Chapter 13: Topics in Commercial Arithmetic (Transactions, Percentage, Profit and Loss)

Class Work (Page 216)

1. Cost of 15 candles = ₹45

Cost of 12 candles = $\frac{₹45^{3}}{\cancel{15}} \times 12 = ₹36$

2. Cost of 12 bananas = ₹ 36

Cost of 8 bananas = $\frac{₹\cancel{36}^{3}}{\cancel{12}} \times 8 = ₹24$

Class Work (Page 217)

1. Cost of 20 stickers = ₹60

Cost of 1 sticker = $\frac{₹60}{20} = ₹3$

First one is a better buy

or

Cost of 12 stickers = ₹48

Cost of 1 sticker = $\frac{₹48}{12} = ₹4$

2. Cost of 10 bananas = ₹15

Cost of 1 banana = $\frac{₹15}{10} = ₹1.50$

First one is a better buy

or

Cost of 5 bananas = ₹8

Cost of 1 banana = $\frac{₹8}{5} = ₹1.60$

Exercise 13A

1. Cost of 24 ballpens = ₹56

Cost of 18 ballpens = $\frac{₹\cancel{56}^{14}}{\cancel{24}_{4}} \times \cancel{18}^{3} = ₹42$

2. In 6 weeks a man earns = ₹3,900

In 10 weeks a man earns = $\frac{₹\cancel{3,900}^{650}}{\cancel{6}} \times 10 = ₹6,500$

3. Cost of 3 L of petrol = ₹290.16

Cost of 10 L of petrol = $\frac{₹\cancel{290.16}^{96.72}}{\cancel{3}} \times 10 = ₹967.20$

4. Cost of 5 shaving blades = ₹56.25

Cost of 12 shaving blades = $\frac{₹\cancel{56.25}^{11.25}}{\cancel{5}} \times 12 = ₹135.00$

5. Cost of 12 oranges = ₹24.60

Cost of 5 oranges = $\frac{₹\cancel{24.60}^{2.05}}{\cancel{12}} \times 5 = ₹10.25$

6. Cost of 720 pens = ₹2160

Cost of 43 pens = $\frac{₹\cancel{2160}^{3}}{\cancel{720}} \times 43 = ₹129$

(5 gross = 144 × 5 = 720)

7. Cost of 160 bananas = ₹192

Cost of 35 bananas = $\frac{₹\cancel{192}^{6}}{\cancel{160}_{\cancel{32}}} \times \cancel{35}^{17} = ₹102$

(8 scores = 8 × 20 = 160)

8. Cost of 24 notebooks = ₹288

Cost of 20 notebooks = $\frac{₹\cancel{288}}{\cancel{24}_{\cancel{6}}^{48}} \times \cancel{20}^{5} = ₹240$

9. Cost of 3 kg of apples = ₹105

Cost of 1 kg of apple = $\frac{₹\cancel{105}}{\cancel{3}}^{35} = ₹35$

First one is a better buy

or

Cost of 5 kg of apples = ₹180

Cost of 1 kg of apple = $\frac{₹\cancel{180}}{\cancel{5}}^{36} = ₹36$

10. (d) 1 L pack of juice costs = $\frac{₹600}{10} = ₹60$

Class Work (Page 218)

1. (a) 54 girls out of 100 = $\frac{54}{100} = 54\%$

(b) 86 wins out of 100 games played = $\frac{86}{100} = 86\%$

(c) ₹17 off on every ₹100 = $\frac{17}{100} = 17\%$

2. (a) Shaded square = 47

(b) Fraction shaded = $\frac{47}{100}$

(c) Decimal = 0.47

(d) Per cent = 47%

Exercise 13B

1. (a) $\frac{35}{100} = 35\%$ (b) $\frac{67}{100} = 67\%$ (c) $\frac{88}{100} = 88\%$ (d) $\frac{24}{100} = 24\%$

