :: 21 : x$

So, $14 \times x = 12 \times 21$

$$x = \frac{12 \times 21}{14}$$

$$x = 18$$

7.

days	labour
4 ↓	640 ↓
30 ↓	x ↓

$$\frac{x}{640} = \frac{30}{4}$$

$$x = ` \frac{30 \times 640}{4}$$

$$x = ` 4800$$

So, ` 4800 will be paid for 30 days of work.

8.

Distance (km)	diesel (l)
220 ↓	20 ↓
660 ↓	x ↓

$$\frac{x}{20} = \frac{660}{220}$$

$$x = \frac{660 \times 20}{220} l$$

$$x = 60 l$$

So, 60 l litres will be needed to ravel a distance of 660 km.

9. 800 km is represent on a map by = 8 cm

100 km is represent on a map by = 1 cm

So, scale 100 km = 1 cm

10. The given ratio of copper and zinc in an alloy = 8 : 5

The weight of zinc = 9.5 kg The weight of copper = ?

So, the weight of copper = the weight of zinc × ratio

$$= 9.5 \times \frac{8}{5} \text{ kg} = 15.2 \text{ kg}$$

Exercise 8.2

1. (a) Required number $= \left(\frac{25}{10}\right) \times 100 = 250$

(b) Required number $= \frac{2 \times 100}{\frac{25}{4}} = \frac{2 \times 100 \times 4}{25} = 32$

(c) Required number $= \left(\frac{23 \text{ kg}}{57\frac{1}{2}}\right) \times 100 = \left(\frac{23 \text{ kg}}{\frac{115}{2}}\right) \times 100 = \frac{23 \times 100 \times 2}{115} = 40$

2. (a) $\frac{2}{5}=\frac{2}{5}\times 100\,\%=40\,\%$ (b) $\frac{33}{50}=\frac{33}{50}\times 100\,\%=66\,\%$

(c) $\frac{5}{60}=\frac{5}{60}\times 100\,\%=\frac{25}{3}\,\%\ =8\frac{1}{3}\,\%$ (d) $\frac{21}{70}=\frac{21}{70}\times 100\%=30\,\%$

(e) $\frac{24}{80}=\frac{24}{80}\times 100\,\%=\frac{24\times 5}{4}\,\%=30\,\%$

3. (a) $50.2=\frac{502}{10}=\frac{5020}{100}=5020\,\%$

(b) $0.275=\frac{275}{1000}=\frac{275}{100\times 10}=\frac{27.5}{100}=27.\,5\,\%$

(c) $0.02=\frac{2}{100}=2\,\%$ (d) $0.001=\frac{1}{1000}=\frac{1}{100\times 10}=\frac{0.1}{100}=0.1\%$

(e) $5.98=\frac{598}{100}=598\,\%$ (f) $0.09=\frac{9}{100}=9\,\%$

(g) $0.92=\frac{92}{100}=92\,\%$ (h) $2.05=\frac{205}{100}=205\,\%$

4. (a) $12.5\%=\frac{125}{10\times 100}=\frac{1}{8}$ (b) $\frac{18.5}{100}=\frac{185}{100\times 10}=\frac{37}{200}$

(c) $33\frac{1}{3}\,\%=\frac{100}{3}\,\%=\frac{100}{3\times 100}=\frac{1}{3}$ (d) $66\frac{2}{3}\,\%=\frac{200}{3}\,\%=\frac{200\times 1}{3\times 100}=\frac{2}{3}$

5. (a) $17.5\%=\frac{17.5}{100}=\frac{175}{1000}=0.175$ (b) $12.5\%=\frac{12.5}{100}=\frac{125}{1000}=0.125$

(c) $66\frac{2}{3}\,\%=\frac{200}{3}\,\%=\frac{200}{3\times 100}=\frac{2}{3}=0.67$ (d) $33\frac{1}{3}\,\%=\frac{100}{3}\,\%=\frac{100}{3\times 100}=\frac{1}{3}=0.33$

6. (a) Required $\%=\frac{30}{60}\times 100\,\%=50\,\%$ (b) Required $\%=\frac{20}{20}\times 100\,\%=100\,\%$

(c) Required $\%=\frac{60\,\text{kg}}{80\,\text{kg}}\times 100\,\%=75\,\%$

(d) Required $\%=\frac{112\,l}{224\,l}\times 100\,\%=\frac{100}{2}\,\%=50\,\%$

7. (a) $33\frac{1}{3}\,\%\text{ of }456=\frac{100}{3}\,\%\text{ of }456=\frac{100}{3\times 100}\times 456=152$

