4. 72 note books weigh 8 kg

1 " " $\frac{8}{72}$ kg

8 " " $\frac{\overset{9}{\cancel{8}}}{\underset{8}{\cancel{72}}}$ $\cancel{81}$ kg

9 kg

8 kg of weight is of 72 note books

1 kg " " $\frac{72}{8}$ note books

6 " " $\frac{\overset{9}{\cancel{72}}}{\cancel{8}}$ 6 Note books

54 Note books

5. A worker paid ₹ 1110 for 6 days working

" " ₹ 1 " $\frac{6}{1110}$ " "

" " ₹ 4625 " $\frac{6}{1110}$ 4625 working

A worker paid ₹ 4625 for 25 days of working.

6. For 900 km travelling cost ₹ 280

" 1 " " ₹ $\frac{280}{900}$

" 360 " " ₹ $\frac{280}{900}$ 360

" " " " ₹ 112

7. A train covers 51 km in 45 minutes

" " 1 " " $\frac{45}{51}$ minutes

" " 221 km " $\frac{45}{51}$ 221 minutes

" " 221 km " 195 minutes

or 3 hr 24 minutes

8. 162 gm weight is of 6 sheets

1 gm " " $\frac{6}{162}$ sheets

13500 " " $\frac{6}{162}$ 13500 sheets

or 13.5kg " 500 sheets

9. (i) In 15 months clerk earns ₹ 18000

In 1 " " ₹ $\frac{18000}{15}$

" 7 " " $\frac{18000 \quad 7}{15}$

" " " = ₹ 8400

(ii) ₹ 1800 is earned by a clerk in 15 months

" " " $\frac{15}{18000}$ months

₹ 30000 " $\frac{15}{18\cancel{000}}$ $\cancel{30000}$ months

25 Months

10. 25 bags of rice weighing 40kg cost ₹ 7750

1 " " " 40 kg " ₹ $\frac{7750}{25}$

" " " 1 kg ₹ $\frac{7750}{25 \quad 40}$

36 " " " 50 kg ₹ $\frac{7750 \quad 36 \quad \overset{2}{\cancel{50}}}{\cancel{25} \quad \cancel{40}_{20}}$

36 bags for rice weighing 40kg cost ₹ 13950

11. Price of 3 Pencils or 5 rubbes ₹ 15

" " 1 pencils or 5 rubbers ₹ $\frac{15}{3}$

" " " 1 rubber $\frac{15}{3 \quad 5}$

" 4 " 3 rubber $\frac{15}{3 \quad 5}$ 4 3

Price of 4 Pencils or 3 rubbers ₹ 12

12. Working 8 hours/days worked completed in 12 days

" " 1 " " 12 8 days

" " 6 " $\frac{12 \quad 8}{6}$ days

" " " " in 16 days

13. For 1152 bars of soap cartons needed 8

" " " $\frac{8}{1152}$

" 3888 " $\frac{8}{1152}$ 3888

27

14. 44m thickness is of 16 cardboard

1 " " " $\frac{16}{44}$ "

715 mm " " $\frac{16 \quad 715}{44}$ cardboard

71.5 cm " " 260 cardboard

15. 16.25m of wall built by 15 men

1 " " " $\frac{15}{16.25}$ men

26 " " " $\frac{15 \quad 26}{16.25}$ men

$\frac{390}{16.25}$ men

26 metres of wall built by 24 men

6 Percentage and Its Applications

Eercise-6.1

1. (i) 32% $\frac{32}{100}$ $\frac{8}{25}$

(ii) $26\frac{2}{3}\%$ $\frac{80}{3}\%$ $\frac{80}{300}$ $\frac{8}{30}$ $\frac{4}{15}$

(iii) $6\frac{1}{4}\%$ $\frac{25}{4}\%$ $\frac{25}{100 \quad 4}$ $\frac{1}{16}$

(iv) $0.5\% = \frac{0.5}{100}$ $\frac{5}{1000}$ $\frac{1}{200}$

(v) 1.25% $\frac{1.25}{100}$ $\frac{125}{10000}$ $\frac{1}{80}$

(vi) 120% $\frac{120}{100}$ $\frac{12}{10}$ $\frac{6}{5}$

(vii) $0.75\% = \frac{0.75}{100}$ $\frac{75}{10000}$ $\frac{3}{400}$

(viii) $0.05\% = \frac{5}{100}\%$ $\frac{1}{2000}$

2. (i) $\frac{53}{100}$ $\frac{53}{100}$ 100% 53%

(ii) $\frac{3}{8}$ $\frac{3}{\cancel{8}_{2}}$ $\cancel{100}^{25}\%$ $\frac{3 \quad 25}{2}$ $\frac{75}{2}\%$

$37\frac{1}{2}\%$

(iii) $\frac{5}{7}$ $\frac{5}{7}$ 100% $\frac{500}{7}\%$ $71\frac{3}{7}\%$

(iv) $\frac{23}{40}$ $\frac{23}{40}$ 100% $\frac{23 \quad 10}{4}$

$\frac{230}{4}\%$ $57\frac{1}{2}\%$

(v) $\frac{7}{20}$ $\frac{7}{20}$ 100% (7 5)% 35%

(vi) $\frac{19}{500}$ $\frac{19}{500}$ 100% $\frac{19}{5}\%$ $3\frac{4}{5}\%$

(vii) $1\frac{3}{5}$ $\frac{8}{5}$ $\frac{8}{5}$ 100%

8 20% 160%

(viii) $1\frac{7}{8}$ $\frac{15}{8}$ $\frac{15}{\cancel{8}_{2}}$ $\cancel{100}^{25}\%$

$\frac{15}{2}$ 25% $\frac{375}{2}\%$ $187\frac{1}{2}\%$

3. (i) 26% $\frac{26}{100}$ $\frac{13}{50}$ 13 : 50

(ii) $13\frac{3}{4}\%$ $\frac{55}{4}\%$ $\frac{55}{4 \quad 100}$

$\frac{11}{4 \quad 20}$ $\frac{11}{80}$ 11 : 80

(iii) 135% $\frac{135}{100}$ $\frac{27}{20}$ 27 : 20

(iv) $5.5\% = \frac{5.5}{100}$ $\frac{55}{100}$ $\frac{11}{200}$ 11 : 200

(v) $2.5\% = \frac{2.5}{100}$ $\frac{25}{1000}$ $\frac{1}{40}$ 1 : 40

(vi) $0.4\% = \frac{0.4}{100}$ $\frac{4}{1000}$ $\frac{1}{250}$ 1 : 250

(vii) 0.65% $\frac{0.65}{100}$ $\frac{65}{10000}$

$\frac{13}{2000}$ 13 : 2000

(viii) 22% $\frac{22}{100}$ $\frac{11}{50}$ 11 : 50

4. (i) 3 : 5 $\frac{3}{\cancel{5}}$ $\cancel{100}^{2}\%$ 60%

(ii) 2 : 3 $\frac{2}{3}$ 100% $\frac{200}{3}\%$ $66\frac{2}{3}\%$

(iii) 36 : 75 $\frac{\cancel{36}^{12}}{\cancel{75}_{3}}$ $\cancel{100}^{4}\%$

12 4% 48%

(iv) 1 : 35 $\frac{1}{35}$ 100% $\frac{20}{7}\%$ $2\frac{6}{7}\%$

(v) 11 : 125 $\frac{11}{125}$ 100%

$\frac{11}{5}\%$ $\frac{4}{5}\%$ $\frac{44}{5}\%$ $8\frac{4}{5}\%$

(vi) $7:5$ $\frac{7}{5}$ 100% 7 20% 140%

(vii) $1:2$ $\frac{1}{2}$ 100% 50%

(viii) $15:8$ $\frac{15}{8}$ 100% $\frac{15}{2}$ 25%

$\frac{375}{2}\%$ $\frac{1}{2}\%$ $187\frac{1}{2}\%$

5. (i) 75% $\frac{75}{100}$ 0.75

(ii) 7% $\frac{7}{100}$ 0.07

(iii) $7.5\% = \frac{7.5}{100}$ 0.075

(iv) $13\frac{1}{2}\%$ $13.5\% = \frac{13.5}{100}$ 0.135

(v) $0.2\% = \frac{0.2}{100}$ 0.002

(vi) 1% $\frac{1}{100}$ 0.01

(vii) $0.05 = \frac{0.05}{100}$ 0.0005

(viii) $\frac{1}{4}\%$ $0.25\% = \frac{0.25}{100}$ 0.0025

6. (i) $0.4 = 0.4$ 100% 40%

(ii) 0.24 0.24 100% 24%

(iii) $0.02 = 0.02$ $100\% = 2\%$

(iv) $0.275 = 0.275$ 100% 27.5%

(v) $0.063 = 0.063$ $100\% = 6.3\%$

(vi) $1.2 = 1.2$ 100% 120%

(vii) $2.05 = 2.05$ 100% 205%

(viii) $0.002 = 0.02$ 100% 0.2%

Exercise-6.2

1. (i) We have to find 70% of 500

$\frac{70}{100}$ 500 350

(ii) $3\frac{1}{2}\%$ of 1600

$\frac{7}{2}\%$ of 1600

$\frac{7}{\cancel{2}} \quad \frac{\overset{8}{\cancel{1600}}}{\cancel{100}}$ 7 8 56

(iii) 20% of ₹ 150 ₹ $\frac{20}{100}$ 150 ₹ 30

(iv) 90% of 130 $\frac{90}{150}$ 130 117

(v) 60% of 55 $\frac{\overset{3}{\cancel{60}}}{\underset{2}{\cancel{100}}}$ $\overset{11}{\cancel{55}}$

3 11

60% of 55 33

(vi) $2\frac{1}{2}\%$ of 30 $\frac{5}{2}\%$ of 30

$= \frac{5}{2}$ 100 30

$\frac{3}{4}$ 0.75

$2\frac{1}{2}\%$ of $30 = 0.75$

(vii) 15.5% of ₹ 3000 ₹ $\frac{15.5}{100}$ 3000

₹ 15.5 300 ₹ 465

15.5% of ₹ 3000 ₹ 465

(viii) 75% of 2kg $\frac{75}{100}$ 20000 gm

1500 gm

75% of 2kg 1.5 kg

(ix) 32% of 1.5 lit

$\frac{32}{100}$ 1.5 100 ml

32 1.5 10 ml

480 ml

32% of 1.5 lit 480 ml

(x) 40% of $1\frac{1}{2}$ hours

$\frac{40}{100}$ 90 minutes

36 minutes

40% of $1\frac{1}{2}$ hours 36 minutes

(xi) $10\frac{1}{2}\%$ of 12m 10.5% of 12km

$\frac{10.5}{100}$ 12000 m

1260 m

$10\frac{1}{2}\%$ of 12 km 1.260 km

(xii) 250% of ₹ 18 ₹ $\frac{250}{100}$ 18

₹ 45

2. (i) Let x % of 32 80

$\frac{x}{100}$ 32 80

x $\frac{\overset{10}{\cancel{80}} \quad \overset{25}{\cancel{100}}}{\underset{4}{\cancel{32}}}$

x 250 %

250 % of 32 80

(ii) Let x % of ₹ 215 ₹ 750

$\frac{x}{100}$ 125 750

x $\frac{\overset{6}{\cancel{750}} \quad 100}{\cancel{125}}$

x 600 %

600 % of ₹ 125 ₹ 750

(iii) Let x % of $3\frac{1}{2}$ kg 25 kg

$\frac{x}{100}$ $3\frac{1}{2}$ 25

$\frac{x}{100}$ $\frac{7}{2}$ 25

x $\frac{25 \quad 100 \quad 2}{7}$

x $\frac{500}{7}$

x $714\frac{2}{7}$ %

$714\frac{2}{7}$ % of $3\frac{1}{2}$ kg 25 kg

(iv) Let x % of 420g 2.25 kg

$\frac{x}{100}$ 420 2250 g

x $\frac{2250 \quad 100}{420}$ %

x 535.75 %

535.75 % of 420g 2.25 kg

(v) Let x % of 1.5km 360 m

$\frac{x}{100}$ 1500 m 360 m

x $\frac{360 \quad 100}{1500}$

x 24

24% of 1.5 km 360 m

(vi) Let x % of 8 hours 3 days

$\frac{x}{100}$ 8 hours 72 hours

x $\frac{72 \quad 100}{8}$

x 900

900% of 8 hours 3 days

3. (i) Reduction ₹ 40 ₹ 232 ₹ 8

Reduction% $\frac{\text{Reduction} \quad 100}{\text{original}}$

$\frac{\overset{2}{\cancel{80}}}{\cancel{40}}$ 100 20 %

(ii) Reduction (6 5.4) kg

0.6 kg

Reduction % $\frac{\text{Reduction}}{\text{Original}}$ 100

$\frac{0.6}{6}$ 100

Reduction % 10 %

(iii) Reduction (12 10) hours

2 hours

Reduction % $\frac{\text{Reduction}}{\text{Original}}$ 100

$\frac{2}{\underset{3}{\cancel{126}}}$ $\overset{50}{\cancel{100}}$ $\frac{50}{3}$ $\frac{20}{3}$

$16\frac{2}{3}$ %

4. (i) Increase (12 10) months

2 months

Increase % $\frac{\text{Increase}}{\text{Original}}$ 100

$\frac{2}{10}$ 100

Increase % 20 %

(ii) Increase ₹ (50 40) ₹ 10

Increase % $\frac{\text{Increase}}{\text{Original}}$ 100

$\frac{10}{40}$ 100 25 %

Increase % 25 %

(iii) Increase (81 72) 9 Marks

Increase % $\frac{\text{Increase}}{\text{Original}}$ 100

$$\frac{\cancel{9}}{\cancel{72}_{8}} \quad 100$$

$$\frac{100}{8} \quad \frac{25}{2} \quad 12\frac{1}{2}\%$$

Increase % $12\frac{1}{2}\%$

5. % of marks secured by Sandhya

$$\frac{630}{900} \quad 100 \quad 70\%$$

% of Marks secured by Monika

$$\frac{650 \quad 100}{1300} \quad 50\%$$

Performance of Sandhya is better.

6. % of books sold $\frac{\text{Sold books}}{\text{total}} \quad 100$

$$\frac{2640}{12000} \quad 100$$

books sold 22%

7. Let students appeared in exams x

students passed 95%

" " failed (100 95)%

5%

5% of x 60

$$\frac{5}{100} \quad x \quad 60$$

$$x \quad \frac{60 \quad \overset{20}{\cancel{100}}}{\cancel{5}}$$

x 1200

1200 students appeared in exams

8. Let Mohan have ₹ x

10% of x ₹ 15

$$\frac{10x}{100} \quad 15$$

$$x \quad \frac{5 \quad 100}{10}$$

x ₹ 150

Mohan have ₹ 150 before he purchased pencil box.