(e) $\frac{32}{100} = 32\%$ (f) $\frac{98}{100} = 98\%$

2. (a) $\frac{4}{5} = \frac{4 \times 20}{5 \times 20} = \frac{80}{100} = 80\%$

(b) $\frac{9}{10} = \frac{9 \times 10}{10 \times 10} = \frac{90}{100} = 90\%$

(c) $\frac{12}{25} = \frac{12 \times 4}{25 \times 4} = \frac{48}{100} = 48\%$

(d) $5\frac{1}{5} = \frac{26 \times 20}{5 \times 20} = \frac{520}{100} = 520\%$

(e) $\frac{13}{50} = \frac{13 \times 2}{50 \times 2} = \frac{26}{100} = 26\%$

(f) $\frac{5 \times 100}{18 \times 100} = \frac{\cancel{500}^{250}}{\cancel{18} \times 100_{9}} = 27\frac{7}{9}\%$

3. (a) $7 \times 100 = 700\%$

(b) $18 \times 100 = 1800\%$

(c) $140 \times 100 = 14000\%$

(d) $2.8 \times 100 = 280\%$

(e) $0.35 \times 100 = 35\%$

(f) $9.83 \times 100 = 983\%$

4. (a) $20\% = \frac{20}{100}$ (b) $58\% = \frac{58}{100}$ (c) $69\% = \frac{69}{100}$ (d) $92\% = \frac{92}{100}$

(e) $480\% = \frac{480}{100}$ (f) $216\% = \frac{216}{100}$

5. (a) $18\% = \frac{\cancel{18}^{9}}{\cancel{100}_{50}} = \frac{9}{50}$ (b) $12.5\% = \frac{\cancel{125}^{\cancel{5}1}}{\cancel{1000}_{\cancel{40}8}} = \frac{1}{8}$ (c) $14\frac{1}{2}\% = \frac{\cancel{145}^{29}}{\cancel{1000}_{200}} = \frac{29}{200}$

(d) $92.3\% = \frac{923}{1000}$ (e) $22\frac{1}{2}\% = \frac{\cancel{225}^{9}}{\cancel{1000}_{40}} = \frac{9}{40}$ (f) $208\frac{1}{2}\% = \frac{\cancel{2085}^{417}}{\cancel{1000}_{200}} = 2\frac{17}{200}$

6. (a) $0.59 = \frac{59}{100} = 59\%$ (b) $0.67 = \frac{67}{100} = 67\%$ (c) $0.03 = \frac{3}{100} = 3\%$

(d) $2.51 = \frac{251}{100} = 251\%$ (e) $7.31 = \frac{731}{100} = 731\%$ (f) $7.84 = \frac{784}{100} = 784\%$

7. (a) $9\% = \frac{9}{100} = 0.09$ (b) $55\% = \frac{55}{100} = 0.55$ (c) $89\% = \frac{89}{100} = 0.89$

(d) $325\% = \frac{325}{100} = 3.25$ (e) $8.9\% = \frac{8.9}{100} = 0.089$ (f) $38.2\% = \frac{38.2}{100} = 0.382$

8. (a) The word 'per cent' means <u>per hundred</u> (b) $\frac{97}{100}$ is the same as <u>97%</u>

(c) 32% means $\frac{32}{100}$ (d) The symbol % is the sign for <u>per cent</u>.

9. (b) $(3.07 \times 100 = 307\%)$ **10.** (b) $\left(\frac{23}{50} = \frac{23 \times 3}{50 \times 2} = \frac{46}{100} = 46\%\right)$

Class Work (Page 221)

1. (a) $30\% \text{ of } 50 = \frac{\cancel{30}^{15}}{\cancel{100}_{\cancel{2}}} \times \cancel{50} = 15$ (b) $50\% \text{ of } 24 \text{ kg} = \frac{\cancel{50}}{\cancel{100}_{\cancel{2}}} \times \cancel{24}^{12} = 12 \text{ kg}$