(b) $66\frac{2}{3}\,\%\text{ of }567=\frac{200}{3}\,\%\text{ of }567=\frac{200}{3\times 100}\times 567=2\times 189=378$

(c) $12\frac{1}{2}\,\%\text{ of }\grave{}\ 24=\frac{25}{2}\,\%\ \grave{}\ 24=\grave{}\ \frac{25}{2\times 100}\times 24=\frac{6}{2}=\grave{}\ 3$

(d) $20\%\text{ of }800\text{ kg}=\frac{20}{100}\times 800\,\text{kg}=20\times 8\,\text{kg}=160\text{ kg}$

(e) $30\%\text{ of }70\text{ kg}=\frac{30}{100}\times 70\,\text{kg}=21\text{ kg}$

(f) $45\%\text{ of }73\text{ hrs}=\frac{45}{100}\times 73\,\text{hrs}=\frac{3285}{100}\text{ hrs}=32.85\text{ hrs}$

(g) $27\%\text{ of }90\ l=\frac{27}{100}\times 90\,l=\frac{243\,l}{10}=24.3\ l$

(h) 12% of ` 65 = ` $\frac{12}{100} \times 65$ = ` $\frac{780}{100}$ = ` 7.8

8. (a) The required number = 80 + 10% of 80 $= 80 + \frac{10 \times 80}{100} = 80 + 8 = 88$

(b) The required number $= 150 - 5\%$ of $150 = 150 - \frac{5 \times 150}{100} = 150 - \frac{75}{10} = 150 - 7.5 = 142.5$

(c) The required number $= 240 - 25\%$ of $240 = 240 - \frac{240 \times 25}{100} = 240 - \frac{600}{10} = 180$

Exercise 8.3

1. (a) Let the number be x
Then, 20% of $x = 8$

$\frac{20}{100} \times x = 8 \quad \Rightarrow \quad x = \frac{8 \times 100}{20} = 40$

$\Rightarrow \quad x = 40$

(b) Let the number be y.

Then, 30% of $y = 150 \quad \Rightarrow \quad y = \frac{150 \times 100}{30} = 500$

$\Rightarrow \frac{30}{100} \times y = 150 \quad \Rightarrow \quad y = 500$

2. The weight of cake = 2.25 kg
The percentag of sugar in cake = 35%
∴ required weight of sugar in cake $= 35\%$ of 2.25 kg

$= \frac{35}{100} \times 2.25 \times 1000$ gm $\quad [\because 1\text{kg} = 1000\text{gm}]$

$= 35 \times 2.25 \times 10 = 787.5$ gm

3. Salary of employee for 1 month = ` 15250
Salary of employee for 12 month (*i.e.*, Annual salary)

= ` $15250 \times 12$ = ` 183000

Bonus declared for the employee = 2%
∴ Bonus amount = 2% of annual salary

= ` $\frac{2}{100} \times 183000$ = ` 1830×2 = ` 3660

4. Total number of throws of a coin = 60
Number of time recorded to get tail = 35%

∴ Number of tails recorded (or, got) = 35% of $60 = \frac{35}{100} \times 60 = \frac{105}{5} = 21$

And number of heads got (or, recorded) $= 60 - 21 = 39$

5. The population of a town in 1986 = 70,350
And population of same town in 1987 = 105525
Increase in population during 1 year $= 105525 - 70350 = 37175$

∴ Required increase % in population in $1987 = \frac{35175}{70350} = 100\% = 50\%$

6. Original cost of am article = ` 5
And the retailer sells it for = ` 7.50
Increase in price = ` 7.50 – ` 5 = ` 2.5

∴ Required increase $\% = \frac{\text{Increase value}}{\text{Original value}} \times 100\%$

$$= \frac{2.5}{5} \times 100\,\% = \frac{250}{5}\,\% = 50\,\%$$

7. Cost of a garment = ` 700
Discount on it = 5%

∴ Required discount amount = 5% of ` 700 = ` $\frac{5}{100} \times 700$ = ` 35

8. Number of students out of 120 who got disctinction in Maths = 80

∴ Required % of students who got distinction in Maths $= \frac{80}{120} \times 100\,\%$

$$= \frac{400}{6}\,\% = 66.66\%$$

Number of students out of 100 who got distinction in English = 70

∴ Required % of students who got distinction in English $= \frac{70}{100} \times 100\,\% = 70\,\%$

Since 70% > 66.66%. Hence, English is better.