9. Reduction in price of Jam 70 56

₹ 14

$$\text{reuction \%} \quad \frac{\text{reduction}}{\text{original}} \quad 100$$

$$\frac{14 \quad 100}{\overset{5}{70}} \quad 20\%$$

reduction % 20%

10. Let number x

x 10% of x

x 10% of x 55

$$x \quad \frac{10x}{100} \quad 55$$

$$x \quad \frac{x}{10} \quad 55$$

$$\frac{10x \quad x}{10} \quad 55$$

$$\frac{11x}{10} \quad 55$$

$$x \quad \frac{\overset{5}{\cancel{55}} \quad 10}{\cancel{11}}$$

x 50

Number is 50

11. Let number x

$$x \quad \frac{8x}{100} \quad 115$$

$$\frac{100x \quad 8x}{100} \quad 115$$

$$\frac{92x}{100} \quad 115$$

$$x \quad \frac{115 \quad 100}{92}$$

x 125

Number is 125

12. Let original salary x

x 15% of x 9200

$$x \quad \frac{15x}{100} \quad 9200$$

$$\frac{100x \quad 15x}{100} \quad 9200$$

$$\frac{115x}{100} \quad 9200$$

$$x \quad \frac{9200 \quad 100}{115}$$

x ₹ 8000

original salary of siddarth ₹ 8000

13. Marks got in maths 80% of 150

$$\frac{80}{100} \quad 150$$

Marks in maths 120

Marks got in English

70% of marks in Maths

70% of 120

$\frac{70}{100}$ 120

84

Marks got in Hindi

75% of Marks in English

$\frac{75}{100}$ 84

63

Marks in Maths 120

Marks in English 84

Marks in Hindi 63

14. % of male workers

(100 25)% 75%

Let total workers be x

75% of x 360

$\frac{75}{100}$ x 360

x $\frac{360 \quad 100}{75}$

x 480

Totoal workers in factory 480

15. Donated to trust 15% of 1,20,000

$\frac{15}{100}$ 1,20,000

Amount donated to trust ₹ 18,000

remainng amount 120000 18000

1,02,000

Amount received by her each daughter and son

$\frac{102000}{3}$

₹ 34000

16. Ram obtained 91% of 600

$\frac{91}{100}$ 600

546 marks

to get 94% Ram should obtain 94 % of 600

$\frac{94}{\cancel{100}}$ $\cancel{600}$

564

Ram should get (564 546) 18 more marks

17. Decrease in the price of computer

55000 52800

₹ 2200

Decrease % $\frac{\text{Decrease}}{\text{original}}$ 100

$\frac{2200}{55000}$ 100

4 %

Decrease % 4 %

18. Present cost of article ₹ 60

cost after 1 year 60 5% of 60

60 $\frac{5}{100}$ 60

60 3 63

Cost after 1 year ₹ 63

Cost particle after 2nd year

63 5% of 63

63 $\frac{5}{100}$ 63

63 $\frac{315}{100}$

63 3.15 66.15

Cost of particle after 2 years 66.15

19. Let population 1 year ago x

x 10% of x 2,04,600

x $\frac{10x}{100}$ 204600

x $\frac{x}{10}$ 204600

$\frac{10x \quad x}{10}$ 204600

$\frac{11x}{10}$ 204600

x $\frac{204600 \quad 10}{11}$

x 186000

population 1 year ago 1,86,000

20. Let cost of petrol ₹ 100

Now price of petrol

₹ 100 20% of 100

₹ (100 20) ₹ 120

Reduction on needed 120 100

20

Reduction % needed $\frac{20}{120}$ 100

$\frac{100}{6}$

$\frac{50}{3}$ $16\frac{2}{3}$%

Exercise-6.3

1. (i) We have, CP ₹ 200, SP ₹ 224

P SP CP

224 200 24

$P\%$ $\frac{P}{CP}$ 100

$\frac{24}{200}$ 100

$P\%$ 12%

(ii) We have, CP ₹ 450, SP ₹ 400

loss CP SP

450 400 50

$l\%$ $\frac{l}{CP}$ 100

$\frac{50 \quad 100}{450}$

loss % $11\frac{1}{9}\%$

(iii) We have, CP ₹ 550, gain ₹ 22

gain % $\frac{g}{CP}$ 100 $\frac{22}{550}$ 100

gain % 4%

(iv) We have, CP ₹ 216, loss ₹ 72

$l\%$ $\frac{l}{CP}$ 100

$\frac{72 \quad 100}{216}$

$l\%$ $33\frac{1}{3}\%$

(v) We have, SP ₹ 500, loss ₹ 100

CP SP loss

500 100

₹ 600

loss % $\frac{l}{CP}$ 100

$\frac{100}{600}$ 100

loss % $16\frac{2}{3}\%$

(vi) We have,SP ₹ 12, profit ₹ 4

CP SP Profit

12 4

CP ₹ 8

Profit % $\frac{P}{CP}$ 100

$\frac{4}{8}$ 100

profit 50%

2. (i) We have, CP ₹ 500, gain 25%

SP $\frac{100 \quad g\%}{100}$ CP

$\frac{100 \quad 25}{100}$ 500

$\frac{125}{100}$ 500

SP ₹ 625

(ii) We have, CP ₹ 60, loss $12\frac{1}{2}\%$

12.5%

$\because$ SP $\frac{100 \quad l\%}{100}$ CP

$\frac{100 \quad 12.5}{100}$ 60

$\frac{87.5}{100}$ 60

SP ₹ 52.5

(iii) We have, CP ₹ 150, loss 20%

$\because$ SP $\frac{100 \quad l\%}{100}$ CP

$\frac{100 \quad 20}{100}$ 150

$\frac{80}{100}$ 150

SP ₹ 120

(iv) We have, CP ₹ 80, gain 2.5%

$\because$ SP $\frac{100 \quad g\%}{100}$ CP

$\frac{100 \quad 2.5}{100}$ 80

$\frac{10.25}{100}$ 80

$\frac{8200}{100}$

SP ₹ 82

3. (i) We havem SP ₹ 924, gain 10%

$\because$ CP $\frac{SP \quad 100}{100 \quad g\%}$

$\frac{924 \quad 100}{100 \quad 10}$

$\frac{92400}{110}$

CP ₹ 840

(ii) We have, SP ₹ 1755, gain 12.5%

CP $\frac{SP \quad 100}{100 \quad g\,\%}$

$\frac{1755 \quad 100}{100 \quad 12.5}$

$\frac{175500}{112.5}$ ₹ 1560

(iii) We have, SP ₹ 851, loss 8%

$\because$ CP $\frac{SP \quad 100}{100 \quad l\,\%}$

$\frac{851 \quad 100}{100 \quad 8}$

$\frac{85100}{92}$

CP ₹ 925

(iv) We have, SP ₹ 560, l $6\frac{2}{3}\%$

$\frac{20}{3}\%$

$\because$ CP $\frac{SP \quad 100}{100 \quad l\,\%}$

$\frac{560 \quad 100}{100 \quad \frac{20}{3}}$ $\frac{56000}{\frac{300 \quad 20}{3}}$

$\frac{56000 \quad 3}{280}$

₹ 600

4. CP of tricycle ₹ 560

SP of tricycle ₹ 630

gain on " " ₹ (630 560)

₹ 70

g % on tricycle $\frac{g}{CP}$ 100

$\frac{\cancel{70}}{\cancel{560}_{8}}$ 100

$\frac{\cancel{100}^{25}}{\cancel{8}_{2}}$ $12\frac{1}{2}\%$

5. CP of anarticle ₹ 400

SP " " ₹ 336

loss on " " ₹ (400 336)

₹ 64

loss% on article $\frac{\text{loss}}{CP}$ 100

$\frac{64}{400}$ 100

loss on article 16%

6. Total CP of Radio ₹ (5863 137)

₹ 6000

SP of Radio ₹ 5700

loss on Radio 6000 5700

₹ 300

loss % on Radio $\frac{300}{6000}$ 100

5%

7. Let CP of 6 toffes 1

CP of 1 toffee $\frac{1}{6}$

SP of 4 toffes 1

SP of 1 toffee $\frac{1}{4}$

gain SP CP

$\frac{1}{4} \quad \frac{1}{6}$

$\frac{3 \quad 2}{12}$

$\frac{1}{12}$

gain % $\frac{g}{CP}$ 100

$\frac{\frac{1}{12}}{1/6}$ 100

$\frac{1}{\cancel{12}_{2}} \quad \frac{\cancel{6}}{1}$ 100

50%

8. Let SP of 20 pens 1

" " 1pen $\frac{1}{20}$

CP of 15 pens 1

" " 1 pen $\frac{1}{15}$

loss CP SP

$\frac{1}{15} \quad \frac{1}{20}$

$\frac{4 \quad 3}{60}$

loss $\frac{1}{60}$

$$\text{loss \%} \quad \frac{\frac{1}{60}}{1/15} \quad 100$$

$$\frac{1}{\cancel{60}_{4}} \quad \frac{\cancel{15}}{1} \quad 100$$

loss % 25%

9. CP of 8 toffes ₹ 1

" 1 " $\frac{1}{8}$

Now SP of 6 toffees ₹ 1

" " 1 toffee ₹ $\frac{1}{6}$

Profit $SP \quad CP$

$$\frac{1}{6} \quad \frac{1}{8}$$

$$\frac{4 \quad 3}{24}$$

$$\text{Profit} \quad \frac{1}{24}$$

$$\text{Profit \%} \quad \frac{P}{CP} \quad 100$$

$$\frac{\frac{1}{24}}{\frac{1}{1/8}} \quad 100$$

$$\text{Profit \%} \quad \frac{1}{\cancel{24}_{3}} \quad \frac{8}{1} \quad 100$$

Profit % $33\frac{1}{3}\%$

10. Ttoal CP of Almirah ₹ (2465 35)

₹ 2500

gain % 16%

$$\text{SPof Almirah} \quad \frac{100 \quad 16}{100} \quad 2500$$

$$\because \quad SP \quad \frac{100 \quad g\%}{100} \quad CP$$

$$\frac{116}{100} \quad 2500$$

SP of Almirah ₹ 2900

11. We have SP of rickshaw ₹ 2640

loss 12%

$$\text{CP of rickshaw} \quad \frac{2640 \quad 100}{(100 \quad 12)}$$

$$\because \quad CP \quad \frac{SP \quad 100}{100 \quad l\%}$$

$$\frac{264000}{88} \quad ₹\ 3000$$

Now to get 12% gain

$$SP \quad \frac{100 \quad g\%}{100} \quad CP$$

$$\frac{100 \quad 12}{100} \quad 3000$$

112 30

SP of rickshaw ₹ 3360

toget 12%

12. Let $CP \quad x, SP$ ₹ 322

$$\text{gain \%} \quad \frac{x}{6}$$

$$g\% \quad \frac{g}{CP} \quad 100$$

$$\frac{\frac{x}{6}}{x} \quad 100$$

$$\frac{100}{6} \quad \frac{50}{3}$$

$g\% \quad 16\frac{2}{3}\%$

13. CP of 100 bats 100 40

₹ 4000

$$\text{SP of 100 bats} \quad \frac{100 \quad 20}{100} \quad 400$$

$$\frac{20}{100} \quad 4000 \quad ₹\ 48000$$

Now CP of 20 bats 20 40 ₹ 800

SP of 20 bats at 5% gain

$$\frac{100 \quad 5}{100} \quad 800$$

105 108 ₹ 840

SP of remaining 80 bats 480

$$\underline{-\ 840}$$

$$\underline{₹\ 3960}$$

CP of remaining 80 bats 80 40

₹ 3200

Profit on 80 bats 3960 3200

760

$$\text{Profit \% on Remaining} \quad \frac{\text{Profit}}{CP} \quad 100$$

$$\frac{760}{3200} \quad 100$$

$$23.75\%$$

14. SP of 1st radio ₹ 924

CP of 1st radio ₹ $\frac{924 \quad 100}{100 \quad 20}$

$$\frac{92400}{120} \quad ₹\ 770$$

SP of IInd radio ₹ 924

CP of IInd radio $\frac{924 \quad 100}{100 \quad 20}$

$$\frac{92400}{80}$$

₹ 1155

TCP 1155 770

₹ 1925

TSP ₹ 1848

loss 1925 1848

77

loss % $\frac{77}{1925}$ 100

$$\frac{77000}{1925}$$

loss in whole transaction 4 %

15. Let Ram Gopal purchased x kg of each tea

CPof both types of tea

$9 \quad x \quad 7 \quad x$

$9x \quad 7x$

$16x$

S.P. of both types of tea $2x \quad 8 \quad 16x$

Profit " $16x \quad 16x$

0

No profit no loss.

16. Let C.P. ₹ 32,000,

loss $\frac{1}{8}$ 32000 4000

loss % $\frac{l}{\text{C.P.}}$ 100

$$\frac{400}{32000} \quad 100$$

$$12.5\%$$

and S.P. 32000 4000

₹ 28000

17. C.P. of 11 pencils ₹ 10

C.P. of 1 Pencil ₹ $\frac{10}{11}$

Now S.P. of 10 pencils ₹ 11

" " 1 Pencil ₹ $\frac{11}{10}$

Profit S.P. – C.P.

$\frac{11}{10} \quad \frac{10}{11}$

$$\frac{121 \quad 100}{110}$$

[LCM of 10 and 11 110]

Profit % $\frac{\frac{21}{110}}{\frac{10}{11}}$ 100

$\frac{21}{110} \quad \frac{11}{10}$ 100

Profit 21%

18. C.P. of 50 pencils ₹ 80

" pencils ₹ $\frac{80}{50}$ ₹ $\frac{8}{5}$

Now S.P. of 40 pencils ₹ 90

S.P. of 1 pencil ₹ $\frac{90}{40}$ ₹ $\frac{9}{4}$

Profit S.P. – C.P.

$\frac{9}{4} \quad \frac{8}{5} \quad \frac{45 \quad 32}{20}$

[$\because$ LCM of4 and 5 20]

$$\frac{13}{20}$$

Profit % $\frac{P}{\text{C.P.}}$ 100 $\frac{\frac{13}{20}}{\frac{8}{5}}$ 100

$\frac{13}{\cancel{20}} \quad \frac{5}{8} \quad \overset{5}{\cancel{100}}$

$$\frac{325}{8}$$

Profit % $40\frac{5}{8}\%$

19. C.P. of 2400 pens (200 dozens)

$$\frac{2400}{12} \quad 15$$

$$200 \quad 15$$

C.P. of 2400 pens $\frac{2400}{12}$ 15

(200 dozens) 200 15

C.P. of 2400 pens ₹ 3000

I Case

S.P. of 5 pens ₹ 8

" " " pens $\frac{8}{5}$

" " Pens $\frac{8}{5}$ 1050

8 210

₹ 1680

IIn Case

S.P.of 1 pen ₹ 2 1350

SP of Remaining 2 1350

1350 Pens ₹ 2700

Total S.P. 2700

+ 1680

4380

Total C.P. 300

Profit 1380

Profit% $\frac{1380}{3000}$ 100 46%

Exercise-6.4

1. (i) We have,

P ₹ 64000, R 6%, p.a, T 2 years

S.I. $\frac{P \quad R \quad T}{100}$

$\frac{64000 \quad 6 \quad 2}{100}$

S.I. ₹ 7680

and Amount 64000 7680

₹ 71680

(ii) We have,

P ₹ 2650, R 8% p.a.,

T $2\frac{1}{2}$ years $\frac{5}{2}$ years

S.I. $\frac{P \quad R \quad T}{100}$

$\frac{2650 \quad 8 \quad \frac{5}{2}}{100}$

$\frac{106000}{200}$

S.I. 530

P S.I.

2650 530

Amount ₹ 3180

(iii) We have, P ₹ 1500, R 12% p.a,

T 3 years 3 month

$3\frac{3}{12}$ years

$3\frac{1}{4}$ years $\frac{13}{4}$ year

S.I. $\frac{1500 \quad 12 \quad \frac{13}{4}}{100}$

₹ 585

Amount ₹ (1500 585)

₹ 2085

(iv) We have,

P ₹ 9600, R $7\frac{1}{2}$% p.a., $\frac{15}{2}$%

t 5 months, t $\frac{5}{12}$years

S.I. $\frac{P \quad R \quad t}{100}$ $\frac{9600 \quad 15 \quad 5}{100 \quad 2 \quad 12}$

₹ 300

Amount ₹ (9600 300) ₹ 9900

(v) We have

P ₹ 5000, R 9% p.a.,

T 146 days $\frac{146}{365}$ year

S.I. $\frac{5000 \quad 9 \quad 146}{100 \quad 365}$

₹ 180

Amount 180 5000

₹ 5180

2. Money borrowed (Principal) ₹ 6000

rate 12%

Time 3 year 8 months

$3\frac{8}{12}$ year $3\frac{2}{3}$ years

Time $\frac{11}{3}$ years

Interest Charged $\frac{6000 \quad 12 \quad 11}{100 \quad 3}$

₹ 2640

Amount of clear off the debt

₹ (6000 2640)

₹ 8640

3. We have,

S.P. ₹ 829.50, r 10%, time 3 years

S.I. $\frac{p \quad r \quad t}{100}$

829.50 $\frac{p \quad 10 \quad 3}{100}$

$$\frac{82950}{10\ \ 3}\ \ p$$

$$2765\ \ p$$

sum ₹ 2765

4. We have rate 11%, time $2\frac{3}{12}$ years

$$2\frac{1}{4}\text{ years}\ \ \frac{9}{4}\text{ years}$$

Amount ₹ 4491

Let Principal x

S.I. $4491\ \ x$

$$\text{S.I.}\ \ \frac{p\ \ r\ \ t}{100}$$

$$(4491\ \ x)\ \ \frac{x\ \ 11\ \ 9}{100\ \ 4}$$

$$400(4491\ \ x)\ \ 99x$$

$$1796400\ \ 400x\ \ 99x$$

$$1796400\ \ 499x$$

₹ 3600 x

Now principal ₹ 3600

Now, $\text{S.I.}\ \ \frac{p\ \ r\ \ t}{100}$

$$\frac{3600\ \ 11\ \ 3}{100}$$

S.I. 1188

₹ 3600 Amounts to ₹ (3600) + 1188) = ₹ 4788 in 3 years.

5. We have,

P ₹ 3600, A ₹ 4734

t $3\frac{1}{2}$ years $\frac{7}{2}$ years

S.I. $4734\ \ 3600$

₹ 1134

$$\text{S.I.}\ \ \frac{P\ \ R\ \ t}{100}$$

$$1134\ \ \frac{3600\ \ R\ \ 7/2}{100}$$

$$\frac{1134\ \ 100\ \ 2}{36000\ \ 7}\ \ R$$

$$9\ \ R$$

at 9% rate ₹ 3600 amounts to ₹ 4734 in $3\frac{1}{2}$ years.

6. We have,

P ₹ 5600, A ₹ 6720, R 8% pa

S.I. $6720\ \ 5600$

₹ 1120

Now, S.I. $\frac{P\ \ R\ \ t}{100}$

$$1120\ \ \frac{5600\ \ 8\ \ t}{100}$$

$$\frac{1120\ \ 100}{5600\ \ 8}\ \ t$$

$$\frac{20}{8}\ \ t\qquad \frac{5}{2}\ \ t$$

$2\frac{1}{2}$ years t

In $2\frac{1}{2}$ years ₹ 5600 amounts to ₹ 6720 at 8% pa

7. Let principal x

Amount $\frac{8}{5}x$

$$\text{S.I.}\ \ \frac{8}{5}x\ \ x\qquad \frac{3x}{5}$$

$$\text{S.I.}\ \ \frac{p\ \ r\ \ t}{100}$$

$$\frac{3x}{5}\ \ \frac{x\ \ r\ \ 5}{100}$$

$$\frac{3x\ \ 100}{5\ \ x\ \ 5}\ \ r$$

$$12\%\ \ r$$

At 12% sum becomes $\frac{8}{5}$ of itself in 5 years.

8. Vibha borrowed ₹ 430,

Rate 12%,

Time $\frac{219}{365}$ years

$$\text{S.I.}\ \ \frac{P\ \ R\ \ t}{100}$$

$$\frac{430\ \ 12\ \ 219}{100\ \ 365}$$

S.I. ₹ 30.96

Amount paid by Vibha ₹ (430 + 30.96)

₹ 460.96

9. Amount borrowed (Principal) ₹ 8400

Rate $\frac{25}{2}$%

Time Jan + Feb + March + April + May + June

21 28 31 30 31 4

145 days

$$\text{Interest} \quad \frac{8400 \quad 25 \quad 145}{100 \quad 2 \quad 365}$$

₹ 420

Amount paid by Mr. Verma

₹ (8400 420)

₹ 8820

10. We have Principal ₹ 400

Amount ₹ 448

S.I. ₹ 48

$$\because \quad \text{S.I.} \quad \frac{p \quad r \quad t}{100}$$

$$48 \quad \frac{400 \quad 4 \quad t}{100}$$

$$\frac{48 \quad 100}{400 \quad 4} \quad t$$

In 3 years ₹ 400 Amounts to ₹ 448 at 4% p.a.