2. $\frac{0.8}{\cancel{10}} \times \cancel{100}^{10} = 8.0\%$ 3. $\frac{35 \text{ p}}{₹1.75} \times 100 = \frac{\cancel{35}\text{p}^{5}}{\cancel{175}\text{p}_{\cancel{7}}} \times \cancel{100}^{4} = 20\%$

Exercise 13C

1. (a) $30\% \text{ of } 20 = \frac{\cancel{30}^{6}}{\cancel{100}_{\cancel{5}}} \times \cancel{20} = 6$ (b) $60\% \text{ of } 150 = \frac{6\cancel{0}}{1\cancel{0}\cancel{0}} \times 15\cancel{0} = 90$

(c) $2.5\% \text{ of } 300 = \frac{2.5}{\cancel{100}} \times \cancel{300}^{3} = 7.5$ (d) $4\frac{1}{2}\% \text{ of } 800 = \frac{9}{\cancel{2} \times \cancel{100}} \times \cancel{800}^{\cancel{8}4} = 36$

(e) $6\% \text{ of } ₹5 = \frac{\cancel{6}^{3}}{\cancel{100}\cancel{20}_{10}} \times ₹\cancel{5} = ₹0.30 = 30 \text{ p}$ (f) $15\% \text{ of } 4 \text{ kg} = \frac{\cancel{15}^{3}}{\cancel{100}\cancel{25}_{5}} \times \cancel{4} \text{ kg} = \frac{3}{5} \text{ kg} = 600 \text{ g}$

(g) $2\frac{1}{4}\% \text{ of } 400 \text{ mL} = \frac{9}{\cancel{4} \times \cancel{100}} \times \cancel{400}^{\cancel{4}} \text{ mL} = 9 \text{ mL}$

(h) $4\frac{1}{5}\% \text{ of } 250 \text{ m} = \frac{21}{\cancel{5} \times \cancel{100}_{2}} \times \cancel{250}^{\cancel{5}} \text{ m} = \frac{21 \text{ m}}{2} = 10.5 \text{ m}$

(i) 150% of 2 kg $= \frac{\cancel{150}^{3}}{\cancel{100}_{\cancel{8}}} \times \cancel{2}$ kg $= 3$ kg

(j) 62.5% of 10 L $= \frac{62.5}{\cancel{100}_{10}} \times \cancel{10} = 6.25$ L

(k) 9% of 1 tonne $= \frac{9}{1\cancel{00}} \times 10\cancel{00}$ kg $= 90$ kg

(l) 70% of a quintal $= \frac{70}{\cancel{100}} \times \cancel{100}$ kg $= 70$ kg

2. (a) 8% of 500 $= \frac{8}{\cancel{100}} \times \cancel{500}^{5} = 40$, 12% of 400 $= \frac{12}{\cancel{100}} \times \cancel{400}^{4} = 48$, 12% of 400 is more.

(b) 12% of 900 $= \frac{12}{1\cancel{00}} \times 9\cancel{00} = 108$, 7% of 1200 $= \frac{7}{1\cancel{00}} \times 12\cancel{00} = 84$, 12% of 900 is more.

3. (a) $\frac{5}{\cancel{20}} \times \cancel{100}^{5} = 25\%$ (b) $\frac{\cancel{140}^{70}}{\cancel{200}_{\cancel{2}}} \times \cancel{100} = 70\%$ (c) $\frac{\cancel{18}}{\cancel{36}\cancel{0}_{\cancel{2}}} \times \cancel{10}\cancel{0}^{5} = 5\%$

(d) $\frac{\cancel{12}^{4}}{\cancel{75}_{\cancel{3}}} \times \cancel{100}^{4} = 16\%$

4. (a) $\frac{\cancel{₹7}}{\cancel{21}\cancel{0}_{3}} \times 10\cancel{0} = \frac{10}{3}\% = 3\frac{1}{3}\%$ (b) $\frac{\cancel{24}\,\text{min}}{\cancel{120}\,\text{min}_{\cancel{5}}} \times \cancel{100}^{20} = 20\%$