9. Class VI : Sect-A, Total students = 50
No. of students passed the exam = 45

∴ Pass student % $= \frac{45}{50} \times 100\,\% = 90\,\%$

Sect.-B Total students = 60
Failed students = 5

∴ Passed students $= 60 - 5 = 55$

Passed students % $= \frac{55}{60} \times 100\,\% = \frac{550}{6}\,\% = 91.66\%$

Since 91.66% > 90%. Hence, Sec.-B had better result.

10. Let total number of pages in the book be 100.
Govind read the pages in a day = 75%
So, the remaining pages to be read $= 100 - 75 = 25\,\%$
But it is given that 32 pages still has to read by Govind.

$\Rightarrow$ $25\,\% = 32$ pages

or, $1\,\% = \frac{32}{25}$ pages

or, $100\,\% = \frac{32}{25} \times 100$

$= 32 \times 4 = 128$ pages

Hence, total number of pages in the book = 128 pages

Exercise 8.4

1. C.P. of a dozen (or 12) eggs = ` 15
S.P. of 1 egg = ` 2.50

∴ S.P. of a dozen (or, 12) eggs = ` 2.50 × 12 = ` 30

Since S.P. > C.P. therefore, there is a profit.

Profit = S.P. – C.P.

= ` (30 – 15) = ` 15

Hence, the selling price of eggs per dozen is ` 30 having profit is ` 15.

2. C.P. of 3 chair = ` 650
Profit = ` 200
S.P. = ?

∵ S.P. = C.P. + Profit

$\therefore$ S.P. = ` (650 + 200)
= ` 850

3. S.P. of an article = ` 1250
Loss = ` 215
C.P. = ?
C.P. of the article = S.P. + Loss
= ` (1250 + 215) = ` 1465
Hence, the cost price of the article is ` 1465.

4. The C.P. of 1 kg sugar = ` 13.50 ($\because$ 1kg = 1000gm)
And cost of 500 gm packet = 25 P = ` $\frac{25}{100}$ = ` 0.25
$\therefore$ Cost of 1000 gm (i.e., 1 kg) packet = ` 0.25 × 2 = ` 0.50
Total cost of 1 kg sugar with packet = ` 13.50 + ` 0.50
= ` 14.00
$\therefore$ Total cost price of 10 kg sugar = ` 14 × 10 = ` 140
S.P. of 10 kg sugar = ` 155
Since S.P. > C.P. Therefore, there is a profit.
$\because$ Profit = S.P. – C.P.
= ` 155 – ` 140 = ` 15

5. S.P. of TV set = ` 21500
S.P. of its cabinet = ` 1800
Total S.P. of 1 set with cabinet = ` 21500 + ` 1800 = ` 23300
$\therefore$ Total S.P. of 8 such sets with cabinets = ` 23300 × 8 = ` 186400
C.P. of the TV set = ` 13500
C.P. of the cabinet = ` 1250
Total C.P. of 1 set with cabinet = ` 13500 + ` 1250 = ` 14750
$\therefore$ Total C.P. of 8 such sets with cabinets = ` 14750 × 8 = ` 118000
Since S.P. of 8 sets > C.P. of 8 sets
Therefore, there is a profit.
$\because$ profit = S.P. – C.P. = ` 186400 – ` 118000 = ` 68400

6. Cost price of defective Titan watch = ` 1550
Selling price of defective Titan watch = ` 1325
Since C.P. > S.P. Therefore, there is a loss.
Loss = C.P. – S.P. = ` 1550 – ` 1325 = ` 225

7. Cost of box = ` 670
Cost of painting it = ` 45
And cost of transport it = ` 25
$\therefore$ Total cost of box = ` 670 + ` 45 + ` 25 = ` 740
Selling price of this box = ` 1120
Since S.P. > C.P. Therefore, there is a gain.
= ` 1120 – ` 740 = ` 380

8. S.P. of old car = ` 45900, Profit = ` 2100, C.P. = ?
$\therefore$ C.P. = S.P – Profit
= ` 45900 – ` 2100 = ` 43800
If the S.P of the car be = ` 53670, then Profit = ?
$\therefore$ Profit = S.P – C.P.
= ` 53670 – ` 43800 = ` 9870
Difference on both the profits = ` 9870 – ` 2100 = ` 7770
$\therefore$ he would have got ` 7770 more profit.