11. Let ₹ x yield ₹ 1416 in 5 years at $\frac{19}{2}$%

S.I. 1416 x

$$(1416 \quad x) \quad \frac{x \quad 19 \quad 5}{100 \quad 2}$$

$$(1416 \quad x) \quad \frac{95x}{200}$$

$200(1416 \quad x) \quad 45x$

$283200 \quad 200x \quad 95x$

$283000 \quad 295x$

$960 \quad x$

₹ 960 yield ₹ 1416 in 5 years at $\frac{19}{2}$%

12. We have,

P ₹ 4500, A ₹ 5400, time 3 years

S.I. ₹ (5400 4500) ₹ 900

$$\text{S.I.} \quad \frac{P \quad R \quad t}{100}$$

$$900 \quad \frac{4500 \quad R \quad 3}{100}$$

$$\frac{\overset{20}{\cancel{900}}}{\cancel{45} \quad 3} \quad R$$

$$R \quad 6\frac{2}{3}\%$$

13. Let P x A $2x$

S.I. A P

$2x \quad x \quad x$

$$\because \quad \text{S.I.} \quad \frac{p \quad r \quad t}{100}$$

$$x \quad \frac{x \quad 10 \quad t}{100}$$

$$\frac{100x}{10x} \quad t \qquad 10 \text{ years} \quad t$$

In 10 years a sum of money double itself at 10% S.I.

14. (i) We have, A ₹ 4637.50,

S.I. ₹ 1137.50

P ₹ (4637.50 1137.50)

P ₹ 3500.00

(ii) We have, A ₹ 1000, S.I. ₹ 3,750

P A S.I.

₹ (10000 3,750)

P ₹ 6,250

15. (i) Rohit borrowed Rate (P) ₹ 4000

time 2 years, Rate 15 %

Interest paid by Rohit

$$\frac{p \quad r \quad t}{100}$$

$$\frac{4000 \quad 15 \quad 2}{100}$$

40 30

₹ 1200

Amount paid by Rohit to clear the debt

4000 1200

₹ 5200

7 Algebraic Expressions

Exercise-7.1

1. (i) $3x$ 5 where x is a number

(ii) $q \quad \frac{3}{4}p$

(iii) $(a \quad b) \quad 9$

(iv) $b \quad b \quad b^2$

(v) $\frac{x}{y} \quad 7$

2. (i) $5p \quad q \quad r^2$ monomial

(ii) $3x^2 \quad y \quad 2z$ monomial

(iii) $3 \quad 7x^2$ binomial

(iv) $\frac{5a^2 \quad 3b^2 \quad c}{2}$ trinomial

(v) $7x^5 \quad \frac{3x}{y}$ binomial

(vi) $5p \quad 3q \quad 3p^2 \quad q^2$ trinomial

(vii) $m^3 \quad 2n^3 \quad 5m \quad \frac{2}{3}$ polynomial

(viii) $9a^3b^3c^3 \quad 5a^2 \quad 1$ trinomial

(ix) $5x^4 \quad \frac{2x^2 \quad 3x \quad 1}{5}$ polynomial

3.

		Numerical Coefficient	Literal Coefficient
(i)	$9p^2q \quad r^2$	9	p^2q^2r
(ii)	$\frac{7}{2}xy^2$	$\frac{7}{2}$	xy^2
(iii)	$\frac{4}{9}a^2b^2cd$	$\frac{4}{9}$	$a \quad b^2cd$
(iv)	$\frac{3}{4x^2y}$	$\frac{3}{4}$	$\frac{1}{x^2y}$
(v)	$3x^2y \quad 2z$	$\frac{3}{2}$	$\frac{x^2y}{z}$
(vi)	$\frac{2}{3}\frac{ax}{by}$	$\frac{2}{3}$	$\frac{ax}{by}$

4. We have, $\frac{2}{3}p^2q^2r^5$

(i) Coefficient of p^2 $\frac{2}{3}pq^2r^5$

(ii) Coefficient of $2pq$ $\frac{1}{3}p^2qr^5$

(iii) Coefficient of $\frac{1}{3}p^2qr$ $\frac{2}{3}pqr^4$

(iv) Coefficient of $\frac{1}{3}p^2qr$ $2pqr^4$

(v) Conefficient $2p^2q^2r \quad \frac{1}{3}pr^4$

(vi) Coefficient p^3q^2 $\frac{2}{3}r^5$

(vii) Coefficient r^5 $\frac{2}{3}p^3q^2$

(viii) $\frac{2}{3}pqr^2 \quad p^2qr^3$

5. Like terms are

(i) $3abc, \ \frac{2}{3}cab, 7bac$

$5ab^2, \frac{2}{7}b^2a$

(ii) $7pq^2, \frac{2}{3}q^2p$,

($3p^2q, \sqrt{5}qp^2, \quad qp^2, (\sqrt{5}\,qp, 4\,pq)$

(iii) $(3x^2yz, \ \sqrt{5}\,yzx$),

$\sqrt{7}\,myz^2, \ \frac{4}{3}z^2xy$

$\frac{2}{5}y^2xz, 9xzy^2$

6. Polynomials are

$\frac{2}{5}x^4 \quad \sqrt{3}x^2 \quad 5x \quad 1$ degree 4

$4a^3b^2 \quad 3ab \quad 5ab \quad \frac{2}{3}$ degree 5

$2m^2n^4 \quad \sqrt{3}\,mn^3 \quad \frac{2}{7}m^7 \quad 9m^2$

$mn \quad 2$ degree 7

7. (i) $3m \quad 5$ for $m \quad 2$

$3(\ 2) \quad 5$

$6 \quad 5 \quad 1$

(ii) $x^2 \quad 4x \quad 5$ for $x \quad 3$

$(\ 3)^2 \quad 4(\ 3) \quad 5$

$9 \quad 12 \quad 5 \quad 26$

(iii) $\frac{3}{a} \quad \frac{2}{b} \quad \frac{1}{4}$ for $a \quad 2, \ b \quad 3$

$\frac{3}{2} \quad \frac{2}{3} \quad \frac{1}{4}$

$\frac{18 \quad 8 \quad 3}{12} \quad \frac{26 \quad 3}{12} \quad \frac{23}{12}$

(iv) $m^2 \quad n^2 \quad 2mn$ for $m \quad \frac{1}{2}, n \quad \frac{1}{3}$

$\frac{1}{2}^2 \quad \frac{1}{3}^2 \quad 2 \quad \frac{1}{2} \quad \frac{1}{3}$

$\frac{1}{4} \quad \frac{1}{9} \quad \frac{1}{3} \quad \frac{9 \quad 4 \quad 12}{36} \quad \frac{25}{36}$

(v) $x \quad 3 \quad 2(x \quad 5)$ for $x \quad 2$

$2 \quad 3 \quad 2(\ 2 \quad 5)$

$2 \quad 3 \quad 2(\ 7)$

$2 \quad 3 \quad 14$

$16 \quad 3 \quad 13$

(vi) $y^2 \quad 2(y \quad 7)$ for $y \quad 3$

$(3)^2 \quad 2(3 \quad 7)$

$9 \quad 2 \quad 10$

$9 \quad 20$

11

Exercise-7.2

1. (i) $3x^2 \quad 4y^2 \quad 5xy \quad 6x^2$

$9xy \quad 3y^2 \quad 8x^2$

Collecting like terms

$x^2(3 \quad 6 \quad 8) \quad y^2(\ 4 \quad 3)$

$xy(5 \quad 9)$

$x^2(1) \quad y^2(\ 1) \quad xy(\ 4)$

$x^2 \quad y^2 \quad 4xy$

(ii) $\frac{2}{3}x^2 \quad 5x \quad 3x \quad \frac{4}{5} \quad 2x^3$

$\frac{7}{2}x^2 \quad 5x \quad 1 \quad 2x^4$

Collecting like terms

$x^3 \quad \frac{2}{3} \quad 2 \quad 2x^4 \quad x^2 \quad 5 \quad \frac{7}{2}$

$x(3 \quad 5) \quad \frac{4}{5} \quad 1$

$x^3 \quad \frac{4}{3} \quad 2x^4 \quad x^2 \quad \frac{17}{2}$

$8x \quad \frac{1}{5}$

$2x \quad \frac{4}{3}x^3 \quad \frac{17}{2}x^2 \quad 8x \quad \frac{1}{5}$

(iii) $\frac{1}{2}p \quad 3q \quad \frac{2}{3}r \quad \frac{4}{5}p \quad \frac{3}{2}q$

$2r \quad \frac{2}{3}p \quad 7r$

Collecting like terms

$p \quad \frac{1}{2} \quad \frac{4}{5} \quad \frac{2}{3} \quad q \quad 3 \quad \frac{3}{2}$

$r \quad \frac{2}{3} \quad 2 \quad 7$

$p \quad \frac{15 \quad 24 \quad 20}{30} \quad q \quad \frac{6 \quad 3}{2}$

$r \quad \frac{2 \quad 6 \quad 21}{3}$

$\frac{59}{30}p \quad \frac{3}{2}q \quad r \quad \frac{25}{3}$

$\frac{59}{30}p \quad \frac{3}{2}q \quad \frac{25}{3}r$

3. (i) $2a \quad 7b \quad 5c \quad 2$

$3a \quad 2b \quad 9c$

$4a \quad 6b \quad 5c \quad 4$

$3a \quad 11b \quad 19c \quad 6$

(ii) $3x \quad 4y \quad z$

$2x \quad 5y \quad z$

$6x \quad 7z$

$3x \quad 9y \quad 2z \quad 5$

$8x \quad 10y \quad 5z \quad 5$

(iii) $4x \quad 7x^2 \quad 9$

$3x^2 \quad 4 \quad 5x$

$7x^3 \quad 1 \quad 11x$

$+ 6x^2 \quad 13x$

$11x^3 \quad 2x^2 \quad 14 \quad 29x$

(iv) $5ax \quad 3by \quad 7cz$

$11ax \quad 7by \quad 3cz$

$ax \quad 3by \quad 12cz$

$7ax \quad by \quad 16cz$

3. (i) $3a \quad 5b \quad 9c \quad 3$

$5a \quad 3b \quad 11c \quad 2$

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

$2a \quad 8b \quad 2ac \quad 5$

(ii) $7x^2 \quad 10xy \quad y \quad 5$

$3x^2 \quad 9xy \quad y^2$

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

$4x^2 \quad xy \quad 2y^2 \quad 5$

(iii) $3p^2 \quad 4q^2 \quad 8r^2$

$4p^2 \quad 5q^2 \quad 7r^2$

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

$p^2 \quad 9q^2 \quad r^2$

(iv) $9m^4 \quad 5m^2 \quad 7m \quad 6$

$5m^4 \quad 2m^2 \quad 3 \quad 3m^3$

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

$4m^4 \quad 3m^2 \quad 7m \quad 9 \quad 3m^3$

or $4m^4 \quad 3m^3 \quad 3m^2 \quad 7m \quad 9$

4. Perimeter of Rectangle $2(l \quad b)$

$2[(3x^2 \quad 2y^2) \quad (x^2 \quad 3xy)]$

$2[3x^2 \quad 2y^2 \quad x^2 \quad 3xy]$

$2[3x^2 \quad x^2 \quad 2y^2 \quad 3xy]$

$2(4x^2 \quad 2y^2 \quad 3xy)$

Perimeter of rectangle

$8x^2 \quad 4y^2 \quad 6xy$

5. We have to find

$[(5x \quad 3y \quad 7z \quad 2) \quad (7y \quad 6x \quad 5z \quad 11)]$
$(3x \quad 5y \quad 4z \quad 3)$
$[5x \quad 6x \quad 3y \quad 7y \quad 7z \quad 5z$
$2 \quad 11] \quad (3x \quad 5y \quad 4z \quad 3)$
$(\ x \quad 4y \quad 12z \quad 9) \quad 3x \quad 5y \quad 4z \quad 3$
$x \quad 3x \quad 4y \quad 5y \quad 12z \quad 4z \quad 9 \quad 3$
$4x \quad y \quad 16z \quad 6$

6. Let A should be added

$(5x^2 \quad 3x \quad 1) \quad A \quad 3x^3 \quad 7x^2 \quad 8$
$A \quad 3x^3 \quad 7x^2 \quad 8 \quad 5x^2 \quad 3x \quad 1$
$3x^3 \quad 12x^2 \quad 3x \quad 7$

$3x^3 \quad 12x^2 \quad 3x \quad 7$ should be added to $5x^2 \quad 3x \quad 1$ to get $3x^3 \quad 7x^2 \quad 8$

7. Let A should be subtracted

$(3a^2 \quad 5ab \quad 2b^2 \quad 3) \quad A$
$5a^2 \quad 7ab \quad 3b^2 \quad 3a$

or $(3a^2 \quad 5ab \quad 2b^2 \quad 3)$
$(5a^2 \quad 7ab \quad 3b^2 \quad 3a) \quad A$

or $3a^2 \quad 5ab \quad 2b^2 \quad 5a^2 \quad 7ab$
$3b^2 \quad 3a \quad A$
$3a^2 \quad 5a^2 \quad 5ab \quad 7ab \quad 2b^2$
$3b^2 \quad 3a \quad 3 \quad A$
$2a^2 \quad 2ab \quad b^2 \quad 3a \quad 3 \quad A$
$2a^2 \quad 2ab \quad b^2 \quad 3a \quad 3$

should be subtracted from $3a^2 \quad 5ab$ $2b^2 \quad 3$ to get $5a^2 \quad 7ab \quad 3b^2 \quad 3a$

8. $(3y^3 \quad 5y \quad 7) \quad (5y^3 \quad 3y^2 \quad 9)$
$3y^3 \quad 5y \quad 7 \quad 5y^3 \quad 3y^2 \quad 9$
$2y^3 \quad 3y^2 \quad 5y \quad 2$

$3y^2 \quad 5y \quad 7$ is excess over $(5y^2 \quad 3y^2 \quad 9)$
by $2y^3 \quad 3y^2 \quad 5y \quad 2$

9. (i) To Find, $x \quad 2y$

Putting values of x and y

$(2a \quad 3b \quad c) \quad 2(5a \quad 2b \quad 3c)$
$2a \quad 3b \quad c \quad 10a \quad 4b \quad 6c$
$12a \quad b \quad 5c$

(ii) To find, $3x \quad y$

Putting values of x and y

$3(2a \quad 3b \quad c) \quad (5a \quad 2b \quad 3c)$
$6a \quad 9b \quad 3c \quad 5a \quad 2b \quad 3c$
$11a \quad 7b$

(iii) To find, $3x \quad 2y$

Putting values of x and y

$3(2a \quad 3b \quad c) \quad 2(5a \quad 2b \quad 3c)$
$6a \quad 9b \quad 3c \quad 10a \quad 4b \quad 9c$
$4a \quad 13b \quad 12c$

(iv) To find $2x \quad 3y$

Putting values of x and y

$2(2a \quad 3b \quad c) \quad 3(5a \quad 2b \quad 3c)$
$4a \quad 6b \quad 2c \quad 15a \quad 6b \quad 9c$
$11a \quad 12b \quad 11c$

(v) Perimeter of triangle $a \quad b \quad c$

$(7p^2 \quad 5p \quad 11) \quad (p^2 \quad 2p \quad 1)$
$(3p^2 \quad 6p \quad 3) \quad C$
$7p^2 \quad 5p \quad 11 \quad (4p^2 \quad 4p \quad 2) \quad C$
$7p^2 \quad 4p^2 \quad 5p \quad 4p \quad 11 \quad 2 \quad C$
$3p^2 \quad p \quad 9 \quad C$

Third side is $3p^2 \quad p \quad 9$

Exercise-7.3

1. (i) To find,

$5x^2 \quad \frac{7}{10}x^3y^2$

$5 \quad \frac{7}{10}x^5y^2 \quad \frac{7}{2}x^5y^2$

$5x \quad \frac{7}{10}x^3y^2 \quad \frac{7}{2}x \quad y^2$

(ii) To find,

$\frac{2}{3}p^2q \quad \frac{3}{4}pq^2 \quad 5pqr$

$\frac{2}{3} \quad \frac{3}{11} \quad 5 \quad p^{2 \quad 1 \quad 1}q^{1 \quad 2 \quad 1}r$

$\frac{5}{2}p^4q^4r$

$\frac{2}{3}p^2q \quad \frac{3}{4}pq^2 \quad 5pqr$

$\frac{5}{2}p^4q^4r$

(iii) To find, $7ab \quad 3a^3 \quad \frac{2}{7}ab^2$

$7 \quad 3 \quad \frac{2}{7} \quad a^{1\ 3\ 1}\ b^{1\ 2}$

$6a^5b^3$

$7ab \quad 3a^3 \quad \frac{2}{7}ab^2 \quad 6a^5b^3$

(iv) To find,

$\frac{1}{2}x^2 \quad \frac{3}{5}xy \quad \frac{2}{3}yz \quad \frac{5}{7}xyz$

$\frac{1}{2} \quad \frac{3}{5} \quad \frac{2}{3} \quad \frac{5}{7} \quad x^{2\ 1\ 1}$

