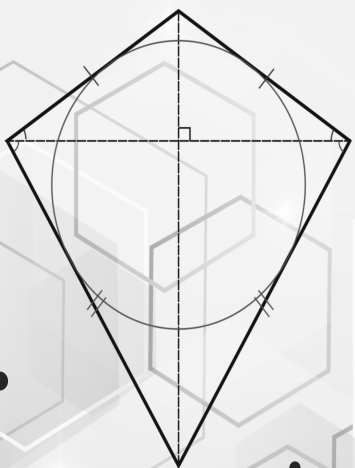
Timax®

MATHS MAGIC

Teacher Manual

$A^2+B^2=C^2$

$\pi=3.1416$



NEP 2020
ENHANCED EDITION

7

Exercise 1.1

1. (a) 80° C is higher (b) 70° C is higher
(c) −2° C is higher (d) +2° C is higher

2. (a) $|23| = 23$ (b) $|-13| = 13$
(c) $|18-5| = |13| = 13$ (d) $|-54| = 54$

3. (a) $-19-(-7) = 19+7 = -12$ (b) $+11+(-14) = +11-14 = -3$
(c) $-9+(+17) = -9+17 = +8$ (d) $+3+(-4) = +3-4 = -1$
(e) $-8+(-15) = -8-15 = -23$ (f) $-25-(+27) = -25-27 = -52$

4. (a) $-47+18 = -47+18 = -29$ (b) $-89+91 = +2$
(c) $-238+(-500) = -238-500 = -738$
(d) $52+(-29) = 52-29 = +23$

5. (a) $196-124 = 72$ (b) $89-(-144) = 89+144 = 233$
(c) $-77-33 = -110$
(d) $-189-(-328) = -189+328 = +139$

Exercise 1.2

1. $48 \times -1 = -48$ **2.** $(-95) \times -1 = 95$

3. (a) $(-35) \times 6 = -210$ (b) $(-9) \times 6 = -54$
(c) $(-17) \times (-15) = +255$ (d) $(-28) \times 6 = -168$
(e) $43 \times (-12) = -516$ (f) $19 \times (-9) = -171$
(g) $(-2) \times (-3) \times (-7) = -42$ (h) $9 \times (-4) \times (-15) = +540$
(i) $(-9) \times (-14) = +126$

4. (a) $68 \times (-97) = (-)$ (b) $-132 \times (24) = (-)$

Exercise 1.3

1. 32 i.e., $\frac{32}{-1} = -32$ **2.** −78 i.e., $\frac{-78}{-1} = 78$

3. (a) $-486 \div (-27) = 18$ (b) $144 \div (-12) = -12$
(c) $-2197 \div (-13) = 169$ (d) $121 \div (-11) = -11$

4. (a) $27 \div (-3) = -9$ (b) $0 \div (-1) = 0$
(c) $-54 \div (-6) = 9$ (d) $25 \div (-5) = -5$
(e) $(-729) \div (-9) = -81$ (f) $(-40) \div 10 = -4$
(g) $(-625) \div 25 = -25$ (h) $(-432) \div (-12) = 36$

5. (i) $4224 \div (-22) = -192$ (j) $20000 \div (-100) = -200$
(k) $(-81) \div (-3) = 27$

5. (a) $(-10-|-5|)\div(30-|-25|)=(-10-5)\div(30-25)=-15\div 5=-3$

(b) $|120\div(-5)|\div|16\div(-2)|=|(-24)|\div|(-8)|=24\div 8=3$

6. (a) False (b) False

(c) False (d) False

(e) True (f) True

Exercise 1.4

1. (a) $3+(-9)=(-9)+3-6=-6$ Yes

(b) $(-18)+7=7+(-18)$; $-18+7=7-18$; $-11=-11$ Yes

(c) $19+(-3)=(-3)+19$; $19-3=-3+19$; $16=16$ Yes

2. (a) $19+(-3+4)=[19+(-3)]+4$; $19+(+1)=[16+4]$; $20=20$ Yes

(b) $(11+3)+(-9)=11+[3+(-9)]$; $14-9=11+[3-9]$

$5=11+(-6)$; $5=11-6$; $5=5$ Yes

(c) $(-18+2)+6=-18+(6+2)$

$(-16)+6=-18+8$; $-16+6=-10$; $-10=-10$ Yes

3. (a) $43+79+21=43+(79+21)=43+100=143$

(b) $2+3+8=3+(8+2)=3+10=13$

(c) $98+63+11=98+(63+11)=98+74=172$

(d) $75+25+125=25+(125+75)=25+200=225$

(e) $63+47+36=36+(63+47)=36+110=146$

4. (a) $98+63=63+98$; $161=161$ True

(b) $(-6)+18=18+(-6)$; $-6+18=18-6$; $12=12$ True

(c) $(18-6)+3=18-(6+3)$; $12+3=18-9$; $15=9$ False

(d) $346-726=726-346$; $-380=380$ False

Exercise 1.5

1. (a) $545\times 0=545$; $0=545$ False

(b) $(-5)\times(-2)=10$ True (c) $-7\times 1=7$; $-7=7$ False

(d) $5\times(-3)=(-3)\times 5$; $-15=-15$ True

(e) $-3\times[4+(-6)]=-3\times 4+(-3)\times(-6)$

$-3\times[4-6]=-12+(+18)$; $-3\times(-2)=12+18$; $6=6$ True

2. (a) 0

(b) $456\times[101+(-1)]$

$=456\times 101+456\times(-1)$

$=46056+(-456)=46056-456=45600$

(c) $235 \times 99 + 235 + 1 = 235 \times (99 + 1) = 235 \times 100 = 23500$

(d) $(-6) \times [(-5) + (-5)] = [(-6) \times (-5)] + [(-6) \times (-5)] = 30 + 30 = 60$

(e) $27 \times (-8) + 27 \times (-10) = 27 \times (-8 - 10) = -486$

(f) $(-1) \times [-4 + 6] = (-1) \times (-4) + (-1) \times (6) = 4 + (-6) = 4 - 6 = -2$

3. (a) $(8 \times 9) \times 5 = 8 \times (9 \times 5)$; $72 \times 5 = 8 \times 45$; $360 = 360$

(b) $[(-7) \times (-9)] \times 6 = (-7) \times [(-9) \times 6]$;

$(63) \times 6 = (-7) \times (-54)$; $378 = 378$

(c) $[4 \times (-112)] \times 3 = 4 \times [(-112) \times 3]$

$(-448) \times 3 = 4 \times (-336)$; $-1344 = -1344$

4. (a) $-1 + 1 = 0$; Inverse property of addition

(b) $10 \times (-3) = -3 \times 10$; Commutative property of multiplication

(c) $5 \times 7 = 7 \times 5$; Commutative property of multiplication

(d) $n \times m = n \times m$ = Commutative Property of multiplication

(e) $8 \times 9 = 9 \times 8$ = Commutative Property of multiplication

(f) $2 + -2 = 0$ = Inverse property of addition

Exercise 1.6

1. $-38 + 22 = -16$ **2.** $-49 + 125 = +76$

3. $-15 + -82 = -97$ **4.** $-44 \times 11 = -484$

5. Withdrawal made everyday = ₹800

Withdrawal made in 5 days = $5 \times$ ₹ 800 = ₹4000

6. Phone's balance = ₹111, STD call = ₹79

Weekly rental = ₹7

Charge for message card = ₹ 49

Now balance left in cell phone = ₹ $(111 - 79 - 7 - 49) = -$(₹ 24)

Exercise 2.1

1. (a) $\frac{1}{10} \times \frac{130}{36} = \frac{130}{360} = \frac{13}{36}$ (b) $\frac{1}{10} \times \frac{110}{17} = \frac{110}{170} = \frac{11}{17}$

(c) $\frac{1}{4} \times 1000 = \frac{1000}{4} = 250$

2. (a) $\frac{13}{5} \times \frac{30}{7} = \frac{13}{1} \times \frac{6}{7} = \frac{78}{7}$ (b) $16 \times \frac{2}{3} = \frac{32}{3}$

(c) $\frac{5}{8} \times 7 = \frac{35}{8}$

Exercise 2.2

1. (a) 2 (b) $\frac{12}{7}$

(c) $\frac{57}{15}$ (d) $\frac{7}{11}$

2. (a) $\frac{16}{3} \div \frac{1}{54} = \frac{16}{3} \times \frac{54}{1} = \frac{16}{3} \times \frac{54}{1} = \frac{16}{1} \times \frac{18}{1} = 288$

(b) $\frac{10}{12} \div \frac{14}{3} = \frac{10}{12} \times \frac{3}{14} = \frac{5}{4} \times \frac{1}{7} = \frac{5}{28}$

(c) $\frac{8}{11} \div \frac{21}{11} = \frac{8}{11} \times \frac{11}{21} = \frac{8}{1} \times \frac{1}{21} = \frac{8}{21}$

(d) $\frac{29}{3} \div \frac{21}{3} = \frac{29}{3} \times \frac{3}{21} = \frac{29}{1} \times \frac{1}{21} = \frac{29}{21}$

3. (a) $2 \times \frac{11}{10} = 1 \times \frac{11}{5} = \frac{11}{5}$

(b) $\frac{5}{2} \div \frac{20}{16} = \frac{5}{2} \times \frac{16}{20} = \frac{1}{1} \times \frac{8}{4} = \frac{1}{1} \times \frac{2}{1} = 2$

(c) $\frac{1}{2} \div \frac{8}{19} = \frac{1}{2} \times \frac{19}{8} = \frac{19}{16}$ (d) $6 \div \frac{4}{7} = 6 \times \frac{7}{4} = \frac{3}{1} \times \frac{7}{2} = \frac{21}{2}$

(e) $6 \div \frac{5}{7} = 6 \times \frac{7}{5} = \frac{42}{5}$ (f) $\frac{17}{5} \div \frac{2}{7} = \frac{17}{5} \times \frac{7}{2} = \frac{119}{10}$

4. (a) $\frac{4}{3} \div \frac{\_}{4} = \frac{8}{3}; \frac{4}{3} \times \frac{4}{2} = \frac{8}{3}; \frac{16}{6} = \frac{8}{3}; \frac{8}{3} = \frac{8}{3}$

(b) $\frac{3}{4} \div \frac{6}{\_} = \frac{1}{8}; \frac{3}{4} \times \frac{1}{6} = \frac{1}{8}; \frac{3}{4} \times \frac{1}{6} = \frac{1}{8}; \frac{1}{4} \times \frac{1}{2} = \frac{1}{8}; \frac{1}{8} = \frac{1}{8}$

(c) $\frac{\_}{6} \div \frac{8}{9} = \frac{3}{4}; \frac{\_}{6} \times \frac{9}{8} = \frac{3}{4}; \frac{4}{6} \times \frac{9}{8} = \frac{3}{4}; \frac{4}{6} \times \frac{9}{8} = \frac{3}{4}; \frac{1}{2} \times \frac{3}{2} = \frac{3}{4}; \frac{3}{4} = \frac{3}{4}$

(d) $\frac{7}{6} \div \frac{7}{\_} = 1; \frac{7}{6} \times \frac{\_}{7} = 1; \frac{7}{6} \times \frac{6}{7} = 1; \frac{1}{1} \times \frac{1}{1} = 1; 1 = 1$

5. (b) $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}$

(c) $\frac{1}{2}, 1, 1\frac{1}{2}, 2, 2\frac{1}{2}, 3, 3\frac{1}{2}, 4$

6. (a) $\frac{7}{10} \div \frac{7}{5} = \frac{7}{10} \times \frac{5}{7} = \frac{1}{2} \times \frac{1}{1} = \frac{1}{2}$ Less than 1

(b) $\frac{2}{3} \div \frac{2}{6} = \frac{2}{3} \times \frac{6}{2} = 2$ is greater than 1

(c) $\frac{1}{6} \div \frac{8}{3} = \frac{1}{6} \times \frac{3}{8} = \frac{1}{2} \times \frac{1}{8} = \frac{1}{16}$ is less than 1

(d) $\frac{2}{3} \div \frac{1}{2} = \frac{2}{3} \times \frac{2}{1} = \frac{4}{3}$ is greater than 1

Exercise 2.3

1. Cost of a pen $₹ 15\frac{2}{3}$; Cost of a pen $= ₹ \frac{47}{3}$

Cost of a pencil $= ₹ 4\frac{3}{4}$; Cost of Pencil $= ₹ \frac{19}{4}$

LCM of 3 and 4 = 12

3	3, 4
4	1, 4
	1, 1

Pen $= \frac{47}{3} \times \frac{4}{4} = \frac{188}{12}$

Pencil $= \frac{19}{4} \times \frac{3}{3} = \frac{57}{12}$

$\therefore$ Cost of Pen is more than Pencil.