9. Loss on 1000 copies of a book = ` 520
C.P. of 1 book = ` 10.50
Then, C.P. of 1000 copies of this book = ` 10.50 × 1000 = ` 10500
S.P. of 1000 books = ?

S.P. of 1000 books = C.P. of 1000 books – loss on 1000 copies of the book.
= ` 10500 – ` 520 = ` 9980

10. Cost of each (one) sweater = ` 430
S.P. of 25 sweaters = ` 14750
C.P. of 25 sweaters = ` 430 × 25 = ` 10750

∴ Total profit on 25 sweaters = S.P. of 25 sweaters – C.P. of 25 sweaters
= ` 14750 – ` 10750 = ` 4000

∴ Profit on Per (i.e. 1) sweater = ` $\frac{4000}{25}$ = ` 160

Exercise 8.5

1. (a) C.P. = ` 72 per dozen S.P. = ` 7.50 per piece
S.P. = ` 7.50 × 12 = ` 90 per dozen
Since S.P. > C.P.,
there is a profit.

$$P = S.P. - C.P. = ` 90 - ` 72 = ` 18$$

$$P\% = \frac{P}{C.P.} \times 100\% = \frac{18}{72} \times 100 = \frac{100}{4} = 25\%$$

(b) C.P = ` 4500, S.P. = ` 4250
Since S.P. < C.P, there is a loss.

$$\text{Loss (L)} = C.P. - S.P.$$
$$= ` 4500 - ` 4250 = ` 250$$

$$\text{Loss (L\%)} = \frac{L}{C.P.} \times 100\% = \frac{250}{4500} \times 100 = 5.55\ \%$$

(c) C.P. for 100 m = ` 2000, C.P. for 1 m = ` $\frac{2000}{100}$ = ` 20
S.P. for per (i.e., one) m = ` 38
Since S.P. > C.P., there is a profit.

$$P = S.P. - C.P. = ` 38 - ` 20 = ` 18$$

$$P\% = \frac{P}{C.P.} \times 100\% = \frac{18}{20} \times 100\% = 90\ \%$$

(d) C.P. = ` 2400, Loss % = 6%

$$\text{Loss \%} = \frac{\text{Loss}}{C.P.} \times 100 = \frac{\text{Loss}}{2400} \times 100$$

$$\text{Loss} = ` 24 \times 6 = ` 144, \text{ S.P.} = ?$$

by, S.P. = C.P. – Loss = ` 2400 – ` 144 = ` 2256

2. C.P. of cow = ` 8500 Loss = 3%, S.P. = ?

∵ $\text{Loss percentage} = \frac{\text{Loss}}{C.P.} \times 100$ $(\because \text{Loss} = C.P. - S.P.)$

$$3 = \frac{8500 - S.P.}{8500} \times 100$$

$$` 3 \times 85 = 8500 - S.P.$$

$$S.P. = ` (8500 - 255) = ` 8245$$

Therefore, $\text{profit} = C.P. - S.P. = ` 8500 - ` 8245 = ` 255$

Hence, the selling price of the cow is ` 8245 and profit is ` 255.

3. C.P. of an article = ` 55, Profit = 5%, S.P = ?

$\because$ $$\text{Profit \%} = \frac{\text{Profit}}{\text{C.P}} \times 100$$

$$5 = \frac{\text{S.P} - \text{C.P}}{\text{C.P}} \times 100 \qquad (\because \text{profit} = \text{S.P.} - \text{C.P.})$$

$$5 = \frac{S.P - 55}{55} \times 100$$

$$` 55 = 20\, S.P. - ` 1100$$

$$20\, S.P = ` (1100 + 55) = ` 1155$$

$$S.P = ` \frac{1155}{20} = ` 57.75$$

Hence, the S.P. of an article is ` 57.75

4. C.P. of dozen (12) Eggs = ` 24, C.P. of 1 egg = $` \frac{24}{12} = ` 2$

C.P. of 100 eggs = ` 2 × 100 = ` 200, gain = 12%

S.P. of 100 eggs = ?