$y^{1\ 1\ 1}\ z^{1\ 1}$

$\frac{1}{7}x^4y^3z^2$

$\frac{1}{2}x^2 \quad \frac{3}{5}xy \quad \frac{2}{3}yz \quad \frac{5}{7}xyz$

$\frac{1}{7}x^4y^3z^2$

2. (i) To find $3xyz \quad (3x \quad 5y \quad 7z)$

$3xyz \quad 3x \quad 3xy \quad 5y$

$3xyz \quad 7z$

$9x^2yz \quad 15xy^2 \quad 21xyz^2$

(ii) To find,

$2pq \quad (2p^2 \quad 3pq \quad 5q^2 \quad 5)$

$2pq \quad 2p^2 \quad 2pq \quad 3pq$

$2pq \quad 5q^2$

$4p^3q \quad 6p^2q^2 \quad 10pq^3 \quad 10pq$

(ii) To find,

$35ab \quad \frac{2}{3}a^2b \quad \frac{4}{5}ab^2 \quad \frac{2}{7}ab \quad 3$

$35ab \quad \frac{2}{3}a^2b \quad 35ab \quad \frac{4}{5}ab^2$

$35ab \quad \frac{2}{7}ab \quad 35ab \quad 3$

$\frac{70}{3}a^3b^2 \quad 28a^2b$

$10a^2b^2 \quad 15ab$

(iv) To find,

$6x^3 \quad 7x^5 \quad 4x^3 \quad 5x^2 \quad \frac{2}{3}x \quad 6$

$6x^3 \quad 7x^5 \quad 6x^3 \quad 4x^3$

$6x^3 \quad 5x^2 \quad 6x^3 \quad \frac{2}{3}x \quad 6x^3 \quad 6$

$42x^8 \quad 24x^6 \quad 30x^5 \quad 4x^4 \quad 36x^3$

3. (i) To find :

$(5x \quad 2)(3x \quad 4)$

Ist Method : Horizontal Method

$5x(3x \quad 4) \quad 2(3x \quad 4)$

(Distributive law)

$15x^2 \quad 20x \quad 6x \quad 8$

$15x^2 \quad 14x \quad 8$

IInd Method : Column Method

$$\begin{array}{r} 5x \quad 2 \\ \times\ 3x \quad 4 \\ \hline 15x^2 \quad 6x \\ \quad\quad 20x \quad 8 \\ \hline 15x^2 \quad 14x \quad 8 \end{array}$$

(ii) $(ax \quad b)(cx \quad d)$

$ax(cx \quad d) \quad b(cx \quad d)$

[distributive law]

$acx^2 \quad adx \quad bcx \quad bd$

$acx^2 \quad (ad \quad bc)x \quad bd$

(iii) $(4p \quad 7)(2 \quad 3p)$

$4p(2 \quad 3p) \quad 7(2 \quad 3p)$

$8p \quad 12p^2 \quad 14 \quad 21p$

$8p \quad 21p \quad 12p^2 \quad 14$

$12p^2 \quad 29p \quad 14$

(iv) $(2x^2 \quad 3)(3x \quad 5)$

$2x^2 \ (3x \quad 5) \quad 3(3x \quad 5)$

$6x^3 \quad 10x^2 \quad 9x \quad 15$

$6x^3 \quad 10x^2 \quad 9x \quad 15$

(v) $2 \ a \quad \frac{1}{2} \quad a \quad \frac{1}{3}$

$2 \ a \ a \quad \frac{1}{3} \quad \frac{1}{2} \ a \quad \frac{1}{3}$

$2 \ a \quad \frac{a}{3} \quad \frac{1}{2}a \quad \frac{1}{6}$

$2 \ a^2 \quad a \quad \frac{1}{3} \quad \frac{1}{2} \quad \frac{1}{6}$

$$2a^2 \quad a \quad \frac{2}{6} \quad \frac{3}{6} \quad \frac{1}{6}$$

$$2a^2 \quad \frac{5a}{6} \quad \frac{1}{6}$$

$$2a^2 \quad \frac{5a}{3} \quad \frac{1}{3}$$

(vi) $(3x \quad 5y) \quad (5x \quad 3y)$

$3x(5x \quad 3y) \quad 5y(5x \quad 3y)$

$15x^2 \quad 9xy \quad 25xy \quad 15y^2$

$15x^2 \quad 16xy \quad 15y^2$

4. (i) We have to find

$(3x \quad 1)(2x^2 \quad 3x \quad 1)$

$3x(2x^2 \quad 3x \quad 1) \quad 1(2x^2 \quad 3x \quad 1)$

$6x^3 \quad 9x^2 \quad 3x \quad 2x^2 \quad 3x \quad 1$

$6x^3 \quad 11x^2 \quad 1$

(ii) To find $(x \quad 2y) \quad (x \quad 2y \quad 3)$

$x(x \quad 2y \quad 3) \quad 2y(x \quad 2y \quad 3)$

$x^2 \quad 2xy \quad 3x \quad 2xy \quad 4y^2 \quad 6y$

$(x \quad 2y)(x \quad 2y \quad 3) \quad x^2 \quad 3x$

$4y^2 \quad 6y$

(iii) To find $(2x \quad 3) \quad (2 \quad 3x \quad 5x^2)$

$2x(2 \quad 3x \quad 5x^2) \quad 3(2 \quad 3x \quad 5x)$

$4x \quad 6x^2 \quad 10x^3 \quad 6 \quad 9x \quad 15x^2$

$10x^3 \quad 6x^2 \quad 21x^2 \quad 4x \quad 9x \quad 6$

$10x^3 \quad 9x^2 \quad 13x \quad 6$

$(2x \quad 3)(2 \quad 3x \quad 5x^2)$

$10x^3 \quad 9x^2 \quad 13x \quad 6$

(iv) To find, $(5 \quad 3x) \quad (3x^3 \quad 2x^2 \quad 5)$

$5(3x^3 \quad 2x^2 \quad 5)$

$3x(3x^3 \quad 2x^2 \quad 5)$

$15x^3 \quad 10x^2 \quad 25 \quad 9x^4$

$6x^3 \quad 15x$

$9x^4 \quad 15x^3 \quad 6x^3 \quad 10x$

$15x \quad 25$

$9x^4 \quad 21x \quad 10x^2 \quad 15x \quad 25$

5. (i) To find,

$(2x^2 \quad x \quad 5) \quad (3x^2 \quad 2x \quad 1)$

$2x^2(3x^2 \quad 2x \quad 1) \quad x(3x^2$

$2x \quad 1) \quad 5(3x^2 \quad 2x \quad 1)$

$6x^4 \quad 4x^3 \quad 2x \quad 3x^3 \quad 2x^2$

$x \quad 15x^2 \quad 10x \quad 5$

$6x^4 \quad 4x^3 \quad 3x^3 \quad 2x \quad 2x^2$

$15x^2 \quad x \quad 10x \quad 5$

$6x^4 \quad x^3 \quad 19x^2 \quad 9x \quad 5$

(ii) To find,

$(2y^2 \quad 1 \quad 3y^2)(2 \quad 3y \quad 5y^2)$

$2y^2(2 \quad 3y \quad 5y^2) \quad 1(2 \quad 3y \quad 5y^2)$

$3y^2(2 \quad 3y \quad 5y^2)$

$4y^2 \quad 6y^3 \quad 10y^4 \quad 2 \quad 3y$

$5y^2 \quad 6y^2 \quad 9y^3 \quad 15y^4$

$10y^4 \quad 15y^4 \quad 6y^3 \quad 9y^3$

$4y^2 \quad 5y^2 \quad 3y \quad 2$

$25y^4 \quad 15y^3 \quad 15y^2 \quad 3y \quad 2$

(ii) To find,

$(x^2 \quad 3x \quad 5)(5x^3 \quad 7x^2 \quad 2x \quad 3)$

$x^2(5x^3 \quad 7x^2 \quad 2x \quad 3)$

$3x(5x^3 \quad 7x^2 \quad 2x \quad 3)$

$5(5x^3 \quad 7x^2 \quad 2x \quad 3)$

$5x^5 \quad 7x^4 \quad 2x^3 \quad 2x^2 \quad 15x^4$

$21x^3 \quad 6x^2 \quad 9x \quad 25x^3$

$35x^2 \quad 10x \quad 15$

$5x \quad 8x^4 \quad 44x^3 \quad 43x^2 \quad x \quad 15$

(iv) $(x^2 \quad xy \quad y^2)(4x^2 \quad 24xy \quad 3y^2)$

$x^2(4x^2 \quad 24xy \quad 3y^2)$

$xy(4x^2 \quad 24xy \quad 3y^2)$

$y^2(4x^2 \quad 24xy \quad 3y^2)$

$4x^4 \quad 24x^3y \quad 3x^2y^2 \quad 4x^3y$

$3x^2y^2 \quad 24x^2y^2 \quad 3xy^3 \quad 24xy^3$

$4x^2y^2 \quad 3y^4$

$4x^4 \quad 24x^3y \quad 4x^3y \quad 3x^2y^2$

$24x^2y^2 \quad 2xy^3 \quad 24xy^3$

$4x^3y \quad 3y^4$

$4x^4 \quad 20x^3y \quad 21x^2y^2 \quad 21xy^3$

$4x^3y \quad 3y^4$

(v) To find,

$(2p \quad 3q \quad 5) \quad (5p \quad 2q \quad 3)$

$2p(5p \quad 2q \quad 3) \quad 3q(5p \quad 2q \quad 3)$

$5(5p \quad 2q \quad 3)$

$10p^2 \quad 4pq \quad 6p \quad 15pq \quad 6q^2$

$9q \quad 25p \quad 10q \quad 15$

$10p^2 \quad 25p \quad 4pq \quad 15pq$

$6p \quad 9q \quad 10q \quad 6q^2 \quad 15$

$10p^2 \quad 11pq \quad 19p \quad 19q$

$6q^2 \quad 15$

6. To find, $[(x \quad 2)(x \quad 3)](x \quad 4)$

$[x(x \quad 3) \quad 2(x \quad 3)](x \quad 4)$

$(x^2 \quad 3x \quad 2x \quad 6)(x \quad 4)$

$(x^2 \quad 5x \quad 6)(x \quad 4)$

$x^2(x \quad 4) \quad 5x(x \quad 4) \quad 6(x \quad 4)$

$x^3 \quad 4x^2 \quad 5x^2 \quad 20x \quad 6x \quad 24$

$x^3 \quad 9x^2 \quad 26x \quad 24$

(ii) To find,

$[(x \quad 3)(x \quad 3)][(x \quad 4)(x \quad 4)]$

$[x(x \quad 3) \quad 3(x \quad 3)][(x(x \quad 4)$

$4(x \quad 4)]$

$[x^2 \quad 3x \quad 3x \quad 9]$

$[x^2 \quad 4x \quad 4x \quad 16]$

$(x^2 \quad 9)(x^2 \quad 16)$

$x^2(x^2 \quad 16) \quad 9(x^2 \quad 16)$

$x^4 \quad 16x^2 \quad 9x^2 \quad 144$

$x^4 \quad 25x^2 \quad 144$

Exercise-7.4

1. (i) To find, $45x^2 \quad 15x$

$$\frac{45x^2}{15x} \quad 3x$$

(ii) To find, $25x \quad x$

$$\frac{25x}{x} \quad 25$$

(iii) To find, $25x^2 \quad x^2$

$$\frac{25x^2}{x^2} \quad 25$$

(iv) To find, $24a^2b^2 \quad 3ab$

$$\frac{24a \quad b^2}{3ab} \quad 8ab$$

(v) To find, $85x^2yz \quad 5xyz$

$$\frac{85x^2yz}{5xyz} \quad 17x$$

$85x^2yz \quad 5xyz \quad 17x$

(vi) Tofind, $21p^2q^2r^2 \quad pqr$

$$\frac{21p^2q^2r^2}{pqr}$$

$21pqr$

$21p^2q^2r^2 \quad pqr \quad 21pqr$

2. (i) To find, $(25x^3 \quad 5x^2 \quad 6) \quad 5x$

$$\frac{25x^3}{5x} \quad \frac{5x^2}{5x} \quad \frac{6}{5x}$$

$5x^2 \quad x \quad \frac{6}{5x}$

$(25x^3 \quad 5x^2 \quad 6) \quad 5x$

$5x^2 \quad x \quad \frac{6}{5x}$

(ii) To find,

$(12x^2y^2 \quad 9x^2y \quad 12xy^2 \quad 6xy) \quad -\frac{2}{3}$

$$\frac{12x^2y^2}{2/3} \quad \frac{9x^2y}{2/3} \quad \frac{12xy^2}{2/3} \quad \frac{6xy}{2/3}$$

$12 \quad -\frac{3}{2}x^2y^2 \quad 9 \quad -\frac{3}{2}x^2y$

$12 \quad -\frac{3}{2}xy^2 \quad 6 \quad -\frac{3}{2}xy$

$18x^2y^2 \quad \frac{27}{2}x^2y \quad 18xy^2 \quad 9xy$

(ii) To find,

$(8x^2y^2 \quad 6x^2y \quad 4xy^2) \quad 2xy$

$$\frac{8x^2y^2}{2xy} \quad \frac{6x^2y}{2xy} \quad \frac{4xy^2}{2xy}$$

$4xy \quad 3x \quad 2y$

(iv) To find, $(x^3 \quad 6x^2 \quad 5x) \quad x$

$$\frac{x^3}{x} \quad \frac{6x}{x} \quad \frac{5x}{x}$$

$x^2 \quad 6x \quad 5$

3. (i) $(15x^2 \quad 6x \quad 3) \quad (x \quad 1)$

$(x \quad 1)\overline{)15x^2 \quad 6x \quad 3}\,(15x \quad 9$

$15x^2 \quad 15x$

$(-) \quad (-)$

$9x \quad 3$

$9x \quad 3$

$(+) \quad (+)$

6

Quotient $15x \quad 9$ Remainder 6

(ii) To find,

$(4x^3 \quad 24x^2 \quad 52x \quad 16) \quad (2x \quad 3)$

$$
\begin{array}{r}
2x^2 \quad 9x \quad 25/2 \\
2x \quad 3 \overline{)\; 4x^3 \quad 24x^2 \quad 52x \quad 16} \\
4x^3 \quad 6x^2 \\
\hline
18x^2 \quad 52x \quad 16 \\
18x^2 \quad 27x \\
\hline
25x \quad 16 \\
25x \quad \frac{75}{2} \\
\hline
\frac{43}{2}
\end{array}
$$

Quotient $2x^2 \quad 9x \quad \frac{25}{2}$

Remainder $\frac{43}{2}$

(ii) To find,

$(x^4 \quad 2x^3 \quad 3x^2 \quad 5x \quad 3) \quad (x \quad 5)$

$$
\begin{array}{r}
x^2 \quad 7x^2 \quad 38x \quad 195 \\
x \quad 5 \overline{)\; x^4 \quad 2x^3 \quad 3x \quad 5x \quad 15} \\
x^4 \quad 5x^3 \\
\hline
7x^3 \quad 3x^2 \quad 5x \quad 15 \\
7x^3 \quad 35x^2 \\
\hline
38x^2 \quad 5x \quad 15 \\
43x^2 \quad 190x \\
\hline
195x \quad 115 \\
195 \quad 975 \\
\hline
900
\end{array}
$$

Quotient $x^3 \quad 7x^2 \quad 38x \quad 195$

Remainder 990

(iv) To find,

$(x^5 \quad 28x^3 \quad 3x^2 \quad 16x) \quad x \quad 3$

$$
\begin{array}{r}
x^4 \quad 3x^3 \quad 19x^2 \quad 54x \quad 178 \\
x \quad 3 \overline{)\; x^5 \quad 28x^3 \quad 3x \quad 16x} \\
x^5 \quad 3x^4 \\
\hline
3x^4 \quad 28x^3 \quad 3x^2 \quad 16x \\
3x^4 \quad 9x^3 \\
\hline
19x^3 \quad 3x^2 \quad 16x \\
19x^3 \quad 57x^2 \\
\hline
54x^2 \quad 16x \\
54x^2 \quad 162x \\
\hline
178x \\
178x \quad 534 \\
\hline
534
\end{array}
$$

(v) $x^3 \quad 3$

$$
\begin{array}{r}
x^2 \quad 36x \quad 20 \\
x^3 \quad 3 \overline{)\; x^4 \quad 6x^3 \quad 17x^2 \quad 15} \\
x^4 \quad 3x^2 \\
\hline
6x^3 \quad 20x^2 \quad 15 \\
6x^3 \quad 18x \\
\hline
20x^2 \quad 18x \quad 15 \\
20x^2 \quad 60 \\
\hline
18x \quad 75
\end{array}
$$

Quotient $x^2 \quad 6x \quad 20$

Remainder $18x \quad 75$

4. (i) To find,

$(x^2 y^2 \quad x^2 \quad y^2) \quad x^2 \quad 1$

$$
\begin{array}{r}
y^2 \quad 1 \\
x^2 \quad 1 \overline{)\; x^2 y^2 \quad x^2 \quad y^2 \quad 1} \\
x^2 y^2 \quad y^2 \\
\hline
x^2 \quad 1 \\
x^2 \quad 1 \\
\hline
0
\end{array}
$$

Quotient $y^2 \quad 1$ Remainder 0

(ii) To find,

$(x^3 \quad x^2 \quad x \quad 1) \quad x^2 \quad 1$

$$
\begin{array}{r}
x \quad 1 \\
x^2 \quad 1 \overline{)\, x^3 \quad x^2 \quad x \quad 1} \\
x^3 \qquad\quad x \\
(-) \qquad\quad (-) \\
\hline
x^2 \quad 1 \\
x^2 \quad 1 \\
(-)\ (-) \\
\hline
0
\end{array}
$$

Quotient $x \quad 1$

Remainder 0

(iii) To find, $(x^2 \quad xy \quad y \quad x) \quad (x \quad y)$

$$
\begin{array}{r}
x \quad 1 \\
(x \quad y) \overline{)\, x^2 \quad xy \quad y \quad x} \\
x^2 \quad xy \\
(-) \quad (+) \\
\hline
y \quad x \\
y \quad x \\
(-) \quad (+) \\
\hline
0
\end{array}
$$