$\frac{188}{12} - \frac{57}{12} = ₹ \frac{131}{12} = ₹ 10\frac{11}{12}$

2. Total length of the road = 440 m

Length of repaired road $= \frac{1}{4} \times 440 = 110$ m

3. Number of children = 40

Total passengers $= 40 \times 8 = 320$

Number of adults $= 320 - 40 = 280$

4. Total students = 48

Number of boys $= \frac{5}{12}$ of $48 = \frac{5}{12} \times 48 = 20$

Number of girls $= 48 - 20 = 28$

5. Cost of one organge $= ₹ 3\frac{3}{4} = \frac{15}{4}$

Total amount collected on selling oranges $= ₹ 210$

Number of oranges $= ₹ 210 \div \frac{15}{4} = ₹ 210 \times \frac{4}{15} = 56$

Hence he sold 56 oranges

6. Quantity of sugar $= 8\frac{1}{2}$ kg $= \frac{17}{2}$ kg

Cost price of sugar $= ₹ 148\frac{3}{4} = \frac{₹ 595}{4}$

Cost price of sugar per kg $= ₹\frac{595}{4} \div \frac{17}{2} = \frac{595}{4} \times \frac{2}{1} = ₹\frac{35}{2} = 17\frac{1}{2}$

Hence cost of 1 kg of sugar was $₹17\frac{1}{2}$

Exercise 3.1

1. (a) $15.828 \times 1000 = 15828$ (b) $51.7 \times 100 = 5170$

(c) $0.5 \times 10 = 5$ (d) $14.7 \times 5000 = 73500$

(e) $0.000084701 \times 1000 = 0.084701$

(f) $43.01 \times 5 = 215.05$

(g) $152.01 \times 11 = 1672.11$

(h) $8.17 \times 300 = 2451$

(i) $0.015 \times 60 = 0.9$

(j) $2.012 \times 14 = 28.1683$

(k) $0.08 \times 0.002 = 0.00016$

(l) $0.011 \times 0.15 =$ So, .00165

$$\begin{array}{r} 11 \\ \times\ 15 \\ \hline 55 \\ 11\times \\ \hline 165 \end{array}$$

Hence, .011 3 decimal places and 0.15 2 decimal places

(m) 8.12×0.0082

8.12= 2 decimal point, 0.0082 = 4 decimal point

So, .066584 = 6 decimal point

(n) $8.843 \times 4.2 = 37.1406$

(o) $0.009 \times 8 = 9 \times 8 = 0.072$

(p) $0.094 \times 100 = 9.400$

$$\begin{array}{r} 15201 \\ +\ 11 \\ \hline 15201 \\ 15201\times \\ \hline 167211 \end{array} \qquad \begin{array}{r} 2012 \\ \times\ 14 \\ \hline 8040 \\ 2012\times \\ \hline 28168 \end{array}$$

$$\begin{array}{r} 812 \\ \times\ 82 \\ \hline 1624 \\ 6496\times \\ \hline 66584 \end{array} \qquad \begin{array}{r} 8843 \\ \times\ 42 \\ \hline 17686 \\ 35372\times \\ \hline 371406 \end{array}$$

2. Number of pens purchased by Kartik = 5 pens

Cost of 1 pens = ₹10.50

Cost of 5 pens = 5×10.50

Hence, cost of 5 pens was ₹52.50

$$\begin{array}{r} 10\ 50 \\ \times\ 5 \\ \hline 52\ 50 \end{array}$$

Exercise 3.2

1. (a) $1.8 \div 0.006 = \frac{18}{10} \div \frac{0006}{1000} \frac{18}{10} \times \frac{1000}{0006} = 300$

(b) $0.046 \div 1000 = \frac{0046}{1000} \div \frac{1000}{1} = \frac{46}{1000} \times \frac{1}{1000} = \frac{46}{1000000} = 0.000046$

(c) $0.062 \div 10 = \frac{0062}{1000} \div \frac{10}{1} = \frac{62}{1000} \times \frac{1}{10} = \frac{62}{10000} = 0.0062$

(d) $12.321 \div 11.1 = \frac{12321}{1000} \div \frac{111}{10}\ \frac{12321}{1000} \times \frac{10}{111} = \frac{111}{100} \times \frac{1}{1} = \frac{111}{100} = 1.11$

(e) $7.7 \div 11 = \frac{77}{10} \div \frac{11}{1} = \frac{77}{10} \times \frac{1}{11} = \frac{7}{10} = 0.7$

(f) $0.121 \div 11 = \frac{0121}{1000} \div \frac{11}{1} = \frac{121}{1000} \times \frac{1}{11} = \frac{11}{1000} = 0.011$

(g) $0.88 \div 4 = \frac{088}{100} \div \frac{4}{1} = \frac{88}{100} \times \frac{1}{4} = \frac{22}{100} = 0.22$

(h) $1.8 \div 0.6 = \frac{18}{10} \div \frac{06}{10} = \frac{18}{10} \times \frac{10}{6} = 3$

(i) $0.04 \div 100 = \frac{004}{100} \div \frac{100}{1} = \frac{4}{100} \times \frac{1}{100} = \frac{4}{10000} = 0.0004$

(j) $6.6 \div 0.11 = \frac{66}{10} \div \frac{011}{100} = \frac{66}{10} \times \frac{100}{11} = 60$

(k) $11.84 \div 0.4 = \frac{1184}{100} \div \frac{04}{10} = \frac{1184}{100} \times \frac{10}{4} = \frac{296}{10} = 29.6$

(l) $0.21 \div 100 = \frac{021}{100} \div \frac{100}{1} = \frac{21}{100} \times \frac{1}{100} = \frac{21}{10000} = 0.0021$

2. Cost of 15 steel chair = ₹1706.25

Cost of one steel chair = ₹1706.25 ÷ 15

$$= \frac{170625}{100} \div \frac{15}{1} = \frac{170625}{100} \times \frac{1}{15} = \frac{11375}{100} = ₹113.75$$

Thus, cost of one steel chairs = ₹113.75

3. Number of pages coloured by Rishab = 30

Total amount of colour used by Rishab = 27.90 m*l*

Amount of colour used by Rishab on each page of book

$= 27.90 \div 30 = \frac{2790}{100} \div \frac{30}{1} = \frac{2790}{100} \times \frac{1}{30} = \frac{93}{100} = 0.93$ m*l*

Thus, Rishab used 0.93 m*l* of colour on each page of book.

4. Distance covered by car = 154.23 km in 12.5 litre of petrol.

(a) Distance travelled by car in 1 litre = 154.23 ÷ 12.5

$= \frac{15423}{100} \div \frac{125}{10} = \frac{15423}{100} \times \frac{10}{125}$

$= \frac{15423}{1250} = 12.3384$ km

(b) Distance travelled by car in 15 litre
$= 12.3384 \times 15 = 185.0760$ km
Thus, distance travelled by car in 15 litre is 185.0760 km

$$\begin{array}{r} 1\,2\,3\,3\,8\,4 \\ \times\ 1\,5 \\ \hline 6\,1\,6\,9\,2\,0 \\ 1\,2\,3\,3\,8\,4\,\times \\ \hline 1\,8\,5\,0\,7\,6\,0 \end{array}$$

Exercise 3.3

1. (a) 7 km to m

1 km = 1000 m So, $7 \text{ km} = 7 \times 1000 \text{ m} = 7000 \text{ m}$

(b) 6.8 kg to gm

1 kg = 1000 gm So, $6.8 \text{ kg} = 6.8 \times 1000 \text{ gm}$

$= 6800.0 \text{ gm} = 6800 \text{ gm}$

(c) 14.6 L to ml

1 litre = 1000 ml So, $14.6 \text{ L} = 14.6 \times 1000 \text{ ml}$

$= 14600.0 \text{ ml} = 14600 \text{ ml}$

(d) 38.35 dm to hm

1 hm = 1000 decimeter So, $1 \text{ dm} = \frac{1}{1000} \text{ hm}$

$= 38.35 \text{ dm} \times \frac{1}{1000} \text{ hm} = 38.35 \times \frac{1}{1000} = 0.03835 \text{ hm}$

(e) 73 dal to kl

$1 \text{ dal} = \frac{1}{100} \text{ kl}$ So, $73 \text{ dal} = 73 \times \frac{1}{100} \text{ kl}$

$= 0.73 \text{ kL}$

(f) 39.33 hm to m

1 hm = 100 m

So, $39.33 \text{ hm} = 39.33 \times \frac{1}{100} \text{ m} = 0.3933 \text{ m}$

(g) 8800 mm to m

$1 \text{ mm} = \frac{1}{1000} \text{ m}$ $1 \text{ mm} = \frac{1}{1000} \text{ m}$

So, $8800 \text{ mm} = 8800 \times \frac{1}{1000} \text{ m} = 8.8 \text{ m}$

(h) 4285 g to dag

1 g = 10 dag

So, $4285 \text{ g} = 4285 \times \frac{1}{10} \text{ dog} = 428.5 \text{ dag}$

(i) 145 cm to dm

$1\text{ cm} = \frac{1}{10}\text{ dm}$ So, $145\text{ cm} = 145 \times \frac{1}{10}\text{ dm} = 14.5\text{ dm}$

2. (a) 76 m 28 cm to cm (1m = 100 cm); = 76 m + 28 cm

So, 76 m 28 cm = 7600 cm + 28 cm = 7628 cm

(b) 2 kg 2 g to g (1 kg = 1000 gm or 100 g)

So, 2 kg 2 g = 2000 g +2 g = 2002 g

(c) 8 km 450 m to m (1 km = 1000 m)

So, 8 km 450 m = 8000 m + 450 m = 8450 m

(d) 4779 m to km $\left(1\text{km} = \frac{1}{100}\text{ km}\right)$

So, $4779\text{ m} = 4779 \times \frac{1}{1000}\text{ km} = 4.779\text{ km}$

(e) 459 cl to l $\left(1\text{cl} = \frac{1}{100}\text{ l}\right)$

So, $459\text{ cl} = 459 \times \frac{1}{100}\text{ l}\ 4.59\text{ l}$

(f) 7004 gm to kg

$1\text{ gm} = \frac{1}{1000}\text{ kg}$ So, $7004\text{ gm} = 7004 \times \frac{1}{1000}\text{ kg} = 7.004\text{ kg}$

3. Weight of Sushma = 55.72 kg

Weight of her father = 1.3×55.72 kg

Thus, weight of her father = 72.436 kg

```
  5 5 7 2
    × 1 3
 1 6 7 1 6
 5 5 7 2 ×
 7 2 4 3 6
```

4. Capacity of a jug = 1.800 l = 1800 ml

Capacity of one glass = 200 ml

Number of glasses = 1800 ÷ 200

Number of glasses = 9

Hence, 9 glasses were required to fill water in the jug.

5. 1 inch = 2.54 cm

So, 12.5 inches = 12.5×2.54

= 31.750 cm

Hence, 31.75 cm will be there in 12.5 inches.

```
    2 5 4
  × 1 2 5
  1 2 7 0
  5 0 8 ×
2 5 4 × ×
3 1 7 5 0
```

6. Thickness of 54 sheets = 15.12 mm

Thickness of 1 sheet = 15.12 ÷ 54

$= \frac{15.12}{100} = \frac{54}{1} = \frac{1512}{100} \times \frac{1}{54} = \frac{28}{100} = 0.28$ mm

So, 0.28 mm $= 0.28 \times \frac{1}{10}$ cm $= 0.028$ cm

Thus, thickness of 1 sheet = 0.028 cm

7. Total Salary of Renu = ₹ 12000

Total spending in 12 months $= 0.75 \times 12{,}000 =$ ₹ 9000

Money saved by her per month = ₹12000 – 9000

= ₹ 3000

Number of months = 39000 ÷ 3000 = 13 Months

8. Number of people went to Restaurant = 20

Amount of per person meal = ₹ 36.60

Total Bill = ₹20 × 36.60

Total Bill = ₹732

Number of People Left to pay the bill = 20 – 5 = 15

Amount paid by 15 person $= 732 \div 15 = \frac{732}{15} =$ ₹ 48.8

Excess amount paid by per person = ₹ 48.80 – 36.60

Thus, Excess amount paid by per person = ₹12.20

```
  3 6 6 0
    × 2 0
  ------
    0 0 0 0
  7 3 2 0 ×
  ---------
7 3 2 . 0 0

  4 8 . 8 0
– 3 6 . 6 0
  ---------
  1 2 . 2 0
```

Exercise 4.1

1. (a) $\frac{-15}{18}$ = 15 and 18 are multiples of 3

$\because \frac{-5 \div 5}{18 \div 3} = \frac{-5}{6}$ $\quad\quad$ $\because \frac{-15}{18} = \frac{-5}{6}$

(b) $\frac{25}{-50}$ = 25 and 50 are multiples of 5

$\because \frac{25 \div 5}{-50 \div 5} = \frac{5}{-10}$

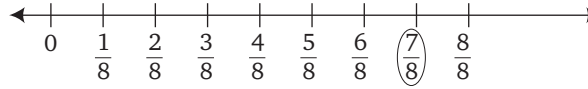
So, 5 and 10 are multiple of 5

$\because \frac{5 \div 5}{-10 \div 5} = \frac{1}{-2}$ $\quad\quad$ $\because \frac{25}{-50} = \frac{1}{-2}$