$$\text{P\%} = \frac{\text{P}}{\text{C.P.}} \times 100 \qquad [\because \text{gain} = \text{profit}]$$

$$12 = \frac{\text{P}}{200} \times 100 = \frac{\text{P}}{2}$$

or, $$\text{P} = ` 12 \times 2 = ` 24$$

S.P. = C.P. + P

S.P. of 100 eggs = C.P. of 100 eggs + Profit

= 200 + 24 = ` 224

5. C.P. of 11 Bananas = ` 10, C.P. of 1 Bananas = $` \frac{10}{11}$ $\qquad \left[\frac{10}{11} = 0.90,\ \frac{11}{10} = 1.1\right]$

S.P. of 10 Banans = ` 11, S.P. of 1 Bananas = $` \frac{11}{10}$

Since S.P. of 1 Banana > C.P. of 1 Banana

Therefore, there is a profit

Hence, Profit= S.P. – C.P.

$$= \frac{11}{10} - \frac{10}{11} = \frac{11 \times 11 - 10 \times 10}{110} = \frac{121 - 100}{110} = \frac{21}{110}$$

$$\text{Profit \%} = \frac{\text{Profit}}{\text{C.P.}} \times 100 = \frac{\left(\frac{21}{110}\right)}{\left(\frac{10}{11}\right)} \times 100 = \frac{21 \times 11}{110 \times 10} \times 100 = \frac{21 \times 11}{11} = 21\ \%$$

6. S.P. of the article = ` 460, loss = 8%

C.P. of the article = ?

$\because$ $$\text{Loss \%} = \frac{\text{Loss}}{\text{C.P.}} \times 100$$

$$\text{Loss \%} = \frac{\text{C.P.} - \text{S.P}}{\text{C.P.}} \times 100$$

$$8 = \frac{\text{C.P.} - 460}{\text{C.P.}} \times 100$$

$$2 = \frac{\text{C.P.} - 460}{\text{C.P.}} \times 25$$

$$2\ \text{C.P.} = 25\,\text{C.P.} - 11500$$
$$25\ \text{C.P} - 2\ \text{C.P} = ` 11500$$
$$23\ \text{C.P} = ` 11500$$
$$\text{C.P.} = ` \frac{11500}{23} = ` 500$$

Hence, the cost price of the article is ` 500.

7. S.P. of machine = ` 2040, loss = 15%

$\because$ $$\text{Loss \%} = \frac{\text{Loss}}{\text{C.P.}} \times 100$$
$$\text{Loss \%} = \frac{\text{C.P.} - \text{S.P}}{\text{C.P.}} \times 100$$
$$15 = \frac{\text{C.P.} - 2040}{\text{C.P.}} \times 100$$
$$3 = \frac{\text{C.P.} - 2040}{\text{C.P.}} \times 20$$
$$3\ \text{C.P.} = 20\,\text{C.P.} - 40800$$
$$20\ \text{C.P} - 3\ \text{C.P} = ` 40800$$
$$17\ \text{C.P} = ` 40800$$
$$\text{C.P.} = ` \frac{40800}{17} = ` 2400$$

Now, we know that,

C.P. = ` 2400, Profit % = 10% and New S.P. = ?

$\because$ $$\text{S.P.} = ` \frac{\text{profit \%} \times \text{C.P.}}{100} + \text{C.P}$$
$$= ` \frac{10 \times 2400}{100} + ` 2400$$
$$= ` 240 + ` 2400 = ` 2640$$

Hence, new selling price of machine will be ` 2640.

8. The given,

S.P. of a few books = ` 6525, Loss % = 10 %

C.P. = ?

$$\text{Loss \%} = \frac{\text{C.P.} - \text{S.P.}}{\text{C.P}} \times 100$$
$$10 = \frac{\text{C.P} - 6225}{\text{C.P}} \times 100$$
$$\text{C.P.} = 10\,\text{C.P.} - 65250$$
$$9\ \text{C.P} = ` 65250$$
$$\text{C.P.} = ` \frac{65250}{9} = ` 7250$$

Now, we know that,

C.P. = ` 7250, Profit % = 10 % and new S.P. = ?

$\because$ $$\text{S.P.} = ` \frac{\text{profit \%} \times \text{C.P.}}{100} + \text{C.P}$$
$$= ` \frac{10 \times 7250}{100} + ` 7250$$
$$= ` 725 + ` 7250 = ` 7975$$

Hene, original cost price is ` 7250 and new S.P. is ` 7975.