Quotient $x \quad 1$

Remainder 0

(iv) To find,

$(x^2 \quad y^2 \quad 2xy \quad 1) \quad (x \quad y \quad 1)$

$$
\begin{array}{r}
x \quad y \quad 1 \\
x \quad y \quad 1 \overline{)\, x^2 \quad y^2 \quad 2xy \quad 1} \\
x^2 \qquad\quad xy \quad x \\
(-) \qquad\quad (-) \quad (+) \\
\hline
y^2 \quad xy \quad x \quad 1 \\
y^2 \quad xy \quad y \\
(\ ) \ (-) \quad (+) \\
\hline
x \quad y \quad 1 \\
x \quad y \quad 1 \\
(-)\ (-) \quad (+) \\
\hline
0
\end{array}
$$

Quotient $x \quad y \quad 1$

Remainder 0

(v) To find,

$(x^6 \quad 3x^4 \quad 3x^2 \quad 1)$

$x^3 \quad 3x^2 \quad 3x \quad 1$

$$
\begin{array}{r}
x^3 \quad 3x^2 \quad 3x \quad 1 \\
x^3 \quad 3x^2 \quad 3x \quad 1 \overline{)\, x^6 \quad 3x^4 \quad 3x^2 \quad 1} \\
x^6 \quad 3x^5 \quad 3x^4 \quad x^3 \\
(-)\ (-) \quad (-) \quad (-) \\
\hline
3x^5 \quad 6x^4 \quad x^3 \quad 3x^2 \quad 1 \\
3x^5 \quad 9x^4 \quad 9x^3 \quad 3x^2 \\
(+) \quad (+) \quad (+) \ (+) \\
\hline
3x^4 \quad 8x^3 \quad 6x^2 \quad 1 \\
3x^4 \quad 9x^3 \quad 9x^2 \quad 3x \\
(-) \quad (-) \quad (-) \quad (-) \\
\hline
1x^3 \quad 3x^2 \quad 3x \quad 1 \\
1x^3 \quad 3x^2 \quad 3x \quad 1 \\
(+) \quad (+) \quad (+) \ (+) \\
\hline
0
\end{array}
$$

Quotient $x^3 \quad 3x^2 \quad 3x \quad 1$

Remainder 2

5. (i) Divident (Divisor) (Quotient) + Remainder

$(x \quad 2)\,(x^2 \quad 2x \quad 3) \quad 0$

$x\,(x^3 \quad 2x \quad 3)$

$2\,(x^2 \quad 2x \quad 3) \quad 0$

$x^3 \quad 2x^2 \quad 3x \quad 2x^2$

$4x \quad 6 \quad 0$

Divident $x^3 \quad x \quad 6$

(ii) Divident $(x^2 \quad 2) \quad (x \quad 2) \quad 0$

$x^2\,(x \quad 2) \quad 2\,(x \quad 2) \quad 0$

Divident $x^3 \quad 2x^2 \quad 2x \quad 4 \quad 0$

(iii) Divident $(x \quad y \quad 1)\,(y \quad x \quad 1) \quad 0$

$xy \quad x^2 \quad x \quad y^2 \quad xy$

$y \quad y \quad x \quad 1$

Divident $2xy \quad x^3 \quad y^2 \quad 1$

(iv) Divident

(Divisor) × Quotient + Remainder

$(x \quad 3) \quad (5x^4 \quad 2x^3 \quad 6x^2$

$3x \quad 9) \quad 7$

$(5x^5 \quad 2x^4 \quad 6x^3 \quad 3x^2 \quad 9x$

$15x^4 \quad 6x^3$

$18x^2 \quad 9x \quad 27 \quad 7$

Divident $5x^5 \quad 13x^4 \quad 15x^2 \quad 20$

Exercise-8.1

1. (i) We have,

$9x \quad 6 \quad 21$

$9x \quad 27$

$x \quad 3$

Checking

LHS $(9x \quad 6)$

$9(3) \quad 6$

$27 \quad 6$

21

LHS RHS Hence Proved

(ii) We have,

$3x \quad 5 \quad 2x \quad 8$

$3x \quad 2x \quad 8 \quad 5$

$x \quad 3$

Checking :

LHS RHS

$3(3) \quad 5 \qquad 2(3) \quad 8$

$14 \qquad 14$ Hence Proved

(iii) We have,

$2(5x \quad 4) \quad 4(3x \quad 5)$

$10x \quad 8 \quad 12x \quad 20$

$2x \quad 28$

$x \quad 14$

Checking :

LHS $2[5(14) \quad 4]$

$2[70 \quad 4]$

$2[74]$

148

RHS $4[3(14) \quad 5]$

$4[42 \quad 5]$

$4 \quad 37$

148

LHS = RHS Hence proved

(iv) We have,

$3x \quad 2(2x \quad 5) \quad 2(x \quad 3) \quad 8$

$3x \quad 4x \quad 10 \quad 2x \quad 6 \quad 8$

$x \quad 10 \quad 2x \quad 2$

$x \quad 2x \quad 2 \quad 10$

$3x \quad 12$

$x \quad 4$

Checking :

LHS

$3(4) \quad 2[2(4) \quad 5]$

$12 \quad 2(8 \quad 5)$

$12 \quad 2 \quad 3$

$12 \quad 6$

6

RHS $4[4 \quad 3] \quad 8$

$2(7) \quad 8$

$14 \quad 8$

6

LHS = RHS Hence Proved

(v) We have,

$$\frac{x}{2} \quad \frac{x}{3} \quad \frac{x}{5} \quad 6$$

$$\frac{x}{2} \quad \frac{x}{3} \quad \frac{x}{5} \quad 6$$

$$\frac{15x \quad 10x \quad 6x}{30} \quad 6$$

$25x \quad 6x \quad 6 \quad 30$

$19x \quad 180$

$$x \quad \frac{180}{19}$$

Checking:

LHS $\dfrac{180}{19 \quad 2} \quad \dfrac{180}{19 \quad 3}$

$$\frac{180 \quad 3 \quad 180 \quad 2}{19 \quad 2 \quad 3}$$

$$\frac{\overset{250}{\cancel{900}}}{19 \quad \cancel{6}} \quad \frac{250}{19}$$

RHS $\dfrac{180}{19 \quad 5} \quad 6$

$$\frac{180 \quad 6 \quad 95}{95}$$

$$\frac{180 \quad 570}{95} \quad \frac{750}{95} \quad \frac{250}{19}$$

$$\frac{250}{19}$$

LHS = RHS Hence proved

(vi) We have,

$$\frac{x \quad 5}{x \quad 9} \quad 7$$

$x \quad 5 \quad 7 \quad (x \quad 9)$

$x \quad 5 \quad 7x \quad 63$

$x \quad 7x \quad 63 \quad 5$

$$6x \quad 68$$
$$x \quad \frac{68}{6}$$
$$x \quad \frac{34}{3}$$

Checking :

$$\frac{34}{3} \quad 5 \quad \frac{34 \quad 15}{3}$$
$$\frac{34}{3} \quad 9 \quad \frac{34 \quad 27}{3}$$
$$\frac{49}{7} \quad 7 \quad \text{RHS}$$

Hence Proved

(vii) We have,

$$2(x \quad 2) \quad 3(4x \quad 1) \quad 0$$
$$2x \quad 4 \quad 2x \quad 3 \quad 0$$
$$14x \quad 7 \quad 0$$
$$x \quad \frac{7}{14} \qquad x \quad \frac{1}{2}$$

Checking :

LHS

$$2\ \frac{1}{2} \quad 2 \quad 3\ 4 \quad \frac{1}{2} \quad 1$$
$$(1 \quad 4) \quad 3(2 \quad 1)$$
$$3 \quad 3$$
$$0 \quad \text{RHS} \qquad \text{(Hence Proved)}$$

(viii) $2x \quad \frac{1}{3} \quad \frac{1}{5} \quad x$

$$2x \quad x \quad \frac{1}{5} \quad \frac{1}{3}$$
$$3x \quad \frac{3 \quad 5}{15}$$
$$3x \quad \frac{8}{15} \qquad x \quad \frac{8}{45}$$

Checking :

LHS		RHS
$2 \quad \frac{8}{45} \quad \frac{1}{3}$		$\frac{1}{5} \quad \frac{8}{45}$
$\frac{16 \quad 15}{45}$		$\frac{9 \quad 8}{45}$
$\frac{1}{45}$	=	$\frac{1}{45}$

LHS = RHS

Hence proved

(ix) $\frac{1}{2}x \quad 3 \quad 5 \quad \frac{1}{3}x$

$$\frac{1}{2}x \quad \frac{1}{3}x \quad 5 \quad 3$$
$$\frac{3x \quad 2x}{6} \quad 8$$
$$x \quad 8 \quad 6$$
$$x \quad 48$$

Checking :

LHS		RHS
$\frac{1}{2} \quad 48 \quad 3$		$5 \quad \frac{1}{3} \quad 48$
$24 \quad 3$		$5 \quad 16$
21	=	21

LHS = RHS Hence proved

(x) We have, $\frac{x}{2} \quad \frac{x}{4} \quad \frac{1}{8}$

$$\frac{2x \quad 1x}{4} \quad \frac{1}{8}$$
$$\frac{3x}{4} \quad \frac{1}{8}$$
$$x \quad \frac{1}{\cancel{8}_{2}} \quad \frac{\cancel{4}}{3} \qquad x \quad \frac{1}{6}$$

Checking :

LHS $\quad \frac{1}{6 \quad 2} \quad \frac{1}{6 \quad 4}$

$$\frac{1}{12} \quad \frac{1}{24} \quad \frac{2 \quad 1}{24}$$
$$\frac{3}{24}$$
$$\frac{1}{8} \quad \text{RHS} \quad \text{Hence Proved}$$

2. (i) We have,

$$0.5x \quad \frac{x}{3} \quad 0.25x \quad 7$$
$$\frac{3 \quad 0.5x \quad 1 \quad x}{3} \quad 0.25x \quad 7$$
$$1.5x \quad x \quad 3(0.25x \quad 7)$$
$$2.5x \quad 0.75x \quad 21$$
$$2.5x \quad 0.75x \quad 21$$
$$1.75x \quad 21$$
$$x \quad \frac{21}{1.75}$$
$$x \quad 12$$

(ii) $0.18(5x \quad 4) = 0.5x \quad 0.8$

$$0.90x \quad 0.72 \quad 0.5x \quad 0.8$$

$$0.90x \quad 0.5x \quad 0.8 \quad 0.72$$
$$0.40x \quad 1.52$$
$$x \quad \frac{1.52}{0.40}$$
$$x \quad 3.8$$

(iii) $2.4(3 \quad x) \quad 0.6(2x \quad 3) \quad 0$
$$7.2x \quad 2.4x \quad 1.2x \quad 1.8 = 0$$
$$2.4x \quad 1.2x \quad 1.8 \quad 7.2$$
$$3.6x \quad 9.0$$
$$x \quad \frac{9.0}{3.6}$$
$$x \quad 2.5$$

(iv) We have,
$$0.5x \quad (0.8 \quad 0.2x) \quad 0.2 \quad 0.3x$$
$$0.5x \quad 0.8 + 0.2x \quad 0.2 \quad 0.3x$$
$$0.5x \quad 0.2x \quad 0.3x \quad 0.2 + 0.8$$
$$1.0x \quad 1.0$$
$$x \quad 1$$

3. (i) We have,
$$\frac{x \quad 2}{x \quad 2} \quad \frac{7}{3}$$
$$3(x \quad 2) \quad 7(x \quad 2)$$
[cross multiplying]
$$3x \quad 6 \quad 7x \quad 14$$
$$6 \quad 14 \quad 7x \quad 3x$$
$$20 \quad 4x$$
$$5 \quad x$$

(ii) We have
$$\frac{2x \quad 5}{3x \quad 4} \quad 3$$
$$2x \quad 5 \quad 3(3x \quad 4)$$
[Cross multiplying]
$$2x \quad 5 \quad 9x \quad 12$$
$$2x \quad 9x \quad 12 \quad 5$$
$$7x \quad 7$$
$$x \quad 1$$

(iii) We have,
$$\frac{2x \quad 1}{3} \quad \frac{6x \quad 2}{5} \quad \frac{1}{3}$$
$$\frac{5(2x \quad 1) \quad 3(6x \quad 2)}{15} \quad \frac{1}{3}$$
$$\frac{10x \quad 5 \quad 18x \quad 6}{15} \quad \frac{1}{3}$$
$$8x \quad 1 \quad 5$$
$$8x \quad 4$$
$$x \quad \frac{4}{8}$$
$$x \quad \frac{1}{2}$$

(iv) We have,
$$\frac{2x \quad 3}{5} \quad \frac{x \quad 3}{4} \quad \frac{4x \quad 1}{7}$$
$$\frac{4(2x \quad 3) \quad 5(x \quad 3)}{20} \quad \frac{4x \quad 1}{7}$$
$$\frac{8x \quad 12 \quad 5x \quad 15}{20} \quad \frac{4x \quad 1}{7}$$
$$\frac{13x \quad 3}{20} \quad \frac{4x \quad 1}{7}$$
$$7(13x \quad 3) \quad (4x \quad 1)\,20$$
$$91x \quad 21 \quad 80x \quad 20$$
$$91x \quad 80x \quad 20 \quad 21$$
$$11x \quad 1$$
$$x \quad \frac{1}{11}$$

(v) We have,
$$\frac{(2x \quad 1) \quad (2x \quad 3)}{(2x \quad 1) \quad (x \quad 1)} \quad \frac{6}{7}$$
$$\frac{2x \quad 1 \quad 2x \quad 3}{2x \quad 1 \quad x \quad 1} \quad \frac{6}{7}$$
$$\frac{4x \quad 2}{x \quad 2} \quad \frac{6}{7}$$
$$7(4x \quad 2) \quad 6(x \quad 2)$$
$$28x \quad 14 \quad 6x \quad 12$$
$$28x \quad 6x \quad 12 \quad 14$$
$$22x \quad 26$$
$$x \quad \frac{26}{22}$$
$$x \quad \frac{13}{11}$$

(vi) $$\frac{(5x \quad 3) \quad (4x \quad 2)}{(5x \quad 3) \quad (x \quad 1)} \quad \frac{7}{4}$$
$$\frac{5x \quad 3 \quad 4x \quad 2}{5x \quad 3 \quad x \quad 1} \quad \frac{7}{4}$$
$$\frac{x \quad 5}{6x \quad 2} \quad \frac{7}{4}$$
$$4x \quad 20 \quad 42x \quad 14$$
$$4x \quad 42x \quad 14 \quad 20$$
$$38x \quad 6$$
$$x \quad \frac{6}{38}$$

$$x = \frac{3}{19}$$

(vii) $\frac{4x}{x-3} = \frac{12x-1}{3x-2}$

$$4x(3x-2) = (12x-1)(x-3)$$
$$12x^2 - 8x = 12x^2 - 36x - x + 3$$
$$-8x = -37x + 3$$
$$8x - 37x = -3$$
$$-29x = -3$$
$$x = \frac{3}{29}$$

(viii) We have,

$$\frac{3x-1}{3x-1} = \frac{2x-1}{2x-1}$$
$$(3x-1)(2x-1) = (2x-1)(3x-1)$$
$$6x^2 - 3x - 2x + 1 = 6x^2 - 2x - 3x + 1$$
$$x - 1 = -x + 1$$
$$2x = 1 + 1$$
$$2x = 0$$
$$x = 0$$

(ix) $\frac{x-2}{6} - \frac{11-x}{3} + \frac{1}{4} = \frac{3x-4}{12}$

$$\frac{x-2}{6} - \frac{4(11-x)}{12} + \frac{3}{12} = \frac{3x-4}{12}$$
$$\frac{x-2}{6} - \frac{44-4x}{12} + \frac{3}{12} = \frac{3x-4}{12}$$
$$\frac{x-2}{6} - \frac{-4x+41}{12} + \frac{3}{12} = \frac{3x-4}{12}$$
$$\frac{2(x-2) - 1(-4x+41) + 3}{12} = \frac{3x-4}{12}$$
$$\frac{2x-4+4x-41+3}{12} = \frac{3x-4}{12}$$
$$6x - 37 + 3 = 3x - 4$$
$$6x - 3x = -4 + 37$$
$$3x = 33$$
$$x = 11$$

(x) We have,

$$\frac{9x-7}{2} - x + \frac{x-2}{7} = 36$$
$$\frac{9x-7}{2} - \frac{7x-(x-2)}{7} = 36$$
$$\frac{9x-7}{2} - \frac{7x-x+2}{7} = 36$$
$$\frac{9x-7}{2} - \frac{6x+2}{7} = 36$$
$$\frac{7(9x-7) - 2(6x+2)}{14} = 36$$
$$\frac{63x - 49 - 12x - 4}{14} = 36$$
$$51x - 45 - 36 = 14$$
$$51x - 45 = 504$$
$$51x = 459$$
$$x = 9$$

Exercise-8.2

1. Let the number be x

$$x - \frac{x}{2} = 72$$
$$\frac{2x-x}{2} = 72$$
$$\frac{x}{2} = 72$$
$$x = 72 \times 2$$
$$x = 24 \times 2$$
$$x = 48$$

Number is 48

2. Let number x

$$x - \frac{2}{3}x = 55$$
$$\frac{3x-2x}{3} = 55$$
$$x = 55 \times 3$$
$$x = \frac{55 \times 3}{5}$$
$$x = 33$$

Number is 33

3. Let number be x

$$x + 21 = 71 - x$$
$$x + x = 71 - 21$$
$$2x = 92$$
$$x = 46$$

Number is 46

4. Let number x

$$x - \frac{2}{3}x = 20$$
$$\frac{3x-2x}{3} = 20$$

$$\frac{x}{3} \quad 20$$

$$x \quad 60$$

Number is 60

5. Let number be x

$$\frac{2}{3}x \quad \frac{1}{3}x \quad 3$$

$$\frac{2x \quad 1x}{3} \quad 3$$

$$x \quad 3 \quad 3$$

$$x \quad 9$$

Number is 9

6. Let first odd number x

Next " " $x \quad 2$

$$x \quad (x \quad 2) \quad 76$$

$$2x \quad 2 \quad 76$$

$$2x \quad 74$$

$$x \quad 37$$

two consecutive odd numbers are 37 and 39.