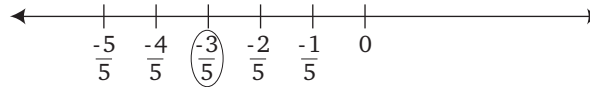
(c) $\frac{68}{16}$ = 68 and 16 are multiple of 4

$\because \frac{68 \div 4}{16 \div 4} = \frac{17}{4}$ $\quad\quad$ $\because \frac{68}{16} = \frac{17}{4}$

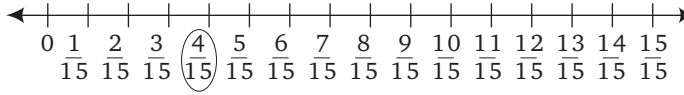
2. (a) $\frac{7}{8}$



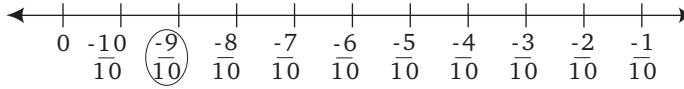
(b) $\frac{-3}{5}$



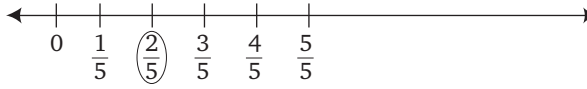
(c) $\frac{4}{15}$



(d) $\frac{+9}{-10}$



(e) $\frac{-6}{-15} = \frac{6}{-15} = \frac{6}{15} = \frac{2}{5}$



3. $\frac{-6 \times 5}{-11 \times -7} = \frac{-30}{77}$

4. (a) $\frac{3}{4}$ is positive rational number

(b) $\frac{17}{-21}$ is a negative rational number

(c) $\frac{-18}{19}$ is a negative rational number

(d) $\frac{2}{-5}$ is a negative rational number

(e) $\frac{-621}{-705} = \frac{621}{705}$ so, it is a positive rational number

5. (a) $\frac{20}{1} = 20$, so it is an integer.

(b) $\frac{6}{7} = \frac{6}{7}$, it is a fraction number.

(c) $\frac{0}{-17} = \frac{0}{-17}$, it is a whole number.

(d) $\frac{-40}{8} = \frac{-5}{1} = -5$, So it is an integer.

(e) $\frac{-6}{-24} = \frac{6}{24} = \frac{1}{4}$ So, it is a fraction number.

(f) $\frac{100}{50} = \frac{2}{-1} = -2$, So, it is an integer.

6. It is neither positive nor negative rational number.

7. $\frac{17}{-50} = \frac{17 \times 2}{-50 \times 2} = \frac{34}{-100}$

8. (a) Numerator = −4 $\quad \frac{-2}{7} \times \frac{2}{2} = \frac{-4}{14}$

(b) Denominator = −28 $\quad \frac{-2}{7} \times \frac{-4}{-4} = \frac{8}{-28}$

(c) number = 8 $\quad \frac{-2}{7} \times \frac{-4}{-4} = \frac{8}{-28}$

(d) denominator = 35 $\quad \frac{-2}{7} \times \frac{5}{5} = -\frac{10}{35}$

9. (a) $\frac{-1}{2} = \frac{-1}{2} \times \frac{-12}{-12} = \frac{12}{-24}$ $\quad$ (b) $\frac{108}{-27} = \frac{108}{-27} \div \frac{9}{9} = \frac{12}{-3}$

10. (a) $\frac{-9}{12}$ and $\frac{8}{12}$

LHS $\quad \frac{-9}{12} = \frac{-3}{4}$ $\quad$ RHS $\quad \frac{8}{12} = \frac{3}{2}$

$\therefore$ $\quad$ LHS $\neq$ RHS

(b) $\frac{-16}{20}$ and $\frac{20}{-25}$

LHS $= \frac{-16}{20} = \frac{-4}{5}$ $\quad$ RHS $= \frac{20}{-25} = \frac{-4}{5}$

$\therefore$ $\quad \frac{-4}{5} = \frac{4}{-5}$ $\quad \therefore$ $\quad$ LHS = RHS

(c) $\frac{-8}{14}$ and $\frac{13}{21}$

LHS $= \frac{-8}{14} = \frac{-4}{7}$ $\quad$ RHS $= \frac{13}{21}$

$\therefore$ $\quad \frac{-4}{7} \neq \frac{13}{21}$ $\quad \therefore$ $\quad$ LHS $\neq$ RHS

Exercise 4.2

1. (a) $\frac{-4}{9} = \frac{4}{9}$ (b) $\frac{-7}{8} = \frac{7}{8}$

(c) $\frac{5}{-21} = \frac{5}{21}$ (d) $\frac{8}{-15} = \frac{8}{15}$

(e) $\frac{-10}{-31} = \frac{10}{31}$

2. (a) $\frac{-9}{10} + \frac{22}{15} + \frac{13}{(-20)}$

$= \frac{54 + 88 - 39}{60}$

$= \frac{-5}{60} = \frac{-1}{12}$

5	10, 15, 20
2	2, 3, 4
2	1, 3, 2
3	1, 3, 1
	1, 1, 1

(b) $\frac{-3}{7}, \frac{2}{9}, 0, \frac{8}{7}, \frac{-13}{7}$

$= \frac{-27 + 14 + 72 - 117}{63} = \frac{-58}{63}$

9	9, 7
9	9, 1
	1, 1

(c) $\frac{2}{3}, \frac{-2}{3}, \frac{1}{6}, \frac{-8}{15} = \frac{+20 + (-20) + 5 + (-16)}{30}$

$= \frac{20 - 20 + 5 - 16}{30} = \frac{-11}{30}$

3	3, 6, 15
5	1, 2, 5
2	1, 2, 1
	1, 1, 1

(d) $2\frac{1}{5}, \frac{-3}{20}, -2\frac{1}{7} = \frac{11}{5}, \frac{-3}{20}, \frac{-15}{7}$

$= \frac{308 + (-21) + (-300)}{140}$

$= \frac{308 - 21 - 300}{140} = \frac{-13}{140}$

5	5, 20, 7
2	1, 4, 7
2	1, 2, 7
7	1, 1, 7
	1, 1, 1

3. (a) $0 - \frac{17}{15} = \frac{-17}{15}$

(b) $\frac{2}{3}$ from $\frac{-2}{3} = \frac{2}{3} - \left(\frac{2}{3}\right) = \frac{-4}{3}$

(c) $\frac{11}{9}$ from $\frac{-5}{-7} = \frac{5}{7} - \left(\frac{11}{9}\right) = \frac{45 - 77}{63} = \frac{-32}{63}$

3	7, 9
3	7, 3
7	7, 1
	1, 1

(d) 0 from $\frac{-6}{5} = \frac{-6}{5} - (0) = \frac{-6}{5}$

(e) $\frac{1}{5}$ from the sum of $\frac{8}{5}$ and $\frac{6}{7}$

5	5, 7,
7	1, 7
	1, 1,

$= \frac{1}{5}$ from Sum of $\left(\frac{8}{5}+\frac{6}{7}\right)$

$= \frac{1}{5}$ from $\left(\frac{56+30}{35}\right) = \frac{1}{5}$ from $\left(\frac{86}{35}\right)$

$= \frac{86}{35} - \left(\frac{1}{5}\right) = \frac{86-7}{35} = \frac{79}{35}$

5	35, 5
7	7, 1
	1, 1

(f) Sum of $\frac{1}{2}$ and $\frac{4}{3}$ from $\frac{-11}{6}$

$= \left(\frac{1}{2}+\frac{4}{3}\right)$ from $\frac{-11}{6} = \left(\frac{3+8}{6}\right)$ from $\frac{-11}{6}$

$= \frac{11}{6}$ from $\frac{-11}{6} = \frac{-11}{6} - \left(\frac{11}{6}\right) = \frac{-11}{6} - \frac{11}{6} = \frac{-22}{12} = \frac{-11}{6}$

2	2, 3
3	1, 3
	1, 1

4. 1st Number = 6

and the sum of two number is $\frac{-4}{11}$

2nd number $= \frac{-4}{11} - 6 = \frac{-4}{11} - \frac{6}{1} = \frac{-4-66}{11}$

2nd number $= \frac{-70}{11}$

11	11, 1
	1, 1

5. $\frac{-5}{36} - \left(\frac{-11}{24}\right) = \frac{-5}{36} + \frac{11}{24} = \frac{-10+33}{72} = +\frac{23}{42}$

2	36, 24
2	18, 12
2	9, 6
3	9 , 3
3	3, 1
	1, 1

6. $\left(\frac{-9}{8}+\frac{11}{10}\right)$ to make 1

$= \frac{-9}{8} + \frac{11}{10} = \frac{-45+44}{40} = \frac{-1}{40} = \frac{-1}{40}$

$= 1 - \left(\frac{-1}{40}\right) = 1 + \frac{1}{40} = \frac{40+1}{40} = \frac{41}{40}$

2	8, 10,
2	4, 5
2	2, 5
5	1, 5
	1, 1

7. Height gained by Aranav in First six months $= \frac{8}{11}$ cm

Height gained in next 6 month $= \frac{8}{11}$ cm

Total height gained by Arnav in total year

$= \frac{8}{11} + \frac{8}{11} = \frac{8+8}{11} = \frac{16}{11}$ cm

Exercise 4.3

1. (a) $15 \times \frac{3}{105} = 15 \times \frac{3}{105} = \frac{3}{7}$

(b) $17 \times \frac{-21}{84} = 17 \times \frac{21}{84} = 17 \times \frac{-1}{4} = \frac{-17}{4}$

(c) $0 \times \frac{-21}{36} = 0$

(d) $\frac{331}{-441} \times 1 = \frac{331}{-441}$

(e) $\frac{7}{3} \times \frac{-3}{7} = 1$

(f) $\frac{210}{-256} \times 1\frac{58}{70} = \frac{210}{-256} \times \frac{128}{70} = \frac{3}{-2} \times \frac{1}{1} = \frac{3}{-2} = \frac{-3}{2}$

(g) $\frac{7}{5} \times \frac{-40}{7} = -8$

(h) $-1\frac{2}{9} \times \frac{27}{55} = \frac{11}{9} \times \frac{279}{55} = \frac{-1}{1} \times \frac{3}{5} = \frac{-3}{5}$

2. (a) $\frac{441}{250} \times \frac{37}{21} \times \frac{125}{111} \times \frac{3}{5} \times -5 = \frac{-21}{2}$

(b) $\frac{-3}{19} \times \frac{15}{61} \times 0 \times \frac{18}{31} \times \frac{9}{41} = 0$

(c) $\frac{-7}{16} \times \frac{24}{49} \times \frac{-28}{15} \times \frac{15}{-8} = \frac{-3}{4}$

(d) $2\frac{1}{3} \times 24\frac{6}{7} \times 18\frac{1}{3} = \frac{7}{3} \times \frac{174}{7} \times \frac{55}{3} = \frac{3190}{3}$

3. (a) $\left(\frac{6}{55} \times \frac{-22}{9}\right) - \left(\frac{26}{125} \times \frac{-10}{39}\right)$

$= \left(\frac{-4}{15}\right) + \left(\frac{-4}{75}\right)$

$= \frac{-20+4}{75} = \frac{-16}{75}$

(b) $-2\frac{1}{5} \times \left(1\frac{4}{7} - \frac{5}{21}\right)$

$= \frac{-11}{5} \times \left(\frac{11}{7} - \frac{5}{21}\right) = \frac{-11}{5} \times \left(\frac{33-5}{21}\right)$

$= \frac{-11}{5} \times \left(\frac{428}{321}\right) = \frac{-11}{5} \times \left(\frac{4}{3}\right) = \frac{-11}{5} \times \frac{4}{3} = \frac{-44}{15}$

3	7, 21
7	7, 7
	1, 1

(c) $\left(\frac{7}{9}-\frac{11}{12}\right)\times\left(\frac{36}{5}+\frac{24}{7}\right)$

5	5, 7
7	1, 7
	1, 1

$=\left(\frac{7}{9}-\frac{11}{12}\right)\times\left(\frac{252+120}{35}\right)=\left(\frac{7}{9}-\frac{11}{12}\right)\times\left(\frac{372}{35}\right)$

$=\left(\frac{28-33}{36}\right)\times\left(\frac{372}{35}\right)=\frac{5}{36}\times\frac{372}{35}=\frac{-1}{3}\times\frac{31}{7}=\frac{-31}{21}$

(d) $\left(\frac{2}{-3}\times\frac{11}{12}\right)\times\left(\frac{-4}{15}\times\frac{-5}{-8}\right)$

3	9, 12
3	3, 4
4	1, 4
	1, 1

$=\left(\frac{2}{-3}\times\frac{11}{126}\right)\times\left(\frac{-4}{15}\times\frac{5}{8}\right)$