9. The given
S.P. = ` 155, gains % = 25 % C.P. = ?

$\because$ $$\text{gains \%} = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P}} \times 100$$

$$25 = \frac{155 - \text{C.P.}}{\text{C.P}} \times 100$$

$$\text{C.P.} = 4 \times 155 - 4\,\text{C.P}$$

$$5\,\text{C.P} = 620$$

$\Rightarrow$ $$\text{C.P.} = \frac{620}{5} = 124$$

Therefore, the C.P. of 1 metre of silk cloth = ` 124
$\therefore$ The C.P. of 200 metres of silk cloth = ` $124 \times 200$ = ` 24800
Similarly,
The S.P of 200 metres of silk cloth = ` $155 \times 200$ = ` 31000
The profit = S.P − C.P = ` 31000 − ` 24800 = ` 6200
Hence, the actual profit is 6200 by selling 200 m of the silk cloth.

10. The S.P. of an article = ` 368, Loss % = 8%, C.P. = ?

$$\text{Loss \%} = \frac{\text{C.P.} - \text{S.P.}}{\text{C.P}} \times 100$$

$$8 = \frac{\text{C.P} - 368}{\text{C.P}} \times 100$$

$$2\text{C.P.} = 25\,\text{C.P.} - 9200$$

$$23\,\text{C.P} = 9200$$

$$\text{C.P.} = \frac{9200}{23} = 400$$

Now, we know that,
C.P. = ` 400, gain % = 10 % and new S.P. = ?

$\because$ $$\text{S.P.} = \frac{\text{gaint \%} \times \text{C.P.}}{100} + \text{C.P}$$

$$= \frac{10 \times 400}{100} + 400 = 40 + 400 = 440$$

11. Total C.P. of an air cooler = ` $(1500 + 575)$ = ` 2075
Profit = 4% and S.P. = ?

$\because$ $$\text{Profit \%} = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P}} \times 100$$

$\therefore$ $$4 = \frac{\text{S.P} - 2075}{2075} \times 100$$

$$4 \times 2075 = (S.P. - 2075) \times 100$$

$$83 = \text{S.P.} - 2075$$

$$\text{S.P.} = 2075 + 83 = 2158$$

12. C.P of per (i.e., 1) sack of rice = ` 1500
And C.P. of per 3 sacks of rice = ` $1500 \times 3$ = ` 4500
Cost of transporting them = ` 125
$\therefore$ total C.P. of sacks of rice = ` 4500 + ` 125 = ` 4625
S.P. of all three sacks = ` 5087.50
Since S.P > C.P, there is a profit.
(a) Profit = ` $(5087.50 - 4625)$

$= ₹\ 462.50$

(b) $P\% = \frac{P}{C.P.} \times 100$

$= \frac{462.5}{4625} \times 100 = 10\%$

13. The C.P of soda set = ₹ 22000

Profit % = 8%, S.P. = ?

$\because$ $\text{Profit \%} = \frac{S.P. - C.P.}{C.P} \times 100$

$\therefore$ $8 = \frac{S.P - 22000}{22000} \times 100$

$₹\ 8 \times 220 = S.P. - ₹\ 22000$

$S.P. = ₹\ 22000 + ₹\ 1760 = ₹\ 23760$

Hnce, the selling price is ₹ 23760

14. The selling price (S.P.) of an almirah = ₹ 4000, Loss % = ₹20%

C.P = ?

$\because$ $\text{Loss \%} = \frac{C.P. - S.P.}{C.P} \times 100$

$20 = \frac{C.P - 4000}{C.P} \times 100$

$C.P. = 5\,C.P. - ₹\ 20000$

$4\,C.P = ₹\ 20000$

$C.P. = 5000$

Hence, the cost price of the almirah is ₹ 5000.

15. $\because$ Each (i.e., one) crates having eggs = 10

$\therefore$ 40 crates having eggs $= 40 \times 10 = 400$

Now, C.P. of 40 crates of eggs (i.e., 400 eggs) = ₹ 400

But on the way, number of eggs were broken = 25

$\therefore$ Remaining eggs $= 400 - 25 = 375$

Given, S.P. of one (i.e., each) egg = ₹ 1.20

S.P. of 375 eggs = ₹ 1.20 × 375 = ₹ 450

Since S.P. > C.P. therefore, there is a profit.