7. Let first even number x

2nd " " $x \quad 2$

3rd " " $x \quad 4$

Now, $x \quad (x \quad 2) \quad (x \quad 4) \quad 90$

$$3x \quad 6 \quad 90$$

$$3x \quad 90 \quad 6$$

$$3x \quad 84$$

$$x \quad 28$$

Ist even number 28

2nd even number $28 \quad 2 \quad 30$

3rd even number $28 \quad 4 \quad 32$

8. Let breadth of rectangle x metres

Length " " $(2x)$ metres

Perimeter of rectangle 150

$$2(l \quad b) \quad 150$$

$$2[2x \quad x] \quad 150$$

$$2(3x) \quad 150$$

$$6x \quad 150$$

$$x \quad 25$$

breadth 25 metres

and length 50 metres

9. Let third side of triangle x

equal sides are $(2x \quad 5)$

Perimeter of triangle 55

$$x \quad (2x \quad 5) \quad (2x \quad 5) \quad 55$$

$$5x \quad 10 \quad 55$$

$$5x \quad 65$$

$$x \quad 13$$

third side of triangle 13 metres

and equal sides of triangle

$$2(13) \quad 5$$

$$26 \quad 5$$

21 metres

10. Let Hari babu total property x

given to his son $\frac{x}{3}$

" " daighter $\frac{x}{4}$

Remaining property $x \quad \frac{x}{3} \quad \frac{x}{4}$

wife share $x \quad \frac{4x \quad 3x}{12}$

$$x \quad \frac{7x}{12}$$

$$\frac{12x \quad 7x}{12}$$

$$18000 \quad \frac{5x}{12}$$

$$\frac{18000 \quad 12}{5} \quad x$$

₹ 43200 x

Total property of Hari babu ₹ 43200

11. Let present age of Raju's cousin x years

" " " Raju $(x \quad 19)$

After 5 years Cousin's age $x \quad 5$

" " " Raju's age $(x \quad 19)$

After 5 years cousin's age $x \quad 5$

" " " Raju's age $(x \quad 19) \quad 5$

$(x \quad 14)$

Now, $\frac{x \quad 5}{x \quad 14} \quad \frac{3}{2}$ (given)

$$2(x \quad 5) \quad 3(x \quad 14)$$

$$2x \quad 10 \quad 3x \quad 42$$

$$3x \quad 2x \quad 42 \quad 10$$

$$x \quad 52$$

$$x \quad 52$$

Cousin's age 52 years

Raju's age $52 \quad 19$

33 years

12. Let age of son x years

" " man $(x \quad 30)$ years

After 12 years

Age of son $(x \quad 12)$ years
" " man $(x \quad 30) \quad 12$
$(x \quad 42)$ years
Now age of man 3 (Age of son)
$x \quad 42 \quad 3(x \quad 12)$
$x \quad 42 \quad 3x \quad 36$
$42 \quad 36 \quad 3x \quad x$
$6 \quad 2x$
$3 \quad x$
Age of son 3 years
" man 33 years

13. Let five years ago age of son x years
" " " man $7x$ years
Present age of son $(x \quad 5)$ years
Present age of man $(7x \quad 5)$ years
After 5 years age of man $(7x \quad 10)$
" " " " son $(x \quad 10)$
Now age of man 3 (Age of son)
$7x \quad 10 \quad 3(x \quad 10)$
$7x \quad 10 \quad 3x \quad 30$
$4x \quad 20$
$x \quad 5$
Present age of son $x \quad 5$
$5 \quad 5$
10 years
" " " man $7x \quad 5$
$7 \quad 5 \quad 5$
40 years

14. Let denominator x
numerator $x \quad 4$

Now, $\dfrac{(x \quad 4) \quad 1}{x \quad 1} \quad \dfrac{1}{2}$

$\dfrac{x \quad 3}{x \quad 1} \quad \dfrac{1}{2}$

$2x \quad 6 \quad x \quad 1$
$2x \quad x \quad 1 \quad 6$
$x \quad 7$
denominator 7
and numerator $7 \quad 4 \quad 3$
fraction is $\dfrac{3}{7}$

15. Let unit place digit x
ten's " " $8 \quad x$
Now two digit number is $10(8 \quad x) \quad x$
After reversing the digits two digit number is
$10x \quad (8 \quad x)$

$[10(8 \quad x) \quad x] \quad 18 \quad 10x \quad (8 \quad x)$
$(80 \quad 10x \quad x) \quad 18 \quad 9x \quad 8$
$98 \quad 9x \quad 9x \quad 8$
$98 \quad 8 \quad 9x \quad 9x$
$90 \quad 18$
$x \quad 5$
unit place digit is 5
and ten's place digit is $(8 \quad 5) \quad 3$
two digit number is 35.

16. Let present age of Manoj x years
After 12 years age of Manoj $(x \quad 12)$
4 years ago " " " $(x \quad 4)$
$(x \quad 12) \quad 3(x \quad 4)$ [given]
$x \quad 12 \quad 3x \quad 12$
$x \quad 3x \quad 12 \quad 12$
$2x \quad 24$
$x \quad 12$
Present age of Manoj 12 years

17. Let unit place digit x
ten's place digit $(9 \quad x)$
two digit number $10(9 \quad x) \quad x$
given,
$[10(9 \quad x) \quad x] \quad 9 \quad 10 \quad x \quad (9 \quad x)$
$90 \quad 10x \quad x \quad 9 \quad 10x \quad 9 \quad x$
$81 \quad 9x \quad 9x \quad 9$
$81 \quad 9 \quad 9x \quad 9x$
$72 \quad 18x$
$4 \quad x$
unit place digit 4
ten's place digit $9 \quad 4 \quad 5$
two digit number is 54

18. Let two numbers be $5x$ and $8x$

$\dfrac{5x \quad 2}{8x \quad 2} \quad \dfrac{2}{3}$ [given]

$15x \quad 6 \quad 16x \quad 4$
$6 \quad 4 \quad 16x \quad 15x$
$2 \quad x$
Original numbers are $5 \quad 2, 8 \quad 2$
$10, 16$

19. Let share of suman x
Suman share Depti share
$4x$ Depti Share
Deepti share 2 Neha share
$4x \quad 2$ Neha share
$2x$ Neha share
Now, Suman share + Deepti share + Nehad share ₹ 2100

$x \quad 4x \quad 2x \quad ₹\,21000$

$7x \quad 21000$

$x \quad 21000$

$x \quad \frac{21000}{7}$

$x \quad ₹\,3000$

Suman share $₹\,3000$

Deepti share $₹\,(4 \quad 3000)$

$₹\,12000$

Neha share $2 \quad 3000$

$₹\,6000$

20. Let three numbers be $4x, 5x, 6x$

$6x \quad 4x \quad 5x \quad 55$ (given)

$10x \quad 5x \quad 55$

$5x \quad 55$

$x \quad 11$

Numbers are $4 \quad 11, 5 \quad 11, 6 \quad 11$

$44, 55, 66$

Exercise-9.1

1. (i) Supplement of $70 \quad 180 \quad 70$

110

(ii) " " $135 \quad 180 \quad 135 \quad 45$

(iii) " " $50 \quad 180 \quad 50 \quad 130$

(iv) " " $120 \quad 180 \quad 120 \quad 60$

(v) " " $90 \quad 180 \quad 90 \quad 90$

2. (i) Complement of $55 \quad 90 \quad 55 \quad 35$

(ii) " " $73 \quad 90 \quad 73 \quad 17$

(iii) " " $45 \quad 90 \quad 45 \quad 45$

(iv) " " $40 \quad 90 \quad 40 \quad 50$

(v) " " $30 \quad 90 \quad 30 \quad 60$

3. Let the complementary angles be $7x, 11x$

$7x \quad 11x \quad 90$

$18x \quad 90$

$x \quad 5$

Complementary angles are

$7 \quad 5, 11 \quad 5$

$35 \ , 55$

4. Let sumpplementary angles be $2x, 7x$

$2x \quad 7x \quad 180$

$9x \quad 180$

$x \quad 20$

Supplementary angles are

$2 \quad 20, 7 \quad 20$

$40 \ , 140$

5. Let the angles be x

Its complemtnary $90 \quad x$

given, $x \quad \frac{1}{2}(90 \quad x) \quad 30$

$x \quad 45 \quad \frac{x}{2} \quad 30$

$x \quad 75 \quad \frac{x}{2}$

$x \quad \frac{x}{2} \quad 75$

$\frac{3x}{2} \quad 75$

$x \quad \frac{75 \quad 2}{3} \qquad x \quad 50$

angles 50

6. Let smaller angle x

larger angle $3x \quad 15$

$x \quad (3x \quad 15) \quad 135$

$4x \quad 15 \quad 135$

$4x \quad 120$

$x \quad 30$

smaller angle 30

larger angle $3 \quad 30 \quad 15$

105

7. Let smaller angle x

larger angle $3x \quad 20$

$x \quad (3x \quad 20) \quad 180$

$4x \quad 180 \quad 20$

$4x \quad 200$

$x \quad 50$

smaller angle 50

larger angle 130

8. (i) $x \quad y \quad z \quad 180$ (straight line)

$55 \quad y \quad 66 \quad 180$

$121 \quad y \quad 180$

$y \quad 180 \quad 121$

$y \quad 59$

(ii) $x \quad y \quad z \quad 180$ (straight line)

$35 \quad 2x \quad z \quad 180$

$35 \quad 2(35) \quad z \quad 180$

$35 \quad 70 \quad z \quad 180$

$105 \quad z \quad 180$

$z \quad 180 \quad 105$

$z \quad 75$

(iii) Let $x \quad 3k, \ y \quad 5k, z \quad 7k$

$x \quad y \quad z \quad 180$ straight line

$3x \quad 5k \quad 7k \quad 180$

$15k \quad 180$

k 12

x 3 12, y 5 12, z 7 12

x 36 y 60 z 84

9. We have, (2x 5) 3x 180 straight line

5x 5 180

5x 175

x 35

Angles are (2 35 5), 3 35 75 , 105

10. We have,

AOC BOC 180 (straight line)

(3b 10) 2a 180

2a 3b 180 10

2a 3b 190 …(1)

4a 3b 20 …(2) [given]

Adding (1) and (2)

6a 190 20

6a 210

a 35

Puttin (2)

4 35 3b 20

140 3b 20

140 20 3b

120 3b

40 b

a 35, b 40

BOC 2a 2 35

BOC 70

and AOC 3b 10

3 40 10

120 10

AOC 110

11. BOD BOE COE 180

40 (x 5) (3x 7) 180 (straight line)

4x 52 180

4x 180 52

4x 128

x 32

(i) AOC 180 (COE BOE)

180 [(3x 7) (x 5)]

180 [4x 12]

180 [4 32 12]

180 [128 12]

180 140

AOC 40

(ii) AOD 180 40

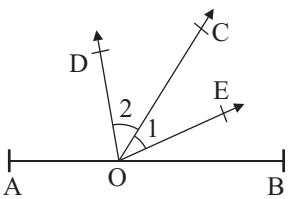
140

(iii) COE 3x 7

3 40 7

COE 127

12. Given : OD, OE are bisectors of AOC and BOC



To prove : DOE 90

(1) AOC BOC 180 straight line

(2) 2 2 2 1 180 bisector

2(2 1) 180

(DOE) $\frac{180}{2}$

or DOE 90

13. (i) ∵ AOB COB 180 straight line

70 x 180

x 110

(ii) POQ ROQ 180 straight line

3x 2x 180

5x 180

x 36

(iii) LON NOP MOP 180

35 x 60 180

x 95 180

x 180 95

x 5

(iv) AOB BOC COD DOE AOE 360

47 x 83 92 75 360

x 297 360

x 63

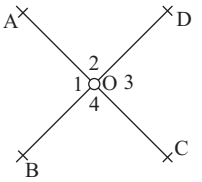
(v) POQ QOR ROS SOP 360

$x \quad 2x \quad 3x \quad 2x \quad 360$

$8x \quad 360$

$x \quad 45$

14. Given,



$1 \quad 48$

To find : $2, \quad 3, \quad 4$

$\because \quad 1 \quad 2 \quad 180$

$48 \quad 2 \quad 180$

$2 \quad 180 \quad 48$

$2 \quad 132$

$3 \quad 1 \quad 48$

Vertically opposite angles

$4 \quad 2 \quad 132$

Vertically opposite angles

15. Given : $COE \quad 90$

(i) Linear pairs $(\quad 5, \quad 1), (\quad 5, \quad 4)$

(ii) Supplementary angles

$(\quad 5, \quad 1), (\quad 5, \quad 4)$

(iii) Vertically opposite angles

$(\quad 1, \quad 4)$

(iv) Complementary angles

$(\quad 1, \quad 2)$

Exercise-9.2

1. We have, $1 \quad 65$

$\because \quad 1 \quad 2 \quad 180$ Linear pair

$65 \quad 2 \quad 180$

$2 \quad 115$

$5 \quad 1 \quad 65$

Corresponding angles

$6 \quad 2 \quad 115$

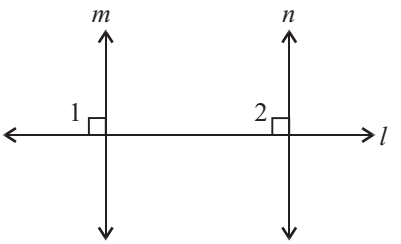
$3 \quad 1 \quad 65$ V.O.A.

$4 \quad 2 \quad 115$

$8 \quad 4 \quad 115$

$7 \quad 3 \quad 65$ Corresponding anlges

2. We have,



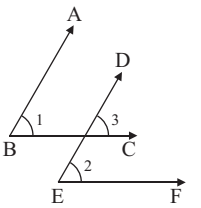
$1 \quad 90, \quad 2 \quad 90$

$1 \quad 2$

$m \,||\, n$

(corresponding angles are equal)

3. We have,



$1 \quad 75$

$\because \quad 3 \quad 1 \quad 75$

(Corresponding anlges)

$2 \quad 3 \quad 75$

4. $(2x \quad 3) \quad (3x \quad 2) \quad 180$

cointerior angles are supplementary

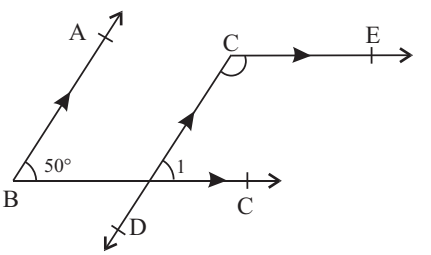
$5x \quad 5 \quad 180$

$5x \quad 185$

$x \quad 37$

5. Given,

$AB \,||\, CD, \quad BC \,||\, CE$



$1 \quad 50$ Corresponding angles

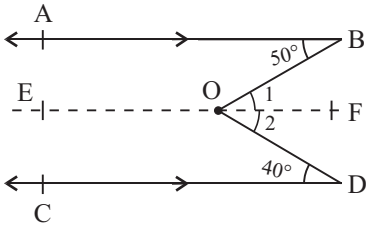
$1 \quad CED \quad 180$

Cointerior angles are supplementary

$50 \quad CED \quad 180$

$CED \quad 130$

6. Draw aline EOF parallel to AB and CD



$1 \quad 50$
$2 \quad 40$ alternate angles

$BOD \quad 1 \quad 2$
$50 \quad 40$
$BOD \quad 90$

7. $a \quad 65$ Vertically opposite angles

$\because \quad a \quad b \quad 180$
$65 \quad b \quad 180$ cointerior angles
$b \quad 180 \quad 65$
$b \quad 115$
$b \quad c \quad 180$
$115 \quad c \quad 180$
$c \quad 180 \quad 115$
$c \quad 65$
$c \quad d \quad 180$
$65 \quad d \quad 180$
$d \quad 115$

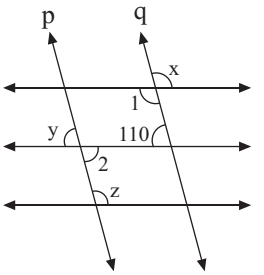
8. $x \quad 70$ corresponding angles
$y \quad 70$ alternate angles

9. $x \quad 70$ alternate angles
$y \quad 70$ corresponding angles

10. $x \quad 60$
$y \quad 50$ alternate angles

11. $x \quad 125 \quad 180$ Linear pair
$x \quad 180 \quad 125$
$x \quad 55$
$x \quad y \quad 180$ cointerior angles
$55 \quad z \quad 180$
$z \quad 180 \quad 55$
$z \quad 125$

12.