$=\left(\frac{11}{-18}\right)\times\left(\frac{-1}{6}\right)=\frac{-11}{18}\times\frac{-1}{6}=\frac{11}{108}$

4. $\left(\frac{3}{4}+\frac{7}{8}\right)\times\left(\frac{11}{13}+\frac{5}{26}\right)=\left(\frac{6+7}{8}\right)\times\left(\frac{22+5}{26}\right)=\left(\frac{13}{8}\right)\times\left(\frac{27}{26}\right)=\frac{13}{8}\times\frac{27}{26}=\frac{27}{16}$

5. $1-\frac{2}{3}\times\frac{15}{27}\times1\frac{19}{26}=1-\left(\frac{2}{3}\times\frac{15}{27}\times\frac{45}{26}\right)=1-\left(\frac{25}{39}\right)=\frac{39-25}{39}=\frac{14}{39}$

6. (a) $-\frac{29}{17}$ (b) 1

(c) $3\frac{1}{2}=\frac{7}{2}=\frac{2}{7}$ (d) $-1=-1$

7. $\frac{17}{11}\times\frac{-33}{5}=\frac{17}{11}\times-\frac{33}{5}=\frac{51}{5}$

8. (a) $\frac{5}{11}$ by $\frac{-5}{22}=\frac{5}{11}\div\frac{-5}{22}=\frac{5}{11}\times\frac{-22}{5}=-2$

(b) -6 by $3\frac{3}{5}=-6\div\frac{18}{5}=\frac{-6}{1}\times\frac{5}{18}=\frac{-5}{3}$

(c) $\frac{8}{9}$ by $4=\frac{8}{9}\div4=\frac{8}{9}\times\frac{1}{4}=\frac{2}{9}$

(d) $3\frac{1}{7}$ by $\frac{11}{-13}=\frac{22}{7}\div\frac{11}{-13}=\frac{22}{7}\times\frac{-13}{11}=\frac{-26}{7}$

9. (a) $\left(\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\frac{1}{6}\right)\div\left(\frac{2}{5}-\frac{5}{9}+\frac{3}{5}-\frac{7}{18}\right)$

2	3, 4, 5, 6
2	3, 2, 5, 3
3	3, 1, 5, 3
5	1, 1, 5, 1
	1, 1, 1, 1

$=\left(\frac{20-15+12-10}{60}\right)\div\left(\frac{36-50+54-35}{90}\right)$

$=\left(\frac{7}{60}\right)\div\left(\frac{5}{90}\right)=\frac{7}{60}\times\frac{90}{5}=\frac{21}{10}$

(b) $\left(\frac{13}{12}\div\frac{39}{42}\right)\times\frac{3}{-5}=\left(\frac{13}{12}\times\frac{42}{39}\right)\times\frac{3}{-5}$

$=\left(\frac{7}{6}\right)\times\frac{-3}{5}=\frac{7}{6}\times\frac{-3}{5}=\frac{-7}{10}$

3	5, 9, 18
3	5, 9, 9
3	5, 3, 3
5	5, 1, 1
	1, 1, 1

10. $\left(\frac{4}{5}+\frac{6}{11}\right)\div\left(\frac{4}{5}-\frac{6}{11}\right)$

$=\left(\frac{44+30}{55}\right)\div\left(\frac{44-30}{55}\right)=\left(\frac{74}{55}\right)\div\left(\frac{14}{55}\right)=\frac{74}{55}\times\frac{55}{14}=\frac{37}{7}$

11. Product of two number $=\frac{-81}{91}$

One number $=\frac{9}{7}$

Other number $=\frac{-81}{91}\div\frac{-9}{7}=\frac{-81}{91}\times\frac{-7}{9}=\frac{+63}{91}$

12. Cost of 13 key chains $=₹201\frac{1}{2}=₹\frac{403}{2}$

Cost of 1 Key chain $=\frac{403}{2}\div 13=\frac{403}{2}\times\frac{1}{13}=\frac{31}{2}$

Exercise 5.1

1. (a) $\frac{5}{8}\times\frac{5}{8}\times\frac{5}{8}\times\frac{5}{8}=\left(\frac{5}{8}\right)^4$

(b) $\left(\frac{-7}{2}\times\frac{-7}{2}\times\frac{-7}{2}\right)=\left(\frac{-7}{2}\right)^3$

(c) $\left(\frac{-4}{9}\right)\times\left(\frac{-4}{9}\right)\times\left(\frac{-4}{9}\right)\times\left(\frac{-4}{9}\right)\times\left(\frac{-4}{9}\right)=\left(\frac{-4}{9}\right)^5$

(d) $\left(\frac{-10}{7}\right)\times\left(\frac{-10}{7}\right)\times\left(\frac{-10}{7}\right)\times\left(\frac{-10}{7}\right)=\left(\frac{-10}{7}\right)^4$

2. (a) $\left(\frac{4}{7}\right)^2=\frac{4}{7}\times\frac{4}{7}=\frac{16}{49}$ (b) $\left(\frac{7}{9}\right)^4=\frac{7}{9}\times\frac{7}{9}\times\frac{7}{9}\times\frac{7}{9}=\frac{2401}{6561}$

(c) $\left(\frac{-3}{11}\right)^2=\frac{-3}{11}\times\frac{-3}{11}=\frac{9}{121}$

(d) $\left(\frac{-3}{11}\right)^5=\frac{-3}{11}\times\frac{-3}{11}\times\frac{-3}{11}\times\frac{-3}{11}\times\frac{-3}{11}=\frac{-243}{161051}$

3. (a) $\frac{8}{216} = \frac{2}{6} \times \frac{2}{6} \times \frac{2}{6} = \left(\frac{2}{6}\right)^3$

(b) $\frac{-1}{243} = \frac{-1}{3} \times \frac{-1}{3} \times \frac{-1}{3} \times \frac{-1}{3} \times \frac{-1}{3} = \left(\frac{-1}{3}\right)^5$

(c) $\frac{64}{125} = \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} = \left(\frac{4}{5}\right)^3$

(d) $\frac{-125}{216} = -\frac{5}{6} \times \frac{-5}{6} \times \frac{-5}{6} = \left(\frac{-5}{6}\right)^3$

(e) $\frac{64}{729} = \frac{4}{9} \times \frac{4}{9} \times \frac{4}{9} = \left(\frac{4}{9}\right)^3$

(f) $\frac{16}{25} = \frac{4}{5} \times \frac{4}{5} = \left(\frac{4}{5}\right)^2$

(g) $\frac{64}{100} = \frac{8}{10} \times \frac{8}{10} = \left(\frac{8}{10}\right)^2$

(h) $\frac{144}{169} = \frac{12}{13} \times \frac{12}{13} = \left(\frac{12}{13}\right)^2$

4. We have cube of $\left[\frac{-2}{3}\right] = \left[\frac{-2}{3}\right]^3$

$\frac{(-2)^3}{(3)^3} = \frac{-2 \times -2 \times -2}{3 \times 3 \times 3} = \frac{-8}{27}$

Square of $\left[\frac{-4}{-5}\right]^2 = \frac{(-4)^2}{(-5)^2} = \frac{16}{25}$

$\therefore$ product of $\frac{-8}{27} \times \frac{16}{25} = \frac{-128}{675}$

5. (a) $(-3)^2 \times \left(\frac{-5}{12}\right)^2 = (-3 \times -3) \times \frac{(-5)^2}{(12)^2} = 9 \times \left(\frac{25}{144}\right) = 9 \times \frac{25}{144} = \frac{25}{16}$

(b) $\left(\frac{-3}{4}\right)^3 \times \left[\frac{16}{27} - \left(\frac{2}{3}\right)^3\right] = \left(\frac{-3}{4}\right)^3 \times \left[\frac{16}{27} - \left(\frac{2 \times 2 \times 2}{3 \times 3 \times 3}\right)\right]$

$= \left(\frac{-3}{4}\right)^3 \times \left[\frac{16}{27} - \frac{8}{27}\right] = \frac{-3 \times -3 \times -3}{4 \times 4 \times 4} \times \left[\frac{16}{27} - \frac{8}{27}\right]$

$= \frac{-27}{64} \times \left[\frac{16 - 8}{27}\right] = \frac{27}{64} \times \frac{8}{27} = \frac{-1}{8}$

(c) $\left(\frac{-1}{2}\right) \times 2^3 \times \left(\frac{3}{4}\right)^2$

$= \left(\frac{-1}{2}\right) \times 8 \times \frac{9}{16} = \frac{-1}{2} \times 8 \times \frac{9}{16} = \frac{-9}{4}$

(d) $(3^2 - 2^2) \div \left(\frac{1}{5}\right)^2$

$= (9-4) \div \left(\frac{1}{25}\right)$

$5 \div \frac{1}{25} = 5 \times \frac{25}{1} = 125$

6. (a) $4^3 = \frac{1}{4 \times 4 \times 4} = \frac{1}{64}$

(b) $\left(\frac{3}{4}\right)^4 = \left(\frac{4}{3}\right)^4 = \frac{4 \times 4 \times 4 \times 4}{3 \times 3 \times 3 \times 3} = \frac{256}{81}$

(c) $\left(\frac{-2}{3}\right)^{105} = \left(\frac{2}{-3}\right)^{105} = \left(\frac{-3}{-2}\right)^{105}$

(d) $\left(\frac{1}{5}\right)^9 \div \left(\frac{1}{5}\right)^{11} = \left(\frac{5}{1}\right)^9 \div \left(\frac{5}{1}\right)^{11}$

$= (5\times5\times5\times5\times5\times5\times5\times5\times5) \div (5\times5\times5\times5\times5\times5\times5\times5\times5\times5\times5)$

$= (5\times5\times5\times5\times5\times5\times5\times5\times5) \times \frac{1}{= (5\times5\times5\times5\times5\times5\times5\times5\times5\times5}$

$= \frac{1}{25}$

7. (a) $\left(\frac{2}{3}\right)^3 = \frac{2\times2\times2}{3\times3\times3} = \frac{8}{27}$ (b) $\left(\frac{-4}{5}\right)^3 = \frac{-4\times-4\times-4}{5\times5\times5} = \frac{-64}{125}$

(c) $\left(\frac{-11}{13}\right)^2 = \frac{-11\times-11}{13\times13} = \frac{121}{169}$ (d) $\left(\frac{7}{9}\right)^2 = \frac{7\times7}{9\times9} = \frac{49}{81}$

8. $\frac{3^2}{4} = \frac{9}{14}$ $\left(\frac{3}{4}\right)^3 = \frac{3^2}{4^2} = \frac{9}{16}$

2	14, 16,
7	7, 8
8	1, 8
	1, 1

LCM of 14 and 16 is 112

Ist Term $= \frac{9}{14} \times \frac{8}{8} = \frac{72}{112}$

2nd Term $= \frac{9}{16} \times \frac{7}{7} = \frac{63}{112}$ $\therefore \frac{72}{112} < \frac{63}{112}$

Hence $\frac{3^2}{4} < \left(\frac{3}{4}\right)^2$

Ten rational number between $\frac{3^2}{4}$ and $\left(\frac{3}{4}\right)^2$ or $\frac{72}{112}$ and $\frac{63}{112}$

$\frac{72}{112}, \frac{71}{112}, \frac{70}{112}, \frac{69}{112}, \frac{68}{112}, \frac{66}{112}, \frac{65}{112}, \frac{64}{112}, \frac{63}{112}$

Exercise 5.2

1. (a) True (b) True

(c) True (d) $x = -2$ and $y = 3$

To Prove : $\left(\frac{x}{y}\right)^{y} = \frac{8}{27}$

LHS Put value of x and y

$\left(\frac{-2}{3}\right)^{3} = \frac{-2\times-2\times-2}{3\times3\times3} = \frac{-8}{27}$

RHS = $\frac{8}{27}$ $\therefore$ LHS $\neq$ RHS

Hence it is false

2. (a) $5^{-3} = \frac{1}{5^3} = \frac{1}{5\times5\times5} = \frac{1}{125}$

(b) $(-3)^{-4} = \frac{1}{(-3)^4} = \frac{1}{-3\times-3\times-3\times-3} = \frac{1}{81}$

(c) $\left(\frac{-7}{9}\right)^{2} = \frac{-7\times-7}{9\times9} = \frac{49}{81}$

(d) $\left(\frac{-3}{11}\right)^{-3} = \left(\frac{11}{-3}\right)^{3} = \frac{11\times11\times11}{-3\times-3\times-3} = -\frac{1331}{27}$

(e) $\left(\frac{2}{5}\right)^{3} = \frac{2\times2\times2}{5\times5\times5} = \frac{8}{125}$

(f) $\left(\frac{-3}{5}\right)^{-2} = \left(\frac{5}{-3}\right)^{2} = \frac{5\times5}{-3\times-3} = \frac{25}{9}$

(g) $\left(\frac{-3}{4}\right)^{-4} = \left(\frac{4}{-3}\right)^{4} = \frac{4\times4\times4\times4}{-3\times-3\times-3\times-3} = \frac{256}{81}$