(c) $\frac{\cancel{15}\text{L}^{3}}{\cancel{35}\text{L}_{7}} \times 100 = \frac{300}{7} = 42\frac{6}{7}\%$ (d) $\frac{\cancel{75}\text{g}^{25}}{\cancel{45}\cancel{0}\text{g}\cancel{0}_{3}} \times \cancel{10}\cancel{0}^{2} = \frac{50}{3}\% = 16\frac{2}{3}\%$

Exercise 13D

1. In 'INDIA' vowels = 3. Percentage $= \frac{3}{\cancel{5}} \times \cancel{100}^{20} = 60\%$

2. Tarun get votes = 60% of 300 $= \frac{60}{\cancel{100}} \times \cancel{300}^{3} = 180$ votes

3. Percentage of seats occupied $= \frac{\cancel{240}^{80}}{\cancel{300}_{\cancel{5}}} \times \cancel{100} = 80\%$

4. Students who come to school by bus = 60% of 520 $= \frac{6\cancel{0}}{1\cancel{0}\cancel{0}} \times 52\cancel{0} = 312$

5. Vikram gave his mother = 30% of ₹3500 $= \frac{30}{1\cancel{00}} \times 35\cancel{00} =$ ₹1050

6. Copper = 70% of 150 kg $= \frac{7\cancel{0}}{1\cancel{0}\cancel{0}} \times 15\cancel{0} = 105$ kg

7. Girls = 70% of 50 $= \frac{\cancel{70}^{35}}{\cancel{100}_{\cancel{2}}} \times \cancel{50} = 35$ $\therefore$ Boys $= 50 - 35 = 15$

8. Questions to be answered correctly $= \frac{\cancel{45}^{9}}{\cancel{10}\cancel{0}_{\cancel{5}}} \times \cancel{8}\cancel{0}^{4} = 36$

9. Total numbers are 10 (1, 2, 3, 4, 5, 6, 7, 9, 11, 12)

(a) Percentage of even numbers $= \frac{4}{\cancel{10}} \times \cancel{100}^{10} = 40\%$

(b) Percentage of greater than 4 $= \frac{6}{\cancel{10}} \times \cancel{100}^{10} = 60\%$

(c) Percentage of less than 10 $= \frac{8}{\cancel{10}} \times \cancel{100}^{10} = 80\%$

10. (b) $\left(\frac{39}{\cancel{50}} \times \cancel{100}^{2} = 78\%\right)$

11. (d) $\left(\frac{\cancel{26}^{13}}{\cancel{40}\ \cancel{2}} \times \cancel{100}^{5} = 65\%\right)$

Challenge!

(c) Weight of a person = 75% of 80 kg $= \frac{\cancel{75}^{3}}{\cancel{100}\ \cancel{4}} \times \cancel{80}^{20} = 60$ kg

Weight of water = 70% of 60 kg $= \frac{70}{100} \times 60$ kg $= 42$ kg

Class Work (Page 226)

1. CP = ₹70, SP = ₹80, Profit = ₹80 – ₹70 = ₹10
2. CP = ₹510, SP = ₹548, Profit = ₹548 – ₹510 = ₹38
3. CP = ₹475, SP = ₹462, Loss = ₹475 – ₹462 = ₹13
4. CP = ₹125.50, SP = ₹128.15, Profit = ₹128.15 – ₹125.50 = ₹2.65

Class Work (Page 227)

1. CP = ₹400, Profit = ₹25, SP = ₹400 + ₹25 = ₹425
2. CP = ₹180.30, Loss = ₹15.45, SP = ₹180.30 – ₹15.45 = ₹164.85
3. SP = ₹765, Profit = ₹45, CP = ₹765 – ₹45 = ₹720
4. SP = ₹1045.25, Loss = ₹46.85, CP = ₹1045.25 + ₹46.85 = ₹1092.10