$y \quad 110$ corresponding angles
$1 \quad x$ vertically opposite angles
$1 \quad 110 \quad 180$ cointerior angles
$x \quad 110 \quad 180$
$x \quad 70$
$2 \quad y$
Vertically opposite angles
$2 \quad z \quad 180$ Cointerior angles
$y \quad z \quad 180$
$110 \quad z \quad 180$
$z \quad 70$

13. $b \quad 45$ alternate angles
$a \quad 35$ alternate angles

10 Triangles and Their Properties

Exercise-10.1

1. (i) $x \quad 45 \quad 55 \quad 180$
Sum angle property of triangle
$x \quad 100 \quad 180$
$x \quad 80$

(ii) $x \quad 90 \quad 60 \quad 180$
$x \quad 150 \quad 180$
$x \quad 30$

(iii) $x \quad 40 \quad 105 \quad 180$
$x \quad 145 \quad 180$
$x \quad 180 \quad 145$
$x \quad 35$

(iv) $x \quad x \quad x \quad 180$
sum angle property of triangle
$3x \quad 180$
$x \quad 60$

(v) $2x \quad x \quad 90 \quad x$
(sum angle property of triangle)
$3x \quad 90$
$x \quad 30$

(vi) $70 \quad x \quad x \quad 180$

$70 \quad 2x \quad 180$

$2x \quad 110$

$x \quad 55$

2. (i) $ACD \quad A \quad B$

Exterior angle equal to sum of interior opposite angles

$x \quad 60 \quad 50$

$x \quad 110$

$x \quad y \quad 180$ (Linear pair)

$110 \quad y \quad 180$

$y \quad 70$

(ii) $PRD \quad P \quad Q$

$110 \quad y \quad 40$

$110 \quad 40 \quad y$

$80 \quad y$

$x \quad 110 \quad 180$ (Linear pair)

$x \quad 70$

(iii) $x \quad 70$ (verticaly opposite angles)

$x \quad 60 \quad y \quad 180$

(sum angle property of triangle)

$70 \quad 60 \quad y \quad 180$

$130 \quad y \quad 180$

$y \quad 50$

(iv) $SRP \quad P \quad Q$

Exterior angle equal to sum of interior opposite angles

$x \quad 90 \quad 30$

$x \quad 120$

$y \quad 180 \quad x$ Linear pair

$180 \quad 120$

$y \quad 60$

(v) $140 \quad 90 \quad x$

Exterior angle equal to sum of interior opposite angles

$140 \quad 90 \quad x$

$50 \quad x$

$y \quad 140$

Vertically opposite angles

3. Let angles of triangle be $4x, 3x, 2x$

$4x \quad 3x \quad 2x \quad 180$

(sum angle property of triangle)

$9x \quad 180$

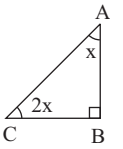
$x \quad 20$

angles of triangle are

$4 \quad 20, 3 \quad 20, 2 \quad 20$

$80, 60, 40$

4. Let acute angles be $2x, 1x$



$x \quad 2x \quad 90 \quad 180$

$3x \quad 90 \quad 180$

$3x \quad 90$

$x \quad 30$

Acute angles are $30, 2 \quad 30 \quad 30, 60$

5. Let equal angles of triangle be x

$x \quad x \quad 100 \quad 180$

$2x \quad 180 \quad 100$

$2x \quad 80$

$x \quad 40$

equal angles are $40 \ , 40$

6. $\because$ sum of exterior angles of triangle

360

$(3x \quad 5) \quad (2x \quad 27) \quad (3x \quad 24) \quad 360$

$8x \quad 8 \quad 360$

$8x \quad 352$

$x \quad 44$

7. Let $2 \quad A \quad 3 \quad B \quad 6 \quad C \quad k$

$A \quad \frac{k}{2}, \quad B \quad \frac{k}{3}, \quad C \quad \frac{k}{6}$

$\because \quad A \quad B \quad C \quad 180$

$\frac{k}{2} \quad \frac{k}{3} \quad \frac{k}{6} \quad 180$

$\frac{3k \quad 2k \quad k}{6} \quad 180$

$\frac{6k}{6} \quad 180$

$k \quad 180$

$A \quad \frac{180}{2}, \quad B \quad \frac{180}{3}, \quad C \quad \frac{180}{6}$

$A \quad 90 \ , \quad B \quad 60 \ , \quad C \quad 30$

8. Let interior opposite angles be $2x, 3x$

$\because$ Exterior angle sum of interior opposite angles

$100 \quad 2x \quad 3x$

$100 \quad 5x$

$20 \quad x$

Interior opposite angles

$2 \quad 20, 3 \quad 20$

$40, 60$

third angle $180 \quad (40 \quad 60)$

80

9. Let a cute angle be $1x$ and $4x$

$\because$ sum of all angles of triangle 180

$1x \quad 4x \quad 90 \quad 180$

$15x \quad 180 \quad 90$

$15x \quad 90$

$x \quad 6$

Acute angles $11 \quad 6, 4 \quad 6 \quad 66, 24$

10. $\because \quad F \quad B \quad C \quad 180$

$50 \quad 30 \quad z \quad 180$

$80 \quad z \quad 180$

$z \quad 100$

$y \quad 30\,; \quad z \quad x \quad 100$

(corresponding angles)

11. (i) Exterior angle sum of interior angle

$DAC \quad B \quad C$

$107 \quad x \quad 57$

$50 \quad x$

(ii) In CAD

$x \quad 45 \quad 105 \quad 180$

$x \quad 150 \quad 180$

$180 \quad 150$

$x \quad 30$

$x \quad 65 \quad y \quad 180$

(Linear pair)

$30 \quad 65 \quad y \quad 180$

$95 \quad y \quad 180$

$y \quad 180 \quad 195$

85

$y \quad 85$

12. $ACD \quad A \quad B$

(Exterior angle = to sum of interior opposite angles)

$ACD \quad 25 \quad 100$

$ACD \quad 125$

Similarly, $ACD \quad D \quad ACD$

$20 \quad 125$

$AED \quad 145$

13. $y \quad C \quad A$

(Exterior angle property)

$18 \quad 50$

$y \quad 68$

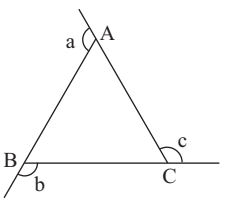
$x \quad y \quad D$

(Exterior angle property)

$68 \quad 35$

$x \quad 103$

14. To prove : $a \quad b \quad c \quad 360$



$a \quad 180 \quad A$

$b \quad 180 \quad B$ Linear pair

$c \quad 180 \quad C$

adding all three steps

$a \quad b \quad c \quad 180 \quad 180 \quad 180$

$(A \quad B \quad C)$

$720 \quad 180$

$a \quad b \quad c \quad 360$

or sum of exterior angles of triangle is equal to 360°.

15. (a) No a triangle cannot have two right angles.

(b) No, a triangle can not have two obtuse angles.

(c) Yes, a triangle have two acute angles.

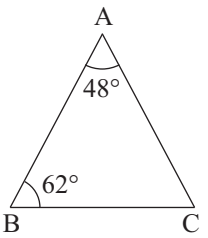
(d) No a triangle cannot have all angles greater than 60°.

(e) No a triangle cannot have all angles less than 60.

(f) Yes a triangle have all angles equal to 60

Exercise-10.2

1.



$\because \quad A \quad B \quad C \quad 180$

$48 \quad 62 \quad C \quad 180$

$110 \quad C \quad 180$

$C \quad 70$

Largest side AB ($\because$ C is largest)

smallest side BC

($\because$ A is smallest)

2. $P \quad Q \quad R \quad 180$

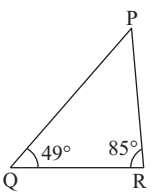
$P \quad 49 \quad 85 \quad 180$

$P \quad 134 \quad 180$

$P \quad 180 \quad 134$

$P \quad 46$

PQ is largest side



($\because$ R is largest)

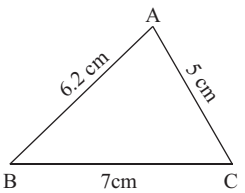
QR is smallest side

($\because$ P is smallest)

Ascending order of side are

QR PR PQ

3.



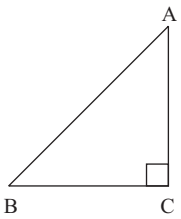
A is largest $\because$ BC is largest

B is smallest $\because$ AC is smallest

descending order of angles

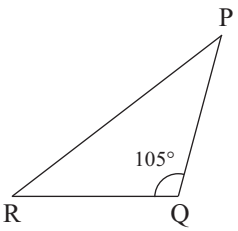
A C B

4. If C 90



AB is longest because in right angled triangle 90 is largest angle and side opposite to it longest.

5. $\because$ Q 105



PR is longest because in obtuse angled triangle obtuse angle is largest angle and side opposite to it is longest.

6. We have, A : B : C 3 : 5 : 7

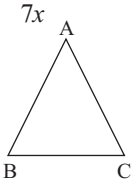
Let A 3x, B 5x, C 7x

3x 5x 7x 180

15x 180

x 12

A 3 2,



B 5 12,

C 7 12

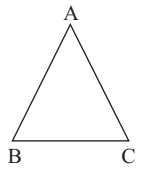
A 36 , B 60 , C 84

AB is longest $\because$ C is largest

BC is smallest $A$is smallest

7. We have,

$AB : BC : CA$ 3 : 8 : 5



A is largest

($\because$ BC is longest)

C is smallest AB is smallest

8. A 180 100 Linear pair

A 80

C 180 135 Linear pair

45

$\because$ A B C 180

80 B 45 180

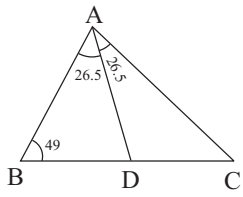
B 125 180

B 55

A 80 , B 55 , C 45

AB AC BC $\because$ C B A

9.



BAD CAD $\frac{A}{2}$ bisector

$\frac{53}{2}$ 26.5

A B C 180

53 49 C 180

102 C 180

C 78

ADC 26.5 + 49 75.5

Exterior angle sum of interior opposit angle

In ADC

DAC 26.5, C 78 ,

ADC (75.5)

Descending order of sides in ADC

AD AC DC

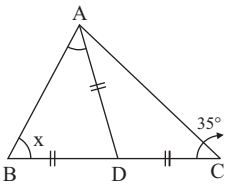
$\because$ ADC C DAC

10. $DAC \quad C \quad 35 \quad \because AD \quad DC$

$ADB \quad DAC \quad C$

$35 \quad 35$

$ADB \quad 70$



Let $BAD \quad DBA \quad x$

(angles opposite to equal sides)

In ABD

$x \quad x \quad 70 \quad 180$

$2x \quad 110$

$x \quad 55$

$AC \quad DC \quad \because \quad ADC \quad A$

$AB \quad AD \quad \because \quad ADB \quad B$

Exercise-10.3

1. (a) $MN^2 \quad LM^2 \quad LN^2$

(Pythagoras theorem)

$14^2 \quad 48^2$

$196 \quad 2304 \quad 2500$

$MN^2 \quad (50)^2$

$MN \quad 50\,\text{cm}$

(b) $AC^2 \quad AB^2 \quad BC^2$

(Pythagoras theorem)

$15^2 \quad 8^2$

$225 \quad 64$

289

$AC^2 \quad 17^2$

$AC \quad 17\,\text{cm}$

(c) $XY^2 \quad XZ^2 \quad YZ^2$

(Pythagoras theorem)s

$26^2 \quad XZ^2 \quad 24^2$

$676 \quad XZ^2 \quad 576$

$676 \quad 576 \quad XZ^2$

$100 \quad XZ^2$

$10^2 \quad XZ^2$

$10\,\text{cm} \quad XZ$

(d) $DF^2 \quad DE^2 \quad EF^2$

$37^2 \quad DE^2 \quad 12^2$

$1369 \quad DE^2 \quad 12^2$

$1369 \quad DE^2 \quad 144$

$1369 \quad 144 \quad DE^2$

$1225 \quad DE^2$

$35^2 \quad DE^2$

$35\,\text{cm} \quad DE$

(e) $AB^2 \quad AC^2 \quad BC^2$

(Pythagoras theorem)

$(4.5)^2 \quad 6^2$

$20.25 + 36$

$AB^2 \quad 56.25 \quad (7.5)^2$

$AB \quad 7.5\,\text{cm}$

(f) $PR^2 \quad QP^2 \quad QR^2$

(Pythagoras Theorem)

$(10.1)^2 \quad QP^2 \quad (9.9)^2$

$102.01 \quad QP^2 \quad 98.01$

$102.01 \quad 98.01 \quad QP^2$

$4 \quad QP^2$

$2^2 \quad QP^2$

$2\,\text{cm} \quad QP$

2. (i) We have sides 2, 3, 4

$\because \quad 2 \quad 3 \quad 4, \; 2 \quad 4 \quad 3, 3 \quad 4 \quad 2$

2, 3, 4 can be the sides of triangle.

(ii) We have sides 5, 7,12

$\because \quad 5 \quad 7 \quad 12$

5, 7, 12 cannot be the sides of triangle.

(iii) We have sides 3.4 ,2.1, 5.3

$\because$ $3.4 + 2.1 > 5.3$, $3.4 + 5.3 > 2.1$, $2.1 + 5.3 > 3.4$

3.4, 2.4, 5.3 can be the sides of triangle

(iv) We have sides 2.5, 1.3, 4

$\because$ $2.5 + 1.3 < 4$

2.5, 1.3.,4 can not be sides of triangle.

(v) We have sides 16, 7, 8

$\because$ $16 + 7 > 8$, $16 + 8 > 7$ and $7 + 8 < 16$

16, 7, 8 cannot be the sides of triangle.

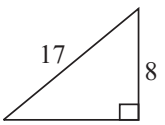
(vi) We have sides 8.5, 16.3, 4.9

$\because$ $8.5 + 16.3 > 4.9$,

$8.5 + 4.9 < 16.3$

8.5, 16.3, 4.9 can not be sides of triangle.

3. $\because$ (Hypotenuse)^2 (Ist side)^2 (other side)^2



17^2 8^2 $(2^{nd}\ \text{side})^2$

289 64 $(2^{nd}\ \text{side})^2$

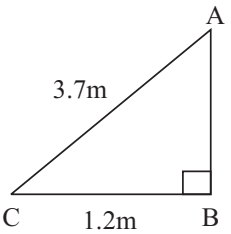
289 64 $(2^{nd}\ \text{side})^2$

225 $(2^{nd}\ \text{side})^2$

15^2 $(2^{nd}\ \text{side})^2$

other side is 15 cm

4. AC is ladder and AB is wall



$\because$ AC^2 AB^2 BC^2

$(3.7)^2$ AB^2 $(1.2)^2$

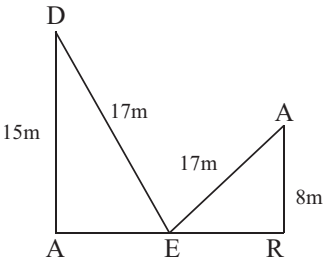
13.69 AB^2 1.44

12.25 AB^2

$(3.5)^2$ m AB^2

ladder will reach upto 3.5m on the wall.

5. A and D are windows BC is street



In AEB,

17^2 8^2 BE^2

289 64 BE^2

225 BE^2

15^2 BE^2

15 m BE

In DCE

DE^2 DC^2 CE^2

17^2 15^2 CE^2

289 225 CE^2

64 CE^2

8^2 CE^2

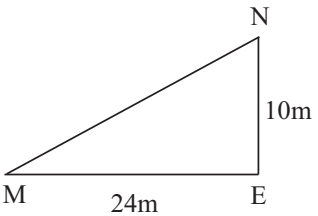
8 CE

Width of street CE BE

8 15

23 m

6. Let M is starting point



MN^2 ME^2 NE^2

24^2 10^2

576 100

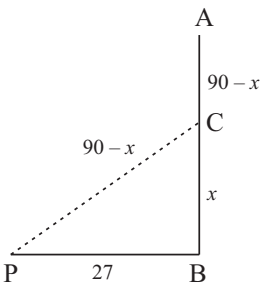
MN^2 1676

MN^2 26^2

MN 26 m

Man is 26m away from starting point

7. Let AB is plant broken at C touches the grount at P.



Let from x cm from the ground it is broken.

$AC \quad PC \quad 90 \quad x$

$\because \quad PC^2 \quad BC^2 \quad PB^2$

$(90 \quad x)^2 \quad x^2 \quad 27^2$

$8100 \quad x \quad 180x \quad x^2 \quad 729$

$8100 \quad 729 \quad 180x$

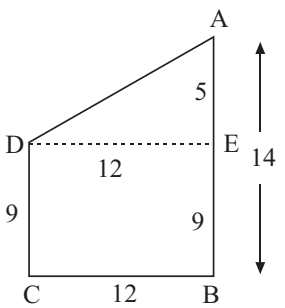
$7371 \quad 180x$

$40.95 = x$

Plant is broken 40.95 cm from the ground

8. Let AB and CD are two poles

Draw $DE \quad AB$



$DE \quad BC \quad 12$

$BE \quad DC \quad 9$

$AE \quad 14 \quad 9 \quad 5$

In ADE

$AD^2 \quad DE^2 \quad AE^2$

$12^2 \quad 5^2$

169

$AD^2 \quad 13^2$

$AD \quad 13$

Distance between their tope is 13 cm.

9. In ADC

$AC^2 \quad AD^2 \quad DC^2$

$25^2 \quad 15^2 \quad DC^2$

$625 \quad 225 \quad DC^2$

$400 \quad DC^2$

$20^2 \quad DC^2$

$DC \quad 20\,\text{cm}$

$BD \quad 28 \quad 20 \quad 8\,\text{cm}$

In ABD

$AB^2 \quad AD^2 \quad BD^2$

$AB^2 \quad 15^2 \quad 8^2$

$225 \quad 64$

289

$AB^2 \quad 17^2$

$AB \quad 17\,\text{cm}$

10. In ABC

$AC^2 \quad AB^2 \quad BC$

$20^2 \quad (4\sqrt{11})^2$

$400 \quad 16 \quad 11$

$400 \quad 176$

576

$AC^2 \quad 24^2$

$AC \quad 24\,\text{cm}$

In CDE

$CE^2 \quad DE^2 \quad CD^2$

$6^2 \quad 8^2$

$36 \quad 64$

$CE^2 \quad 100$

$CE^2 \quad 10^2$

$CE \quad 10\,\text{cm}$

$\because \quad AE^2 \quad 26^2 \quad 676$

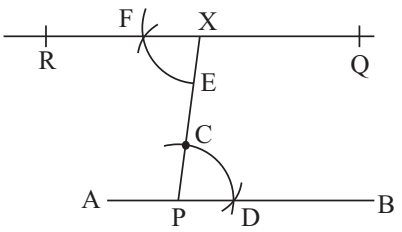
$AC^2 \quad CE^2 \quad 576 \quad 100 \quad 676$

$AC^2 \quad AC^2 \quad CE^2$

$ACE \quad 90$

Exercise-11.1

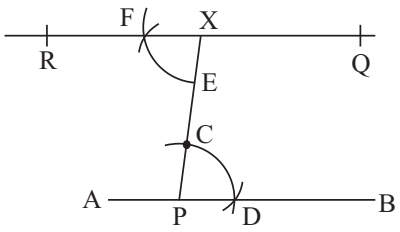
1. (i) Steps of Construction



(1) Draw AB 5 cm.
(2) Take any point X outside of AB.
(3) Join X with AB at a point P.
(4) At P draw an arc of any radius meeting XP at C and D.
(5) At X draw an arc with same radius meeting PX at E.
(6) With E as centre and radius CD cut the previous arc at F.
(7) Draw a line passing through F and X call it RQ.