(h) $\left(\frac{2}{3}\right)^{-5} = \left(\frac{3}{2}\right)^{5} = \frac{3\times3\times3\times3\times3}{2\times2\times2\times2\times2} = \frac{243}{32}$

3. (a) $\left(\frac{1}{6}\right)^{-3} = 6^3$ (b) $\left(\frac{-1}{8}\right)^{-2} = 8^2$

(c) $5^{-3}\times5^{-7} = 5^{[-3+(-7)]}$

As $(a)^m \times (a)^n = (a)\, m+n = 5^{(3-7)} = 5^{-10} = \left(\frac{1}{5}\right)^{10}$

(d) $\left[\left(\frac{3}{2}\right)^{-2}\right]^{-3} = \left[\left(\frac{2}{3}\right)^{2}\right]^{-3} = \left(\frac{2}{3}\right)^{2x-3} = \left(As\ (a^m)^n = a^{m\times n}\right)$

$= \left(\frac{2}{3}\right)^{-6} = \left(\frac{3}{2}\right)^{6} = \frac{729}{64}$

(e) $(3^5 \div 3^8) \times 3^{-7}$

As, $a^m \div a^n = a^{m-n}$

There fore, $3^{5-8} \times 3^{-7} = 3^{-3} \times 3^{-7}$ As $a^m \times a^n$ $\therefore\ a^{m+n}$

So, $(3)^{-3-7} = (3)^{-10} = \left(\frac{1}{3}\right)^{10}$

(f) $\left[\left(\frac{4}{3}\right)^{-3}\right]^{+4} = \left[\left(\frac{3}{4}\right)^{3}\right]^{4}$

As we know that $(a^m)^n = a^{m\times n}$

$\therefore \quad \left(\frac{3}{4}\right)^{3\times 4} = \left(\frac{3}{4}\right)^{12} = \left(\frac{3}{4}\right)^{12}$

4. (a) $\left(\frac{1}{5}\right)^{3} = (5)^{-3}$

(b) $(3^2)^3 =$ As we know that $(a^m)^n = a^{m\times n}$

$\therefore \quad (3)^{2\times 3} = (3)^6 = \left(\frac{1}{3}\right)^{-6}$

(c) $3^4 \times 3^5 =$ As we know that $a^m \times a^n = a^{m\times n}$

$\therefore \quad (3)^{4+5} = (3)^9 = \left(\frac{1}{3}\right)^{-9}$

(d) $\left[\left(\frac{-7}{5}\right)^{3}\right]^{2} =$ As me know that $(a^n)^n = a^{m\times n}$

$\therefore \quad \left(\frac{-7}{5}\right)^{3\times 2} = \left(\frac{-7}{5}\right)^{6} = \left(\frac{5}{7}\right)^{-6}$

5. (a) $4^0 =$ As, $(a^0 = 1)$ $\therefore\ 4^0 = 1$

(b) $6^{5-5} = 6^0$ As, $a^0 = 1$ $\therefore\ 6^0 = 1$

(c) $\left(\frac{4}{7}\right)^{4+2-6} = \left(\frac{4}{7}\right)^{0}$ (As, $a^0 = 1$)

$\therefore \quad = \left(\frac{4}{7}\right)^{0} = 1$

(d) $(-4)^{3\times5-6-9} = (-4)^{15-15} = (-4)^0$ As, $a^0 = 1$

$\therefore \quad (-4)^0 = 1$

(e) $3°+4°+5° = (\text{As, } a° = 1)$

$= 3°+4°+5 \qquad \therefore \quad 1+1+1 = 3$

(f) $2°\times3°\times4°\times5° = (\text{As, } a° = 1)$

$\therefore \quad 1\times1\times1\times1 = 1$

(g) $(4°-3°)\times6° = (\text{As, } a° = 1)$

$\therefore \quad (1-1)\times1 = 0\times1 = 0$

(h) $(9°-3°)\times(6°+2°) = (\text{As, } a° = 1)$

$\therefore \quad (1-1)\times(1+1) = 0\times2 = 0$

6. (a) $\left(\frac{-4}{5}\right)^2\times\left(\frac{125}{64}\right)\times\frac{15}{2}\times\frac{1}{6}$

$= \left(\frac{-4\times4}{5\times5}\right)\times\frac{125}{64}\times\frac{15}{2}\times\frac{1}{6}$

$= \frac{16}{25}\times\frac{125}{64}\times\frac{15}{2}\times\frac{1}{6} = \frac{75}{48}\frac{25}{16} = \frac{25}{16}$

(b) $\left[\left(\frac{2}{3}\right)^2\right]^3\times\left(\frac{1}{3}\right)^{-2}\times3^{-1}\times\frac{1}{6} = (\text{As, } (a^m)^n = a^{m\times n})$

$\therefore \quad = \left(\frac{2}{3}\right)^{2\times3}\times\left(\frac{1}{3}\right)^{-2}\times3^{-1}\times\frac{1}{6}$

$= \left(\frac{2}{3}\right)^6\times(3)^2\times\frac{1}{3}\times\frac{1}{6}$

$= \frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times9\times\frac{1}{3}\times\frac{1}{6} = \frac{32}{729}$

(c) $\left(\frac{3}{4}\right)^7\div\left(\frac{3}{4}\right)^5 = (\text{As, } a^m\div a^n = a^{m-n})$

$\therefore \quad \left(\frac{3}{4}\right)^{7-5} = \left(\frac{3}{4}\right)^2 = \frac{3\times3}{4\times4} = \frac{9}{16}$

(d) $\left(\frac{1}{4}\right)^{-2}+\left(\frac{1}{2}\right)^{-2}+\left(\frac{1}{3}\right)^{-2}$

$= \left(\frac{4}{1}\right)^2+\left(\frac{2}{1}\right)^2+\left(\frac{3}{1}\right)^2 = \frac{16}{1}+\frac{4}{1}+\frac{9}{1} = \frac{16+4+9}{1}$

$= \frac{16+4+9}{1} = \frac{29}{1} = \frac{29}{1} = 29$

7. (a) $\left(2^{-1} \div 5^{-1}\right)^2 \times \left(\frac{-5}{8}\right)^{-1} = (\text{As, } a^m \div b^m = \left(\frac{a}{b}\right)^m$

$\therefore \quad \left[\left(\frac{2}{5}\right)^{-1}\right]^2 \times \left(\frac{-8}{5}\right)^1$

$\therefore \quad \left(\frac{2}{5}\right)^{-2} \times \left(\frac{-8}{5}\right) = (\text{As, } (a^n)^n = a^{m \times n})$

$\therefore \quad = \left(\frac{2}{5}\right)^{-2} \times \left(\frac{-8}{5}\right) = \frac{25}{4} \times \frac{8}{5} = -10$

(b) $(4^{-1} + 8^{-1}) \div \left(\frac{2}{3}\right)^{-1}$

$= \left(\frac{1}{4} + \frac{1}{8}\right) \div \left(\frac{3}{2}\right)^1 = \left(\frac{2+1}{8}\right) \div \left(\frac{3}{2}\right) = \frac{3}{8} \times \frac{2}{3} = \frac{1}{4}$

8. Required number $= (-12)^{-1} \div (-9)^{-1}$

$= \left(\frac{1}{-12}\right)^{+1} \div \left(\frac{1}{-9}\right)^1 = \frac{1}{12} \times \frac{9}{1} = \frac{19}{12} = \frac{3}{4}$

9. Required number $= (-24)^{-1} \div 3^{-1}$

$= \left(\frac{1}{-24}\right)^1 \div \left(\frac{1}{3}\right)^1 = \frac{1}{24} \times 3 = \frac{1}{-8} = (-8)^{-1}$

10. $x = ? \left(\frac{5}{3}\right)^{-5} \times \left(\frac{5}{3}\right)^{-11} = \left(\frac{5}{3}\right)^{8x}$

$(\text{As, } a^m \times a^n = a^{m+n})$

$\therefore \quad \left(\frac{5}{3}\right)^{-5+(-11)} = \left(\frac{5}{3}\right)^{8x} \qquad \therefore \quad \left(\frac{5}{3}\right)^{-5-11} = \left(\frac{5}{3}\right)^{8x}$

$\therefore \quad \left(\frac{5}{3}\right)^{-16} = \left(\frac{5}{3}\right)^{8x}$

$-16 = 8x \qquad \frac{16}{8} = x \qquad x = -2$

11. $5^{2x+1} \div 25 = 125$ value of $x = ?$

$5^{2x+1} \div 5^2 = 5^3 \qquad (\text{As, } a^m \div a^n = a^{m-n})$

$\therefore \quad 5^{2x+1-2} = 5^3$

$\therefore \quad 5^{2x-1} = 5$

$2x - 1 = 3;\ 2x = 3 + 1;\ \ 2x = 4,\ x = \frac{4}{2}$

$\therefore \quad x = 2 \qquad\qquad \therefore$ Value of $x = 2$

12. $\frac{P}{q} = \left(\frac{3}{2}\right)^{-2} \div \left(\frac{6}{7}\right)^{\circ}$, find the value of $\left(\frac{P}{q}\right)^{-3}$

As, $a^{\circ} = 1$

$\frac{p}{q} = \left(\frac{2}{3}\right)^{2} \div 1 \qquad\qquad \frac{p}{q} = \frac{4}{9}$

$\left(\frac{p}{q}\right)^{-3} = \left(\frac{4}{9}\right)^{-3} = \left(\frac{9}{4}\right)^{3}$

$= \frac{9 \times 9 \times 9}{4 \times 4 \times 4} = \frac{729}{64}$

13. (a) $\left(\frac{7}{11} \times \frac{8}{3}\right)^{3} = \left(\frac{7}{11}\right)^{3} \times \left(\frac{8}{3}\right)^{3}$

As, $(a^m \times b^m = (a \times b)^m)$

$\therefore \quad \left(\frac{7}{11} \times \frac{8}{3}\right)^{3} = \left(\frac{7}{11} \times \frac{8}{3}\right)^{3}$

(b) $\left(\frac{-13}{15} \times \frac{19}{16}\right)^{-8} = \left(\frac{-13}{15}\right)^{-8} \times \left(\frac{19}{18}\right)^{-8}$

$= \left[\frac{-13}{15} \times \frac{19}{18}\right]^{-8}$

$\therefore \quad \left[\frac{-13}{15} \times \frac{19}{16}\right]^{-8} \neq \left[\frac{-13}{15} \times \frac{19}{18}\right]^{-8}$

14. $\left[\left(\frac{-2}{3}\right)^{3} \times \left(\frac{-2}{3}\right) \div \left(\frac{4}{9}\right)^{2}\right]$

$= \left[\text{As, } (a)^m \times (a)^n = a^{m+n}\right]$

$\therefore \quad \left[\left(\frac{-2}{3}\right)^{3} \times \left(\frac{2}{3}\right)^{1} \div \left(\frac{4}{9}\right)^{2}\right]$

$\therefore \quad \left[\left(\frac{-2}{3}\right)^{3} \times \left(\frac{2}{3}\right)^{1} \div \left(\frac{4}{9}\right)^{2}\right]$

$\therefore \quad \left[\left(\frac{-2}{3}\right)^{3+1} \div \left(\frac{+4}{9}\right)^{2}\right]$

$\therefore \quad \left[\left(\frac{-2}{3}\right)^4 \div \left(\frac{4}{9}\right)^2\right]$

$= \left[\left(\frac{-2\times 2\times -2\times -2}{3\times 3\times 3\times 3}\right) \div \left(\frac{4\times 4}{9\times 9}\right)\right] = \left(\frac{16}{81} \div \frac{16}{81}\right) = \left(\frac{16}{81} \times \frac{81}{16}\right) = 1$

$\therefore$ The power of $2 = 2^\circ$

Exercise 6.1

1. (a) $x - 3y$ (b) $\frac{x}{y} = -5$

(c) $2x - 10$ (d) $d = 2r$

2. Per day expenditure of Karan = ₹x

Per week expenditure of Karan = ₹$7x$

Saving of Karan per week = ₹y

Saving of Karan in 3 weeks = ₹$3y$

Expenditure of 3 weeks will be = $3 \times 7x = 21x$.