Exercise 13E

1. (a) CP = ₹150, SP = ₹275, Profit = ₹275 – ₹150 = ₹125
   (b) CP = ₹185.75, SP = ₹172.50, Loss = ₹185.75 – ₹172.50 = ₹13.25
   (c) CP = ₹200, SP = ₹315.50, Profit = ₹315.50 – ₹200 = ₹115.50
   (d) CP = ₹65.85, SP = ₹55.25, Loss = ₹65.85 – ₹55.25 = ₹10.60
2. CP = ₹12000, SP = ₹13510, Profit = ₹13510 – ₹12000 = ₹1510
3. CP = ₹1150, SP = ₹1070, Loss = ₹1150 – ₹1070 = ₹80
4. Total cost of 20 TV sets = ₹7150 × 20 = ₹143000
   Total CP with cartage = ₹143000 + ₹360 = ₹143360
   Total SP of 20 TV sets = ₹7500 × 20 = ₹150000
   Profit = ₹150000 – ₹143360 = ₹6640

5. CP of 100 pens = ₹350, CP of 1 pen = $\frac{₹350}{100}$ = ₹3.50

SP of 8 pens = ₹40, SP of 1 pen = $\frac{₹40}{8}$ = ₹5.00

Profit = ₹5.00 – ₹3.50 = ₹1.50

6. (a) Cost price = ₹508 + ₹95 = ₹603

SP = ₹615, Cartage = ₹615 – ₹603 = ₹12

(b) SP = CP + Cartage – Loss = ₹325 + ₹15 – ₹30 = ₹310

(c) CP = SP – Cartage + Loss = ₹56.10 – ₹3.15 + ₹4.28 = ₹57.23

(d) SP = CP + Cartage + Profit = ₹1600 + ₹18 + ₹162 = ₹1780

(e) CP = SP – Profit – Cartage = ₹217.68 – ₹21.75 – ₹7.13 = ₹188.80

7. SP = ₹2140, Profit = ₹153 ∴ CP = ₹2140 – ₹153 = ₹1987

8. CP = ₹312, Profit = ₹58 ∴ SP = ₹312 + ₹58 = ₹370

9. CP = ₹97.50, Loss = ₹12.35 ∴ SP = ₹97.50 – ₹12.35 = ₹85.15

10. (b) (₹1875 + ₹176 = ₹2051 CP)

11. (C) Remaining mangoes must be sold at $\frac{₹1360}{17}$ = ₹80 per kg

Exercise 13F

1. CP = ₹500, SP = ₹550. Profit = ₹550 – ₹500 = ₹50. Profit % = $\frac{\text{Profit}}{\text{CP}} \times 100 = \frac{\cancel{50}^{10}}{\cancel{500}_{\cancel{5}}} \times \cancel{100} = 10\%$

2. CP = ₹50, SP = ₹80, Profit = ₹80 – ₹50 = ₹30. Profit % = $\frac{\text{Profit}}{\text{CP}} \times 100 = \frac{30}{\cancel{50}} \times \cancel{100}^{2} = 60\%$

3. CP = ₹1125, SP = ₹900, Loss = ₹1125 – ₹900 = ₹225. Loss % = $\frac{\text{Loss}}{\text{CP}} \times 100 = \frac{\cancel{225}^{5}}{\cancel{1125}_{\cancel{45}}} \times \cancel{100}^{4}$ = 20%

4. Cost of 1 card = $\frac{₹850}{100}$ = ₹8.50. SP of 1 card = $\frac{₹136}{10}$ = ₹13.60

Profit = ₹13.60 – ₹8.50 = ₹5.10. Profit % = $\frac{\text{Profit}}{\text{CP}} \times 100 = ₹\frac{\cancel{5.10}^{3}}{\cancel{8.50}_{\cancel{5}}} \times \cancel{100}^{20} = 60\%$

Mental Maths

1. (a) $18\% = \frac{\cancel{18}^{9}}{\cancel{100}_{50}} = \frac{9}{50}$ (b) $0.75 = 0.75 \times 100 = 75\%$