$RQ \parallel AB$

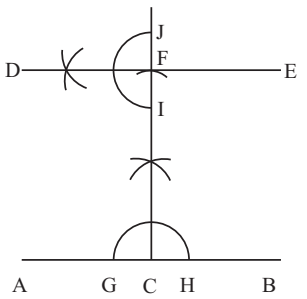
2. Steps of constructions



(1) Draw PQ 6.3
(2) Take any point X outside it.
(3) Join X with PQ at E.
(4) With E as centre and any radius draw an arc cutting XE at A and B.
(5) With$X$ as centre and same radius drawan arc cutting XC at C.
(6) With C as centre and radius AB cut previous arct at D.
(7) Join XD and produce it to form line RS

$RS \parallel PQ$

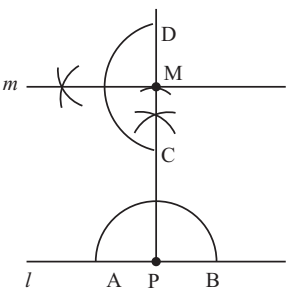
3. Steps of constructions



(1) Draw any line AB.
(2) Take any point C on it.
(3) Draw perpendicular at C.
(4) With C as centre and radius equal to 5 cm cut an arc on perpendicular at F.
(5) At F draw perpendicular and produce it to form line DE.

$DE \parallel AB$

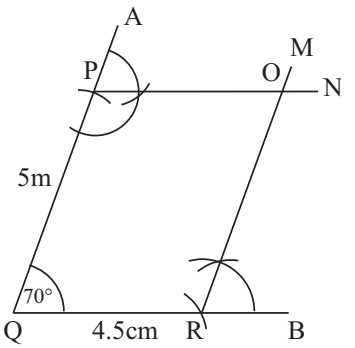
4. Steps of constructions :



(1) Draw a line AB.
(2) Take any point P on it.
(3) With P as centre and radius equal to 3 cm cut an arc on the perpendicular.
(4) At M draw perpendicular and produce it to form a line m.

$m \parallel l$

5. Steps of constructions :



(1) draw AOB 70

(2) With Q as centre and radius equal to 4.5 cm cut on arc R on QB.

(3) With Q as and radius equal to 5 cm cut an arc P on QA.

(4) At R draw MRB AQB

(5) At R draw APN PQB meeting previous MRB at O.

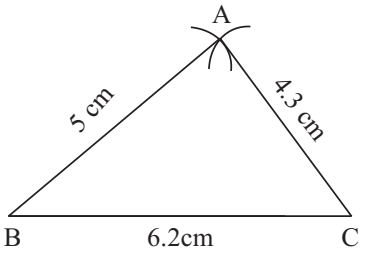
PM QR 4.5 cm

OR QP 5 cm

($\because QROP$ is a parallelogram)

Exercise-11.2

1. Steps of construction :



(1) Draw BC 6.2 cm

(2) With C as centre and radius 4.3 cut an arc.

(3) With B as centre and radius 5 cm cut the previous arc at A .

(4) Join AB and AC

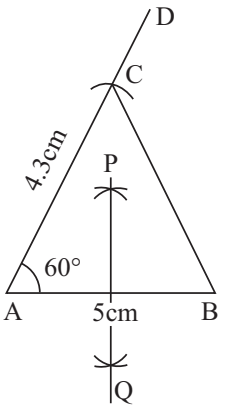
ABC is required triangle.

2. Steps of construction :

(1) Draw AB 5 cm

(2) At A draw DAB 60

(3) With A as centre and radius 4.3 cm cut the AD at C.



(4) Join BC

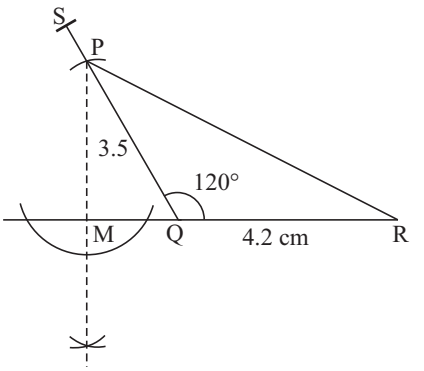
ABC is required triangle

(5) With A as centre and radius more than half of AB cut two arcs.

(6) With B as centre and same radius cut the previous arcs at $P$and Q.

(7) Join PQ which is required perpendicular bisector.

3. Steps of construction :



(1) Draw QR 4.2 cm

(2) At Q draw SQR 120

(3) With Q as centre and radius 3.5 cm cut an arc QS. Join PR

PQR is required triangle.

4. Steps of construction

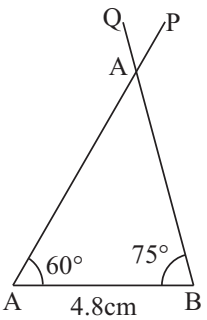
(1) Draw BC 4.8 cm

(2) At B draw PBC 60

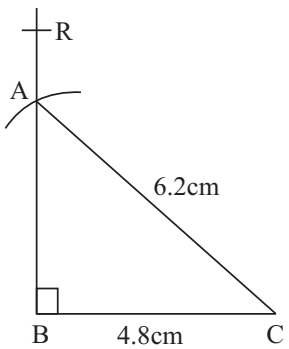
(3) At C draw QCB 75

Meeting previous angle at A

ABC is required triangle.



5. Step of construction :



(1) Draw BC 4.8 cm

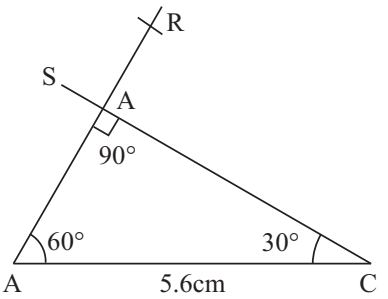
(2) AtB draw B 90

(3) With C as centre and radius 6.2 cm cut BR at A.

(4) Join AC

ABC is required triangle.

6. If one a cute angle of right angled triangle is 30° then other acute angle is 60°.



Steps of construction

(1) Draw BC 5.6 cm

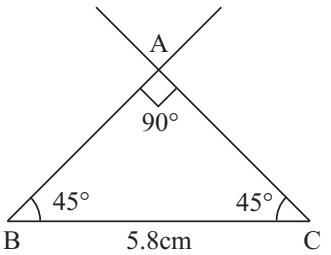
(2) At B draw RBC 60

(3) At C draw SCB 30

Meeting previous angle at A

ABC is required triangle.

7. Each acute angle of right angled triangle is 45°



Steps of construction :

(1) Draw BC 5.8 cm

(2) At B and C draw angle 45° each meeting each other at A.

ABC is required isosceles right angled triangle.

12 Congruence

Exercise-12

1. (i) Yest the triangles are congruent by SSS congruence condition.

(ii) Yes the triangles are congruent by ASA congruence condition.

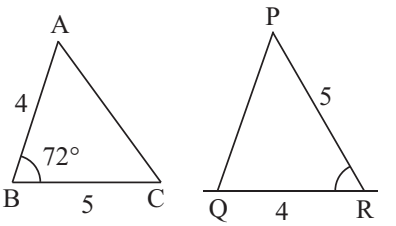
(iii) No the triangles are not congruent.

(iv) Yes the triangles are congruent by ASA congruence conditon.

(v) No the triangles are not congruent.

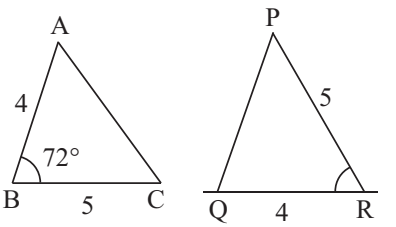
(vi) Yes the triangles are congruent by ASA congruence condition.

2. (i) Yes ABC PRQ by SAS



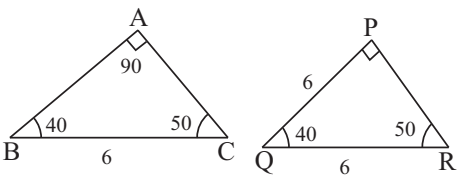
$\because$ AB PR, B R, BC QR

(ii) Same as (i)



(iii) B 180 (90 50)

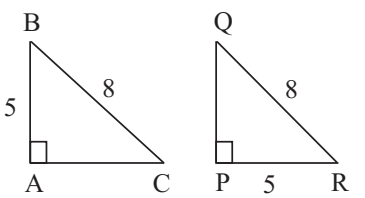
B 40



No the triangles are not congruent.

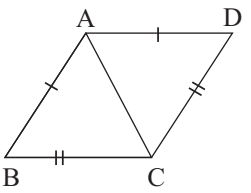
(iv) Yes ABC PRQ

By RHS



$\because$ A P, BC QR, AB PR

(v) Figure is according to given condition



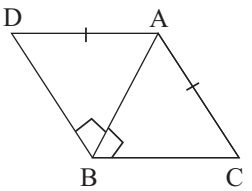
Yes, ABC ADC (By sss)

$\because$ AB AD, BC DC, AC AC

(vi) Yes ABC ABD (By RHS)

$\because$ ABC ABD 90

AC AD



AB AB

3. AOB is not to EOD

$\because$ Only A E, B D

(alternte angles)

But no sides are equal

4. (i) ADB DBC (alternate angles)

In DAB and BCD

AD BC (given)

ADB DBC (alternate angles)

BD BD

DAB BCD (By SAS)

5. A D 180 (65 30)

180 95

A D 85

OA OD 3 cm

AOB DOC 30

AOB DOC (By ASA)

6. Yes, LPQ MPQ (By SSS)

$\because$ PL PM

PQ PQ, LQ MQ

7. In PQR and SQR

PR SR

$PRQ \quad SRQ$

$QR \quad QR$

$PQR \quad SQR$ By **SAS**

8. In AOB and DOC

$A \quad D$ alternate angles

$AB \quad CD$ common

$B \quad C$ alternate angles

$AOB \quad DOC$ by ASA

9. In ABC and DCB

$AB \quad DC$ (given)

$AC \quad BD$ (given)

and $BC \quad BC$

$ABC \quad DCB$ (By SSS)

In ABD and DCA

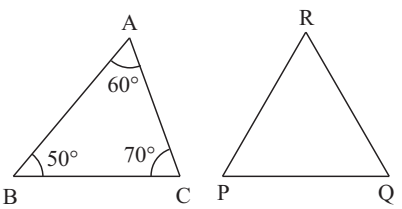
$AD \quad AD$

$AB \quad CD$

$BD \quad AC$

$ABD \quad DCA$ (By SSS)

10.



$C \quad 180 \quad (50 \quad 60) \quad 70$

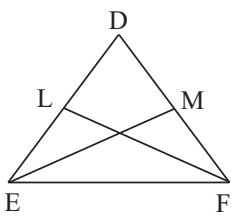
$\because \quad ABC \quad RPQ$

$R \quad A \quad 60$

$P \quad B \quad 50$ C.P.C. t C

$Q \quad C \quad 70$

11. In DEM and DFL



$DE \quad DF$ (given)

$D \quad D$ (common)

$DM \quad DL$ (given)

$DEM \quad DFL$ (By SAS)

12. $A \quad D, \quad B \quad E, \quad C \quad F$ (given)

But ABC not DEF becuase even in two equilateral triangles angles are equal but sides canbe different.

13. In ABN and ACM

$AB \quad AC$ (given)

$A \quad A$ (Common)

$AN \quad AM$ (given)

$ABN \quad ACM$ (by SAS)

$BN \quad CM$ (CPCTC)

14. (i) Yes $ABC \quad CDA$

(ii) SSS Congruence condition

(iii) Yes $AC \quad AC$ (common)

15. In ABC and DBC

$A \quad D \quad 90$ (given)

$BC \quad BC$ (common)

$AC \quad BD$ (given)

$ABC \quad DBC$ (by RHS)

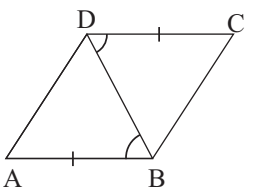
16. $ABD \quad ACD$ (by ASA)

$\because \quad CAD \quad BAD$ (angle bisector)

$AD \quad AD$ (common)

$CDA \quad BDA$ (angle bisector)

17. Given : $ABCD$ is a parallelogram



To prove : $ABD \quad CDB$

In ABD and CDB

$AB \quad CD$

(opposite sides of parallelogram)

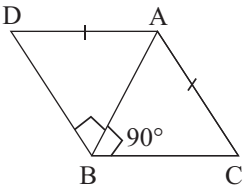
$AD \quad BC$

$BD \quad BD$ (common)

$ABD \quad CDB$ by SSS

diagonal of parallelogram bisect the parallelogram.

18. In ABC and ABD



ABC ABD 90

AC AD (given)

AB AB (common)

ABC ABD (by RHS)

19. (i) They are of equal lengths.

(ii) Their measure are equal.

(iii) They have the same side length.

(iv) Their dimensions are same.

(v) They have the same radii.

20. (i) False (ii) True (iii) False (iv) False

13 Perimeter and Area

Exercise-13.1

1. (i) Perimeter of Rectangle

$2(l \quad b)$

$2[5 \quad 4]$

18 cm

(ii) Perimeter of rectangle

$2(l \quad b)$

$2[6 \quad 2]$

$2(8)$

16 cm

(iii) Perimeter of rectangle $2(7 \quad 1.5)$

$2(8.5)$ 17 cm

2. (i) Perimeter of square 4 side

$10 \quad 4 \quad$ side

$\frac{10}{4}$ side

2.5 cm side of square

(ii) side of square $\frac{\text{Perimeter of square}}{4}$

$\frac{16}{4}$ 4 m

(iii) Side of square

$\frac{\text{Perimeter of square}}{4}$

$\frac{40}{4}$ 10 cm

(iv) Side of square

$\frac{\text{Perimeter of square}}{4}$

$\frac{22}{4}$ 5.5 cm

3. (i) Perimeter of rectangle

$2(l \quad b)$

$360 \quad 2[100 \quad b]$

$180 \quad 100 \quad b$

$80\text{ cm} \quad b$

(ii) Perimeter of rectangle

$2(l \quad b)$

$360 \quad 2[116 \quad b]$

$180 \quad 116 \quad b$

$64\text{ cm} \quad b$

(iii) Perimeter of rectangle

$2(l \quad b)$

$360 \quad 2[140 \quad b]$

$180 \quad 140 \quad b$

$40\text{ cm} \quad b$

(iv) Perimeter of rectangle $2(l \quad b)$

$360 \quad 2(102 \quad b)$

$180 \quad 102 \quad b$

$78\text{ cm} \quad b$

4. $\because$ diagonal of squqre $\sqrt{2}$ side

$10\sqrt{2} \quad \sqrt{2}$ side

10 cm side

Perimeter of square

$4 \quad$ side

$4 \quad 10 \quad 40\text{ cm}$

5. (i) Diagonal of Rectangle

$\sqrt{l^2 \quad b^2}$

$\sqrt{16^2 \quad 12^2}$

$\sqrt{256 \quad 144}$

$\sqrt{400}$

$\sqrt{20^2}$

diagonal of rectangle 20 cm

(ii) Similarly, diagonal of Rectangle

$\sqrt{40^2 \quad 90^2}$

$\sqrt{1600 \quad 81}$

$\sqrt{1681}$

$\sqrt{41^2}$

Length of diagonalof rectangle 41 cm

6. Perimeter of rectangular playground

$2(l \quad b)$

$2[120 \quad 70]$

$2(190)$

380 cm

7. Perimeterof rectangle

$2(l \quad b)$

$2(l \quad 3)$

$9 \quad l \quad 3$

Lengthof rectangle 6 cm

8. $\because$ Perimeter of building $2(l \quad b)$

$320 \quad 2[125 \quad b]$

$160 \quad 125 \quad b$

$35\,\text{m} \quad b$

breadth of building 35 m

9. $\because$ Perimeter of field $2(l \quad b)$

$932 \quad 2[l \quad 125]$

$466 \quad l \quad 125$

$466 \quad 125 \quad l$

341m lengths

length of field 341 m

10. Perimeter of foot ball ground $2(l \quad b)$

$324 \quad 2[95 \quad b]$

$162 \quad 95 \quad b$

$67m \quad b$

Length of football ground 67 m

11. Iron wire required to fence the triangular park

Perimeter

60 40 20

120 m

Cost of the wire to fence

(25 120)

₹ 3000

12. Perimeter of triangle

$a \quad b \quad c$

$64 \quad 15 \quad 24 \quad c$

$64 \quad 39 \quad c$

$25 \quad c$

length of third side 25 m

13. Distance travelled by a boy in going round a square Perimeter of square

4 side

4 20

distance covered by a boy 80 m

14. Perimeter of equilateral triangle

3 side

3 12.5 37.5 cm

15. Perimeter of regular hexagon

6 side

6 8.3

49.8 cm

16. Perimeter of 8 sided polygon

8 side

53.6 8 side

6.7 cm side

17. Wire required Perimeter of park

$2(l \quad b)$

$2[30 \quad 20]$

100 m

Cost of fencing 15 100

₹ 1500

18. Perimeter of triangle $a \quad b \quad c$

5 3 7

15 cm

19. Perimeter of Rectangular park

$2(l \quad b)$

$2[200 \quad 150]$

700 m

cost of fencing 20 700

₹ 14000