According to question, Income = Expenditure + Savings

Income = ₹$(21x + 3y)$

3. $7p = x - y$

4. Marks scored by Suman in Science = 67

Marks scored by Suman in Maths = x

Total marks scored by her = $x + 67$

5. $5x = z - y$

Exercise 6.2

1. (a) $(x)^{12} = x^{12}$ (b) $4 \times (a)^4 \times (b)^4 = 4a^4b^4$

(c) $7 \times x^3 \times y^3 \times z^2 = 7x^3y^3z^2$ (d) $6a^3b^2$

2. (a) $a^2b^2 = a \times a \times b \times b \times b$

(b) $2x^3y^4 = 25 \times x \times x \times x \times y \times y \times y \times y$

(c) $15x^2y^3z^4 = 15 \times x \times x \times y \times y \times y \times z \times z \times z \times z$

(d) $4ax^2y^3 = 4 \times a \times x \times x \times y \times y \times y$

3. (a) x^3 = monomial (b) x^2y^2 = monomial

(c) $b + 3$ = binomial (d) xyz = monomial

(e) $4x + 2$ = binomial (f) $x^3 + y^2 + z + 3$ = quadrinomial

(g) $x^3 + y^2 + zxy$ = trinomial (h) $4a^3 + 3b^2 + 2c + 1$ = quadrinomial

Exercise 6.3

1. (a) $a + bc + bd$ Terms = a, bc, bd

(b) $2a + 3b - 5c$ Terms = $2a$, $3b$, $-5c$

(c) $ab + bc + ca$ Terms = ab, bc, ca

(d) $a^2b + ab^2$ Terms = a^2b, ab^2

(e) $3x^2y^2 + y^2 - 3xy$ Terms = $3x^2y^3$, y^2, $-3xy$

2. (a) $2x$ = monomial (b) $3x^2 + 4$ = bionomial

(c) $4x^2 + y - z + y^2$ = quadrinomial (d) $x + 54^2$ = bionomial

(e) 7 = monomial

3. (a) $7x^3 = 7$ (b) $2x^3y = 2$

(c) $-3xy^2 = -3$ (d) $-xyz = -1$

(e) $p^3qr = 1$

4. (a) (i) The cofficient of x in $2xy = 2y$

(ii) The cofficient of x^2 in $-3x^2y^3 = -3y^3$

(iii) The coefficient of y in $-5yx^2 = -5x^2$

(iv) The coefficient of ab in $-6abc^2 = -6c^2$

(v) The coefficient of the variable that has least power $5xy^2z^3 = 5y^2z^3$

(b) (i) co-fficient of $y^2 = 5xz^3$

co-efficient of $5x = y^2z^3$

$\therefore$ the sum of both co-efficient = $5xz^3 + y^2z^3$

(b) (iii) In the terms $-3x^2y^3z^4$

co-efficient of $x^2 = -3y^3z^4$

co-efficient of $3z^4 = +x^2y^3$

$\therefore$ the sum of both co-efficient = $3y^3z^4 + (x^2y^3)$

$= -y^3(3z^4 + x^2) = -(3z^4 + x^2)y^3$

5. (a) $3xy$, xy^2z, $-4x^2z$, yx^2z = No like terms

(b) $2xyz$, xy^2z, x^2yz, $2yxz = (2xyz, 2yxz)$ are the like terms.

(c) a^2x, ax^2, $ax - xa^2$, xa, $x^3a = (a^2x, xa^2)$, (ax, xa) are the like terms

(d) $5m^2n^2p$, $6m^2pn$, $-3mn^2p$, $2mnp^1$, m^2np

(e) $2xy^2z$, $-x^2yz$, $5xy^2z$, $-2xyz^2$, $2xyz^2$, $3yx^2z$

$= (2xy^2z, 5xy^2z)(-x^2yz, 3yx^2z); (-2xyz^2, 2xyz^2)$ are like terms.

6. (a) $3x^2 - 2y^2 + z^2 - y^2 + z^2 + x^2 + 3y^2$

$= (3x^2 + x^2); (z^2 + z^2); (-2y^2 + 3y^2 - y^2)$

$\therefore$ these are the like terms.

(b) $2ab + 3ab^2 - a^2b + 4ab^2 + 5a^2b - 3ab$

$(2ab - 3ab)$; $(3ab^2 + 4ab^2)$; $(-a^2b + 5a^2b)$

$\therefore$ these are the like terms.

(c) $5xy^2z + 3xyz^2 - 2x^2yz + xyz^2 - 2xy^2z$

$(5xy^2z - 2xy^2z)$; $(3xyz^2 + xyz^2)$

$\therefore$ these are the like terms.

7. (a) $a = 1$, $b = -1$ and $c = 0$

$2a + b - c = 2\times1 + (-1) - (0) = 2 - 1 = 0 = 1$

(b) $a = 1$, $b = -1$ and $c = 0$

$a - 3b + 2c = 1 - 3\times(-1) + 2\times0 = 1 + 3 + 0 = 4$

(c) $a = 1$, $b = -1$, $c = 0$

$ab - bc + 2a^2 = 1\times-1 - (-1\times0) + 2(1)^2$

$= -1 - (0) + 2(1) = -1 - 0 + 2 = 1$

8. (a) $a + b\times c = 2 + 1\times0 = 2 + 0 = 2$

(b) $a\times b + c = 2\times1 + 0 = 2 + 0 = 2$

(c) $a + b - c = 2 + 1 - 0 = 3 - 0 = 3$

9. (a) $x \div y + xy = 6 \div 3 + (6\times3) = 6 \div 3 + 18 = 2 + 18 = 20$

(b) $xy \div z - yz = (6\times3) \div 2 - (3\times2) = 18 \div 2 - 6 = 9 - 6 = 3$

(c) $4xy + x \div 4 + xz \div 3 = (4\times6\times3) + (6 \div 4) + (6\times2) \div 3$

$= 72 + \frac{6}{4} + (12 \div 3) = 72 + \frac{6}{4} + 4 = \frac{288 + 6 + 16}{4} = \frac{310}{4} = 76.1$

(d) $x^2 + y^2 - z^2 = (6)^2 + (3)^2 - (2)^2 = 36 + 9 - 4 = 25 - 4 = 41$

(e) $x^2y - 2xy^2 + 3z^2$

$= (6)^2 3 - 2\times6(3)^2 + 3\times(2)^2 = (36\times3) - (2\times6\times9) + (3\times4)$

$= 108 - (108) + 12 = 108 - 1078 + 12 = 12$

10. (a) $3x^4 - 2x^3 - x^2 + x - 3$ when $x = 2$,

$= 3(2)^4 - 2(2)^3 - (2)^2 + 2 - 3 = (3\times16) - 2(8) - 4 + 2 - 3$

$= 48 - 16 - 4 + 2 - 3 = 27$

(b) $x^5 - x^4 + x^3 - x^2 + x - 3$ When $x = -1$

$(-1)^5 - (-1)^4 + (-1)^3 - (-1)^2 + (-1) - 3$

$= -1 - (+1) + (-1) - (1) - 1 - 3 = -1 - 1 - 1 - 1 - 1 - 3 = -8$

(c) $2a^3 - 3a^2 + a + 5$ When $a = -2$

$= 2(-2)^3 - 3(-2)^2 + (-2) + 5$

$= 2(-8) - 3(4) - 2 + 5$

$= -16 - 12 - 2 + 5 = -25$

(d) $x^2 + ax + 3^2$ When $x = 2$, $a = 3$

$= (2)^2 + (3 \times 2) + 3^2$

$= 4 + 6 + 9 = 19$

(e) $2x^2y + a^2x^2y^2$ When $x = 2$, $y = 3$, $a = 1$

$= 2(2)^2 \times 3 + (1)^2 \times (2)^2 \times (3)^2$

$= 2(4 \times 3) + (1 \times 4 \times 9)$

$= 2 \times 12 + 36 = 24 + 36 = 60$

Exercise 6.4

1. If $x + 3 = 9$ Value of x = ?

$x = 9 - 3$, $x = 6$

2. If $x - 5 = 0$

The root of this equation

it, $x = 5$

3. Is 4 a root of $3x - 9 = 12$?

No, $3x = 12 + 9$

$3x = 21$; $x = \frac{21}{3}7$, $x = 7$

Hence, No 4 is not a root of $3x - 9 = 12$

4. If $\frac{x}{9} = 14$, then value of x = ?

$\therefore \quad x = 14 \times 9$ $x = 126$

5. $x + 5 = 7$ $x = 7 - 5$

$x = 2$

Verification

LHS $x + 5 = 2 + 5 = 7$

RHS = 7 $\therefore$ LHS = RHS

Hence verified

6. $x - 6 = 10$; $x = 10 + 6$; $x = 16$

Verification

LHS, $x - 6 = 16 - 6 = 10$; RHS = 10

$\therefore$ LHS = RHS, Hence verified

7. $5 - x = 3;\ x = 3 - 5;\ x = -2$

Verification

LHS $= 5 - x = 5 - (-2) = 5 + 2 = 7$

$\therefore$ LHS $\neq$ RHS, Hence verified

8. $2x = x + 3\ ;\ 2x - x = 3;\ x = 3$

Verification

LHS $= 2x = 2 \times 3 = 6$

RHS $= x + 3 = 3 + 3 = 6$

$\therefore$ LHS = RHS, Hence verified.

9. $8x = 40;\ x = \frac{40}{8};\ x = 5$

Verification

LHS $= 8x = 8 \times 5 = 40$

RHS $= 40$

$\therefore$ LHS = RHS, Hence verified.

10. $11x + 13 = -20;\ 11x = -20 - 13;\ 11x = -33;\ x = \frac{-33}{11};\ x = -3$

Verification, LHS $= 11x + 13$ RHS $= -20$

$= 11 \times -3 + 13 = -33 + 13 = -20$

$\therefore$ LHS = RHS, Hence verified

11. $\frac{x}{9} = 6$

$x = 6 \times 9;\ x = 54$

Verification, LHS $= \frac{x}{9} = \frac{54}{9}$

LHS = 6, RHS = 6

$\therefore$ LHS = RHS, Hence verified.

12. $14x = 84$

$x = \frac{84}{14};\ x = 6$

Verification, LHS $= 14x = 14 \times 6$

LHS = 84, RHS = 84

$\therefore$ LHS = RHS, Hence verified

13. $\frac{x}{4} - 4 = -1;\ \frac{x}{4} = -1 + 4;\ \frac{x}{4} = 3;\ x = 3 \times 4 = 12;\ x = 12$

Verification LHS $= \frac{x}{4} - 4 = \frac{12}{4} - 4$

LHS $= 3 - 4 = -1$ RHS $= -1$

$\therefore$ LHS = RHS, Hence verified

14. $y - \frac{1}{2} = 3;\ y = 3 + \frac{1}{2};\ y = \frac{6+1}{2} = \frac{7}{2}$

Verification, LHS $= y - \frac{1}{2} = \frac{7}{2} - \frac{1}{2} = \frac{7-1}{2} = \frac{6}{2} 3 = 3$

RHS = 3

$\therefore$ LHS = RHS, Hence Verified

15. $5(x + 3) = 60$

$5x + 15 = 60;\ 5x = 60 - 15;\ 5x = 45;\ x = \frac{45}{5},\ x = 9$

Verification, LHS $= 5(x + 3) = 5(9 + 3) = 5(12)$

LHS = 60, RHS = 60

$\therefore$ LHS = RHS, Hence verified.

16. $7x - 10 = 25$

$7x = 25 + 10;\ 7x = 35;\ x = \frac{35}{7},\ x = 5$

Verification, LHS $= 7x - 10 = (7 \times 5) - 10$

LHS $= 35 - 10 = 25$

RHS = 25

$\therefore$ LHS = RHS, Hence verified

17. $x + 3 = 15 + \frac{x}{2}$

$x + 3 = \frac{30 + x}{2};\ 2(x + 3) = 30 + x;\ 2x + 6 = 30 + x;\ 2x - x = 30 - 6$

$x = 24$

Verification, LHS $= x + 3 = 24 + 3 = 27$

RHS $= 15 + \frac{24}{2} = 27$

$\therefore$ LHS = RHS, Hence verified

18. $\frac{7x+3}{2} = 19$

$7x + 3 = 19 \times 2;\ 7x + 3 = 38$

$7x = 38 - 3;\ 7x = 35$

$x = \frac{35}{7},\ x = 5$

Verification, LHS $= \frac{7x+3}{2} = \frac{7\times5+3}{2} = \frac{35+3}{2}$

LHS $= \frac{38}{2}$ RHS $= 19$

RHS $= 19$

$\therefore$ LHS = RHS, Hence Verified

19. $10(2-x) = 4(x-9)$

$20 - 10x = 4x - 36;\ -10x = 4x - 36 - 20$

$-10x - 4x = -56;\ -14x = -56$

$x = \frac{56}{14} = \frac{56}{14};\ x = 4$

Verification, LHS $= 10(2-x) = 20 - 10x = 20 - 10 \times 4$

LHS $= 20 - 40 = -20$

RHS $= 4(4-9) = 4(-5) = -20$

$\therefore$ LHS = RHS, Hence verified

20. $3(x-1) - (x+2) = 3$

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

$3x - 3 - x - 2 = 3$

$3x - x - 3 - 2 = 3$

$2x - 5 = 3;\ 2x = 3 + 5$

$2x = 8;\ x = \frac{8}{2},\ x = 4$

Verification, LHS $= 3(x-1) - (x+2)$

$= 3(4-1) - (4+2) = 3(3) - (6) = 9 - 6 = 3$, LHS $= 3$

RHS $= 3$

$\therefore$ LHS = RHS,

Hence verified

21. If $\frac{x}{2} = 4$, value of $3x + 2 = ?$

$\frac{x}{2} = 4$ $\quad\quad$ $\therefore \quad 3x + 2$

$x = 4 \times 2 = 8$ $\quad\quad$ $= 3 \times 8 + 2$

$x = 8$ $\quad\quad$ $= 24 + 2 = 26$

22. If $4x = 12$, then value of $-x + \frac{3}{x} + 2 = ?$

$4x = 12;$ $\quad\quad$ $x = \frac{12}{4},\ x = 3$

$\therefore \quad -x + \frac{3}{x} + 2 = -3 + \frac{3}{3} + 2 = \frac{-9 + 3 + 6}{3} = \frac{-9 + 9}{3} = \frac{0}{3} = 0$

$\therefore \quad x = 3, 0$

Exercise 6.5

1. (a) Let the another number be x.