$P = S.P. - C.P. = ₹\ 450 - ₹\ 400 = ₹\ 50$

$P\% = \frac{P}{C.P.} \times 100 = \frac{50}{400} \times 100 = \frac{50}{4} = 12\frac{1}{2}\%$

Exercise 8.6

1. (a) P = ₹ 1500, R = 5.5%, I = 16.50, T = (in days)?

by $I = \frac{P \times R \times T}{100}$,

We have $T = \frac{I \times 100}{P \times R} = \frac{16.50 \times 100}{1500 \times 5.5}$

$= \frac{1}{5}$ years $[\because 1 \text{year} = 365 \text{days}]$

$= \frac{1}{5} \times 365$ days

$\therefore$ $T = 73$ days

(b) $P = ₹\ 3800,\ R = 4\%,\ I = 60.80,\ T = (\text{in days})?$

by $I = \dfrac{PRT}{100}$

We have $T = \dfrac{I \times 100}{PR}$ year

$= \dfrac{60.80 \times 100}{3800 \times 4} = \dfrac{60.80}{38 \times 4}$

$= \dfrac{15.2}{38} = 0.4$ years

$= 0.4 \times 365$ days $[\because 1 \text{year} = 365 \text{days}]$

$\therefore$ $T = 146$ days

2. (a) Here, $I = ₹\ 3500,\ T = 5$ years, $R = 14\%$

by $P = \dfrac{I \times 100}{R \times T} = \dfrac{3500 \times 100}{14 \times 5} = \dfrac{700 \times 100}{14}$

$\therefore$ $P = ₹\ 5000$

(b) $I = ₹\ 2304,\ T = 4$ years, $R = 12\%$

by $P = \dfrac{I \times 100}{RT} = \dfrac{2304 \times 100}{12 \times 4} = \dfrac{192 \times 100}{4}$

$\therefore$ $P = 48 \times 100 = ₹\ 4800$

(c) $I = ₹\ 1650,\ T = 3$ years, $R = 10\%$

by $P = \dfrac{I \times 100}{RT} = \dfrac{1650 \times 100}{10 \times 3} = 5500$

$\therefore$ $P = ₹\ 5500$

3. $P_1 = ₹\ 5600,\ T_1 = 8$ year, $R_1 = 6\%,\ I_1 = ?$

$I_1 = \dfrac{P_1 R_1 T_1}{100} = \dfrac{5600 \times 6 \times 8}{100} = ₹\ 2688$

$P_2 = ₹\ 5000,\ T_2 = 10$ year, $R_2 = 5\%,\ I_2 = ?$

$I_2 = \dfrac{P_2 R_2 T_2}{100} = \dfrac{5000 \times 5 \times 10}{100}$

$= 50 \times 50 = ₹\ 2500$

Clearly, ₹ 2688 > ₹ 2500

Hence, first investment is better

4. Here, we have to given Principal (P) = ₹ 876, Rate (R) = 4 %

Time (T) = 8 months $= \dfrac{8}{12}$ years

$[\because$ 1 year = 12 months, so 1 month $= \dfrac{1}{12}$ year$]$

$\because$ S.I. $= \dfrac{PRT}{100} = \dfrac{876 \times 4 \times 8}{100 \times 12} = \dfrac{73 \times 4 \times 8}{100} = \dfrac{2336}{100} = ₹\ 23.36$

5. $P = ₹\ 800,\ R = 5\%,\ T = 146$ days $= \dfrac{146}{365}$ years $= \dfrac{2}{5}$ years

I (or, S.I.) $= \dfrac{PRT}{100} = \dfrac{800 \times 5 \times 2}{100 \times 5} = ₹\ 16$

6. (a) $P = ?,\ T = 2\dfrac{1}{2}$ year $= \dfrac{5}{2}$ year, $R = ?,\ I = ₹\ 120,\ A = ₹\ 520$