2. 15% of 200 = $\frac{15}{\cancel{100}} \times \cancel{200}^{2} = 30.$

3. Percentage of letter o = $\frac{2}{\cancel{4}} \times \cancel{100}^{25} = 50\%$

4. Cost of 12 ballpens = ₹60, Cost of 1 ballpen = $\frac{₹60}{12}$ = ₹5

5. CP = ₹400, SP = ₹500, Profit = ₹500 – ₹400 = ₹100

6. SP = ₹540, Loss = ₹60, CP = ₹540 + ₹60 = ₹600

Chapter Test

1. (a) $2\frac{1}{4} = \frac{9}{\cancel{4}} \times \cancel{100}^{25} = 225\%$

(b) 12% of 1.2 kg = $\frac{12}{\cancel{100}} \times \cancel{1200}\,\text{g}^{12} = 144$ g

(c) $0.035 \times 100 = 3.5\%$

(d) $\frac{16\cancel{0}}{25\cancel{0}} \times \cancel{100}^{4} = 64\%$

2. (a) Cost of one pack = $\frac{₹100}{20}$ = ₹5

(b) Cost of 15 packs = ₹5 × 15 = ₹75

3. Per cent of flour = $\frac{15 \text{ kg}}{\cancel{50}\text{ kg}} \times \cancel{100}^{2} = 30\%$

4. Discount = 10% of ₹248 = $\frac{1\cancel{0}}{10\cancel{0}} \times$ ₹248 = ₹24.80

Price of book after discount = ₹248 – ₹24.80 = ₹223.20

5. Points scored by Sameer = 72% of 600 = $\frac{72}{\cancel{100}} \times \cancel{600}^{6} = 432$

Total points scored by Rahul and Sameer = 600 + 432 = 1032

6. CP = ₹500, SP = ₹400, Loss = ₹500 – ₹400 = ₹100

7. (a) $\frac{4}{\cancel{5}} \times \cancel{100}^{20} = 80\%$

8. (a) $\frac{\cancel{4}}{\cancel{400}_{\cancel{4}}} \times \cancel{100}^{1} = 1\%$

9. (a) Good apples = $\frac{8\cancel{0}}{1\cancel{0}\cancel{0}} \times 4\cancel{0} = 32$; Red apples = $\cancel{32}^{8} \times \frac{\cancel{75}^{3}}{\cancel{100}_{\cancel{4}}} = 24$; Green apples = 32 – 24 = 8

10. (b) Profit = ₹45,00,000 – ₹42,79,890 = ₹2,20,110

11. (c) Profit % = $\frac{\cancel{90}^{5}}{\cancel{18}\,\cancel{00}} \times 1\cancel{00} = 5\%$

12. (d) Cost of 1 pencil = ₹32.5 ÷ 5 = ₹6.50

Challenge!

Discount on bag = 40% of ₹300 = $\frac{40}{\cancel{100}} \times \cancel{300}^{3} =$ ₹120; Cost of bag for Manasi = ₹300 – ₹120 = ₹180

Manasi pays 50% of ₹180 = $\frac{5\cancel{0}}{1\cancel{0}\cancel{0}} \times$ ₹18$\cancel{0}$ = ₹90

Worksheet

1.

	(a)	(b)	(c)
Fraction =	$\frac{4}{8}=\frac{1}{2}$	$\frac{3}{10}$	$\frac{9}{36}=\frac{1}{4}$
Decimal =	0.5	0.3	0.25
Percentage =	$0.5 \times 100 = 50\%$	$0.3 \times 100 = 30\%$	$0.25 \times 100 = 25\%$

2. Sold bracelets = 64% of 200 $= \frac{64}{\cancel{100}} \times \cancel{200}^{2} = 128$

SP of 128 bracelets = 128 × ₹60 = ₹7680

CP of 200 bracelets = ₹9000, Cost of 1 bracelet $= \frac{₹9000}{200} = ₹45$

CP of 128 bracelets = 128 × ₹45 = ₹5760

Profit on the sold bracelets = ₹7680 − ₹5760 = ₹1920