So, the number is 4 times of another number

As, their sum is 30

$\therefore$ Equation will be, $4x + x = 30$

(b) Let the another number be x

So, the number is $8x$

and their difference is 42

$8x - x = 42$

$\therefore$ Equation will be, $8x - x = 42$

(c) Let the number be x

and it is decreased by 10 is 50.

$\therefore$ Equation will be, $x - 10 = 50$

(d) Let the number be x

and 6 times a number added to 10 is 58

$\therefore$ Equation will be, $\frac{x}{2} = 2x - 21$

$\therefore \quad 2x - \frac{x}{2} = 21$

2. (a) Let the number be x.

$3x = 60;\ x = \frac{60}{3}$

$\therefore$ the number will be 20

(b) Let the cost of one pen = ₹x

$\therefore$ Equation will be $5x$ = ₹100

$$x = ₹\frac{100}{5}$$

$\therefore$ x = ₹ 20 $\quad\quad$ $\therefore$ the cost of one pen = ₹ 20

(c) Let the number be x

$\therefore$ Equation will be $\frac{2}{3}x = 15$ $\quad\quad$ $2x = 15 \times 3;\ 2x = 45;\ x = \frac{45}{2}$

$\therefore$ Number will be = 22.5

(d) Let the number be x

$\therefore$ Equation will be $\frac{3}{4}x = 30$

$3x = 30 \times 4;\ 3x = 120;\ x = \frac{120}{3},\ x = 40$

$\therefore$ number will be = 40

(e) Let the weight be x

$\therefore$ Equation will be $\frac{2}{3}x = 32$

$2x = 32 \times 3;\ 2x = 96;\ x = 48$ kg

$\therefore$ weight of a boy = 48 kg

3. Let the number be x

$$\frac{x}{7} = 5;\ x = 5 \times 7;\ x = 35$$

$\therefore$ Number = 35

4. Let the cost of the book = x

According of question

$50 - 5 = x;\ 45 = x$

$\therefore$ cost of the book is ₹ 45

5. Let the one side of the square = $4x - 7$

Adjacent side of the square = $3x + 5$

(As, all sides of square are equal)

$4x - 7 = 3x + 5;\ 4x - 3x = 5 + 7;\ x = 12$

Exercise 7.1

1. (a) $\frac{10}{0.25} = \frac{10}{25} \times 100 = \frac{40}{1} = 40:1$

(b) ₹1 = 100 paise

So, ₹60 = 60 × 100p = 6000P

$\therefore$ Ratio $= \frac{25}{6000} = 1:240$

$\therefore$ Ratio $= \frac{1000}{25} = 40:1$

(c) As, 1m = 100 cm

So, 10 m = 10 × 100 = 1000 cm

$\therefore$ Ratio $= \frac{1000}{25} = 40:1$

(d) Ratio $= \frac{3.2}{56} = \frac{32}{56} = \frac{8}{28 \times 5} = \frac{2}{35} = 2:35$

(e) Ratio $= \frac{20}{24} = 5:6$

2. (a) Ratio $= \frac{7.50}{4} = \frac{7.50}{4 \times 100} = \frac{750}{400} = 15:8$

(b) As, 1 hr = 60 min

So, 2hr = 2 × 60 = 120 min

So, Ratio $= \frac{120}{300} = 2:5$

(c) As, 1 m = 100 cm

So, 6 m = 600 cm

1 m 25 cm = 125 cm

$\therefore$ Ratio $= \frac{600}{125} = 24:5$

(d) As, 1 km = 1000 m

So, 5 km = 5 × 100m = 5000 m

1 km 500 m = 1500 m

$\therefore$ Ratio $= \frac{5000}{1500} = 10:3$

(e) As, 1 litre = 1000 mL

$\therefore$ Ratio $= \frac{700}{1000} = 7:10$

3. Manik's earning per month = ₹ 955

Manik's saving per month = ₹ 185

Manik's expenditure per month = ₹ 955 – ₹185 = ₹ 770

(a) $\frac{191}{154} = 191:154$

(b) $\frac{185}{955} = 37:191$

(c) $\frac{185}{770} = \frac{37}{154} = 37:154$

4. Total number of persons = 72

Number of Men = 48

Number of women = 72 – 48 = 24

(a) $\frac{48}{24} = 2:1$

(b) $\frac{48}{72} = 2:3$

(c) $\frac{72}{24} = 3:1$

5. Let the common ratio be x

Number of boys = $8x$

Number of girls = $5x$

Total strength of the school is = $8x + 5x$

According to question

$5x = 160;\ x = \frac{160}{5}$

Number of boys = $8x = 8 \times 32 = 256$

Number of girls = $5x = 5 \times 32 = 160$

Total strength of the school = 256 + 160 = 416

6. Investment made by Palak = ₹ 1800

Investment made by Pankaj = ₹ 2400

Ratio of the investments = $\frac{1800}{2400} = 3:4$

Profit = ₹ 1400

Palak's Profit = $\frac{3}{7} \times 1400$ = ₹ 600;

Pankaj's Profit $= \frac{4}{7} \times 1400 = ₹\,800$

7. Let the common ratio be x

Perimeter of triangle = Sum of three sides

According to question

$1x + 2x + 3x = 36;\ 6x = 36;\ x = \frac{36}{6},\ x = 6$

1st side $= 1x = 1 \times 6 = 6$ cm

2nd side $= 2x = 2 \times 6 = 12$ cm

3rd side $= 3x = 3 \times 6 = 18$ cm

8. Let the common ratio be x.

Length of rectangular paper $= 2x$

breadth of rectangular paper $= 3x$

According to question

Area of rectangle = Length × breadth

$150 = 2x \times 3x;\ 150 = 6x^2;\ x^2 = \frac{150}{6};\ x = 5$ cm

length $= 2x = 2 \times 5 = 10$ cm

breadth $= 3x = 3 \times 5 = 15$ cm

9. Let the number to be added $= x$

According to question

$\frac{6+x}{7+x} = \frac{9}{10};$

$10(6 + x) = 9(7 + x)$

$60 + 10x = 63 - 60;$

$x = 3$

10. Let the common fraction be x

According to question

$\frac{3x+3}{2x-2} = \frac{9}{4};$ $\qquad 4(3x + 3) = 9(2x - 2)$

$12x + 12 = 18x - 18;$ $\qquad 18x - 12x = 12 + 18$

$6x = 30;$ $\qquad x = \frac{30}{6},\ x = 5$

$\therefore$ original fraction $= \frac{3x}{2x} = \frac{3 \times 5}{2 \times 5} = \frac{15}{10}$

Exercise 7.2

1. (a) $36:49::6:7$ 36, 49, 6, 7

$\frac{36}{49}::\frac{6}{7}$; $\frac{36}{49}=\frac{6}{7}$

$36\times7=49\times6$; $252=294$

$\therefore$ it is true that 36, 49, 6, 7 are not in proportion

(b) 30, 40, 45, 60 are in proportion

$30:40::45:60$

$\frac{30}{40}::\frac{45}{60}$; $\frac{30}{40}=\frac{45}{60}$

$30\times60=45\times40$; $1800=1800$

Yes, it is true that 30, 40, 45, 60 are in proportion.

2 (a) $\frac{5}{7}=\frac{30}{x}$

$5\times x=30\times7$; $5x=210$

$x=\frac{210}{5}$, $x=42$

(b) $\frac{8}{36}=\frac{6}{x}$; $8\times x=6\times36$

$8x=216$; $x=\frac{216}{8}$, $x=27$

3. (a) $150:250::200:300$

$\frac{150}{250}::\frac{200}{300}$; $\frac{3}{5}=\frac{200}{300}$; $\frac{3}{5}=\frac{2}{3}$; $3\times3=2\times5$; $9=10$

$\therefore$ 150, 250, 200, 300 are not in proportion.

(b) $8:16::6:12$

$\frac{8}{16}::\frac{6}{12}$; $8\times12=6\times16$; $96=96$

$\therefore$ 8, 16, 6, 12 are in proportion.

(c) $6:2::4:3$

$\frac{6}{2}::\frac{4}{3}$; $\frac{6}{2}=\frac{4}{3}$; $6\times3=4\times2$; $18=8$

$\therefore$ 6, 2, 4, 3 are not in proportion

4. Let the number to be subtracted = x

According to question

$\frac{10-x}{12-x}=\frac{19-x}{24-x}$; $(10-x)\times(24-x)=(19-x)\times(12-x)$

$10(24-x)-x(24-x)=19(12-x)-x(12-x)$

$(240-10x)(-24x+x^2)-228-19x-12x+x^2$

$240-34x+x^2=228-31x+x^2$

$34x-31x+x^2-x^2=240-228$

$3x=12$; $x=\frac{12}{3}$; $x=4$

5. Let the common ratio be x

According to question

$7x=56$; $x=\frac{56}{7}$, $x=8$

$\therefore$ Number of women $=5x=5\times8=40$

6. Let the common ratio be x

Perimeter of triangle = Sum of three sides

According to question

$4x+5x+6x=30$; $15x=30$; $x=\frac{30}{15}$; $x=2$

1st side $=4x=4\times2=8$ cm

2nd side $=5x=5\times2=10$ cm

3rd side $=6x=6\times2=12$ cm

7. $36:54::54:x$

$\frac{36}{54}=\frac{54}{x}$; $36\times x=54\times54$

$36x=2916$; $x=\frac{2916}{36}$; $x=81$

8. Let the mean proportional between 9 and 16 be x

$\therefore$ $9:x=x:16$; $\frac{9}{x}=\frac{x}{16}$

$x^2=9\times16$; $x^2=144$; $x=12$

9. (a) $6:x=11:55$

$\frac{6}{x}=\frac{11}{55}$

$11x=6\times55$; $x=\frac{6\times55}{11}$; $x=30$

(b) $9:8=x:12$

$\frac{9}{8} = \frac{x}{12}$; $8x = 9 \times 12$; $x = \frac{9 \times 12}{8} = \frac{27}{2}$; $x = 13.5$

(c) $2 : 9 = x : 27$

$\frac{2}{9} = \frac{x}{27}$; $9x = 2 \times 27$; $x = \frac{2 \times 27}{9} = 6$, $x = 6$

10. $9 : x = x : 12$

$\frac{9}{x} = \frac{x}{2}$; $x^2 = 9 \times 12$; $x^2 = 108$; $x^2 = 108$

Incorrect question

Exercise 7.3

1. Cost of 3 m cloth = ₹ 79.50

Cost of 1 m cloth = $\frac{79.50}{3}$ = ₹ 26.5

Cost of 15 m cloth = 26.5×15 = ₹ 397.5

Cost of 15 m cloth = 26.5×5 = ₹ 397.5

2. Income of a worker in 8 days = ₹3000

Income of a worker in 1 day = ₹ $\frac{3000}{8}$

Income earned by worker in 15 days = $\frac{3000}{8} \times 15$ = ₹ 5625

3. Distance covered in 5 hours = 200 km.

Distance covered in 1 hour = $\frac{200}{5}$ = 40 km.

Distance covered in 7 hours = 40×7 = 280 km

4. Sales tax on ₹ 60 = ₹ 4.20

Sales tax on ₹ 1 = $\frac{4.20}{60}$

Sales tax on ₹ 120 = $\frac{4.20}{60} \times 120$ = ₹8.40

5. Cost of travelling 75 km = ₹ 215

Cost of traavelling 1 km = $\frac{215}{75}$

cost of travelling 120 km = $\frac{215}{75} \times 120$ = ₹344

6. Cost of 15 post cards = ₹2.25

Cost of 1 postcard = $\frac{2.25}{15}$

Cost of 36 post cards = $\frac{2.25}{15} \times 36 = ₹5.40$

Number of post cards bought for ₹ 2.25 = 15

Number of post cards bought for ₹ 1 = $\frac{15}{2.25}$

Number of post cards bought for ₹ 45 = $\frac{15}{2.25} \times 45 = 300$ postcards.

Exercise 7.4

1.

Pages per day	Time taken (day)
18	25
15	x

$\frac{18}{15} = \frac{x}{25}$; $18 \times 25 = 15 \times x$; $x = \frac{18 \times 25}{15}$

$x = 30$ days

2.