$\because \quad I = \frac{PRT}{100}$

$120 = \frac{P \times R \times 5}{100 \times 2}$

$P \times R = ` \frac{120 \times 200}{5}$

$P \times R = ` 4800 \quad \ldots (1)$

$\because \quad A = P + I$

$\Rightarrow \quad ` 520 = P + ` 120$

$\therefore \quad P = ` 520 - ` 120 = ` 400$

Put $P = ` 400$ in equation (1), we get

$400 \times R = ` 4800$

$R = \frac{48000}{400} \quad \Rightarrow \quad R = 12\%$

(b) $P = ` 1000, T = 4$ years, $R = 5\%$, , $I = ?, A = ?$

$I = \frac{PRT}{100} = \frac{1000 \times 5 \times 4}{100} = ` 200$

$A = P + I = ` 1000 + ` 200 = ` 1200$

(c) $T = 3$ years, $R = 6\%$, $I = ` 72, P = ?, A = ?$

$\because \quad I = \frac{PRT}{100}$

$72 = \frac{P \times 6 \times 3}{100}$

$P = \frac{72 \times 100}{6 \times 3} = ` 400$

$\because \quad A = P + I = ` 400 + ` 72 = ` 472$

(d) $P = ` 1250, R = 14\%, I = ` 700, T = ?, A = ?$

$I = \frac{PRT}{100} = \frac{1250 \times 14 \times T}{100}$

$700 = \frac{1250 \times 14 \times T}{100}$

$T = \frac{700 \times 10}{125 \times 14} = 4$ years

$A = P + I = ` 1250 + ` 700 = ` 1950$

(e) $P = ` 3000, T = 3\frac{1}{2}$ years $= \frac{7}{2}$ years, $R = 14\%, I = ?, A = ?$

$I = \frac{PRT}{100} = \frac{3000 \times 14 \times 7}{100 \times 2} = 30 \times 7 \times 7 = ` 1470$

$A = P + I = ` 3000 + ` 1470 = ` 4470$

7. Here, we have to given

$P = ` 1200, \qquad R = 4\frac{1}{2}\% = \frac{9}{2}\%,$

$T = 1$ year 5 months $= \left(1 + \frac{5}{12}\right)$ year $= \frac{17}{12}$ year

$S.I. = \frac{PRT}{100} = \frac{1200 \times 9 \times 17}{100 \times 2 \times 12} = \frac{9 \times 17}{2} = \frac{153}{2} = ` 76.5$

Total Amount $= P + I = ` 1200 + ` 76.5 = ` 1276.5$

8. $P = ` 1000, R = 10\%, T = ?, A = ?$

Time = days from January 1st to August 7th

= January + February + March + April + May + June + July + August

$= 30 + 28 + 31 + 30 + 31 + 30 + 31 + 7 = 219$ days $= \frac{219}{365}$ year ($\because$ year = 3 days)

$$I = \frac{P \times R \times T}{100} = \frac{1000 \times 10 \times 219}{100 \times 365} = \frac{21900}{365} = ` 60$$

$\therefore$ Amount $(A) = P + I = ` 1000 + ` 60 = ` 1060$

Hence, Total amount that 'A' pay after 219 days is ` 1060.

9. **For first Person :** $P = ` 20000, R = 8\%, T = 5$ years

$\therefore$ Interest for First Person $(I_1) = \frac{PRT}{100} = \frac{20000 \times 8 \times 5}{100} = 200 \times 40 = ` 8000$

For client : $P = ` 20,000, T = 5$ years, $R = 14\%$

$\therefore$ Interest for client $(I_2) = \frac{PRT}{100} = \frac{20000 \times 14 \times 5}{100} = 200 \times 700 = ` 14000$

$\therefore$ Money gained by the person in the transaction after 5 years

$= ` 14000 - ` 8000 = ` 6000$

10. $P = ` 50000, A = ` 102500, R = 21\%, I = ?, T = ?$

By $A = P + I,$

We have $I = A - P = ` 102500 - ` 50000 = ` 52500$

By $I = \frac{P \times R \times T}{100},$

We have $52500 = \frac{50000 \times 21 \times T}{100}$

$$T = \frac{52500}{500 \times 21} = \frac{525}{105} = 5 \text{ years}$$

11. $P = ` 6000, I = ` 360, R = 15\%, T = ?$

by $I = \frac{PRT}{100},$

We have $T = \frac{I \times 100}{PR} = \frac{360 \times 100}{6000 \times 15}$

$= \frac{6}{15} = \frac{2}{5}$ year $= \frac{2}{5} \times 365$ days $\quad [\because 1 \text{year} = 365 \text{days}]$

$\therefore \quad T = 2 \times 73$

$= 146$ days

12. $I = ` 17355, R = 15\%$ p.a., $T = 1$ year, $P = ?$

by $I = \frac{PRT}{100},$

We have $P = \frac{I \times 100}{R \times T} = \frac{17355 \times 100}{15 \times 1}$

$\therefore \quad P = ` 115700$

MCQ's

1. (d) **2.** (c) **3.** (b) **4.** (a) **5.** (b) **6.** (c) **7.** (a) **8.** (a) **9.** (b) **10.** (b)