No. of cows	Time taken (day)
45	13
x	9

$\frac{45}{x} = \frac{9}{13}$; $45 \times 13 = 9 \times x$; $9x = 45 \times 13$; $x = \frac{45 \times 13}{9}$

$x = 65$ cows

3.

No. of men	No. of days
36	25
15	x

$\frac{36}{15} = \frac{x}{25}$; $15 \times x = 36 \times 25$; $x = \frac{36 \times 25}{15}$

$x = 60$ days

4.

No. of Men	No. of days
500	24
300	x

$\frac{500}{800} = \frac{x}{24}$; $500 \times 24 = 300 \times x$; $x = 500 \times 24 = 5 \times 3$

$x = 15$ days

Exercise 8.1

1. (a) $\frac{3}{8} = \frac{3}{8} \times 100 = 37.5\%$ (b) $\frac{53}{100} = \frac{53}{100} \times 100 = 53\%$

(c) $\frac{5}{7} = \frac{5}{7} \times 100 = 71.43\%$ (Approx)

(d) $\frac{4}{5} = \frac{4}{5} \times 100 = 80\%$ (e) $\frac{9}{20} = \frac{9}{20} \times 100 = 45\%$

(f) $\frac{1}{4} = \frac{1}{4} \times 100 = 25\%$ (g) $\frac{3}{4} = \frac{3}{4} \times 100 = 75\%$

2. (a) $6.5 = \frac{6}{5} \times 100 = 120\%$ (b) $30 : 80 = \frac{30}{80} \times 100 = 37.5\%$

(c) $11 : 125 = \frac{11}{125} \times 100 = 8.8\%$ (d) $1 : 5 = \frac{1}{5} \times 100 = 20\%$

(e) $3 : 12 = \frac{3}{12} \times 100 = 25\%$

(f) $2 : 3 = \frac{2}{3} \times 100 = 66.66\%$ (Approx)

(g) $4 : 5 = \frac{4}{5} \times 100 = 80\%$

3. (a) $0.002 = \frac{0.002}{1000} \times 100\% = 0.2\%$ (b) $0.24 = \frac{0.24}{100} \times 100\% = 24\%$

(c) $0.004 = \frac{0.004}{1000} \times 100\% = 0.4\%$ (d) $0.275 = \frac{0.275}{1000} \times 100\% = 27.5\%$

(e) $1.2 = \frac{1.2}{10} \times 100\% = 120\%$ (f) $0.02 = \frac{0.02}{100} \times 100\% = 2\%$

(g) $0.037 = \frac{0.037}{1000} \times 100\% = 3.7\%$

4. (a) $15\% = \frac{15}{100} = \frac{3}{20}$

(b) $25.5\% = \frac{25.5}{100} = \frac{255}{1000} = \frac{255}{1000} = \frac{51}{200}$

(c) $136\% = \frac{136}{100} = \frac{34}{25}$

(d) $0.1\% = \frac{0.1}{100} = \frac{01}{1000} = \frac{1}{1000}$

(e) $12\frac{1}{2}\% = \frac{25}{2}\% = \frac{25}{2\times100} = \frac{25}{200} = \frac{1}{8}$

(f) $250\% = \frac{250}{100} = \frac{5}{2}$

(g) $300\% = \frac{300}{100} = \frac{3}{1}$ (h) $115\% = \frac{115}{100} = \frac{23}{20}$

5.

Subjects	Maximum Marks	Marks Obtained	Percentage or Marks count of 100
Physic	50	42	$\frac{42}{50}\times100\% = 84\%$
Chemistry	20	18	$\frac{18}{20}\times100\% = 90\%$
Maths	25	19	$\frac{19}{25}\times100\% = 76\%$
Computer	40	28	$\frac{28}{40}\times100\% = 70\%$
Biology	25	20	$\frac{20}{25}\times100\% = 80\%$

Exercise 8.2

1. (a) $\frac{20}{100}\times400 = 80$ kg (b) $\frac{70}{100}\times300 = 210$

(c) $\frac{75}{100}\times400 = 300$ Mangoes (d) $\frac{8}{100}\times600 = 48$ m

(e) $\frac{35}{100}\times350 = 122.5$ (f) $\frac{5}{100}\times300 = 15$

2. (a) 36% of 825 km $= \frac{36}{100}\times825 = 297$ km

(b) $2\frac{1}{2}\%$ of 840 people $= \frac{5}{2}\%$ of $840 = \frac{5}{200}\times840 = 21$ people

(c) 30% of $650 = \frac{30}{100}\times650 = 195$

3. (a) Let the total marks $= x$

According to question

$\frac{40}{100}\times x = 60;\ x = \frac{60\times100}{40};\ x = 150$

(b) Let the population of village $= x$

According to question

$$\frac{5}{100} \times x = 125;\ x = \frac{125 \times 100}{5};\ x = 2500$$

(c) Let the amount of sale = x

According to question

$$\frac{6}{100} \times x = 3;\ x = \frac{3 \times 100}{6};\ x = ₹\,50$$

(d) Let the original price of saree = x

According to question

$$\frac{15}{100} \times x = ₹135;\ x = \frac{135 \times 100}{15};\ x = ₹900$$

(e) Let the distance travelled = x km

According to question

$$\frac{10}{100} \times x = 72;\ x = \frac{72 \times 100}{10};\ x = 720 \text{ km}$$

(f) Let the original price of the suit = ₹x.

According to question

$$\frac{20}{100} \times x = ₹\,420;\ x = \frac{420 \times 100}{20};\ x = ₹2100$$

(g) Let the amount invested = x

According to question

$$\frac{7}{100} \times x = ₹\,217;\ x = \frac{217 \times 100}{7};\ x = ₹\,3100$$

4. (a) 48 cm, 80 cm

$$\text{the required } \% = \frac{\text{first quantity}}{\text{second quantity}} \times 100\%$$

$$= \frac{48}{80} \times 100\% = 60\%$$

(b) 21, 110 the required $\% = \frac{\text{first quantity}}{\text{second quantity}} \times 100\%$

$$= \frac{21}{110} \times 100 = 19.09\% \qquad \text{(Approx)}$$

(c) 3.64 kg, 5.6 kg the required $\% = \frac{\text{first quantity}}{\text{second quantity}} \times 100\%$

$$= \frac{3.64}{5.6} \times 100\% = \frac{364}{5.6} = 65\%$$

(d) ₹ 80, ₹ 280 the required % $= \frac{\text{first quantity}}{\text{second quanitity}} \times 100\%$

$= \frac{80}{280} \times 100 = \frac{200}{7} = 28.57\%$ (approx)

5. Rent of room for 1 day = ₹3500

So, that rent for 2 days = ₹3500 × 2 = ₹7000

Luxury tax for 2 days = 7% of 7000 $= \frac{7}{100} \times 7000 =$ ₹490

Total maximum marks in all

∴ Total amount paid in 2 days = ₹7000 + ₹ 490 = ₹7490

6. Percentage of Marks= Total marks obtained in each subject/Total maximum marks in all subjects

Let the marks obtained in mathematics = x

$60\% = \frac{72+70+x}{120+150+180}; \frac{60}{100} = \frac{142+x}{450}$

$60 \times 450 = 100(142+x)$

$27000 = 100\,(142+x)$

$\frac{27000}{1000} = 142+x;\ 270 = 142+x;\ x = 270-142$

$x = 128$ Marks

∴ The marks obtained in mathematics = 128

7. Marks obtained in Hindi = 50% of 100 $= \frac{50}{100} \times 100 = 50$ Marks

Marks obtained in English = 75% of 140 $= \frac{75}{100} \times 140 = 105$ marks

Marks obtained in Maths = 90% of 160 $= \frac{90}{100} \times 160 = 144$ marks

Aggregate Percentage $= \frac{\text{Total marks obtained in each subject}}{\text{Total maximum marks in all subjects}}$

$= \frac{50+105+144}{100+140+160} = \frac{299}{400} \times 100\%$

$= \frac{29900}{400} = 74.75\%$

8. Let the total votes = x

Number of votes scored by Sumit = 11484

According to question

44% of x = 11484

$\frac{44}{100} \times x = 11484;\ x = \frac{1148400}{44};\ x = 26100$ votes

$\therefore$ Total votes = 26100

Votes scored by Namit = 26% of 26100 $= \frac{26}{100} \times 26100 = 6786$ votes

(a) Number of votes cast in the village= 26100 votes

(b) Number of voters who did not vote forester Sumit or Namit = 26100 – 11484 – 6786 = 7830 votes

9. Total monthly salary =₹24000

House rent = 20% of 24000 $= \frac{20}{100} \times 24000$; House rent =₹4800

Amount spend on food items =₹7200

According to question

Percentage of money spend on food item = x% of 4000 = 7200

$\frac{x}{100} \times 24000 = 7200;\ \ 240x = 7200;\ \ x = \frac{7200}{240};\ x = 30\%$

$\therefore$ He is spending 30% on food items.

10. Number of children = 28000

Let the total population of town = x

Percentage of children = 25%

According to question

25% of x = 28000; $\frac{25}{100} \times x = 28000;\ 25x = 28000 \times 100$

$25x = 2800000;\ x = \frac{2800000}{25}$

$\therefore$ The total population of town = 112000 people.

Exercise 8.3

1. (a) C.P. = ? S.P. =₹1254, Loss =₹32

As, Loss = cost Price – Selling Price

₹32 = C.P. –₹1254

$\therefore$ C.P. = 32+ 1254; C.P. =₹1286 $\therefore$ Cost price =₹1286

$\therefore$ Cost Price =₹1286

(b) C.P. =₹720, S.P. =?, Loss =₹55.50

As, Profit = Selling Price – Cost price

55.50 = S.P. –720

S.P. = 720 + 55.50 ∴ S.P. = ₹775.50

(c) C.P. = ₹1200, S.P = ₹1350, Profit/Loss% = ?

As, Profit = S.P. – C.P. = 1350 – 1200 = ₹150

$$\text{Profit \%} = \frac{\text{Profit}}{\text{C. P.}} \times 100 = \frac{150}{1200} \times 100$$

∴ Profit % = 12.5%

2. Cost price of house = ₹45,200

Money spent on repairs = ₹2800

Total cost price = ₹45200 + ₹ 2800 = ₹ 48000

Selling price of hourse = ₹46800

As, Loss = C.P. – S.P = ₹48000 – 46800

∴ Loss = ₹1200

$$\text{As, Loss \%} \frac{\text{Loss}}{\text{C. P}} \times 100 = \frac{1200}{48000} \times 100$$

∴ Loss % = 2.5%

3. Cost price of 1 dozen peri's = ₹10.80

Cost price of 4 dozen pen's = ₹10.80 × 4 = ₹43.20

Selling price of 1 pen = 80P

Selling price of 4 dozen pen's = 0.80 × 48 = ₹38.4

As, Loss = Cost Price - Selling Price

∴ Loss = 43.20 – 38.40 = ₹4.80

$$\text{As, Loss \%} = \frac{\text{Loss}}{\text{C. P.}} \times 100 = \frac{4.80}{43.20} \times 100 = \frac{480}{4320} \times 100 = \frac{4800}{432} = 11.11\%$$

Hence, Loss % = 11.11%

4. $$\text{As, Profit \%} = \frac{\text{Profit}}{\text{C. P}} \times 100$$

$$10 = \frac{\text{Proft}}{120} \times 100; \frac{10 \times 120}{100} = \text{Profit}$$

Profit = ₹12 ∴ Profit = ₹12

As, selling Price = cost prince + Profit

= ₹120 + 12 = ₹132 ∴ Selling Price = ₹132

5. Cost price of article = ₹400

Selling price of article = ₹ 336

As, Loss = Cost Price - Selling Price

Loss = 400 – 336 = ₹64

$\therefore$ As, Loss% $= \frac{\text{Loss}}{\text{C. P.}} \times 100 = \frac{64}{400} \times 100 \therefore$ Loss % $= 16\%$

6. Selling price of book by seema $=₹200$

Profit % $= 20\%$

Profit for Seema $= 20\%$ of $200 = \frac{20}{100} \times 200 = 40$

$\therefore$ Cost Price of book for Samarth $=₹240$

Selling price of book for Samarth = C.P. – Loss % of cost

$= 240 - \frac{10}{100} \times 240 = 240 - 24 = ₹216$

$\therefore$ Cost price of book for Rishika $=₹216$

7. Do it yourself

8. Cost price of 1 dozen mangoes $=₹135$

Cost price of 50 dozen's mangoes $= 50 \times 135 = ₹6750$

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

$20 = \frac{\text{Profit}}{6750} \times 100; \frac{20 \times 6750}{100} = \text{Profit}$

Profit $=₹1350$

As, Selling price = Profit + Cost Price $= 1350 + 6750 = 8100$

$\therefore$ Selling price of 45 dozen mangoes $=₹8100$

$\therefore$ Selling price of 1 dozen mangoes $= \frac{8100}{45} = ₹180$

Exercise 8.4

1. As, simple interest $= \frac{P \times R \times T}{100} = \frac{8000 \times 15 \times 5}{100} = ₹\,6000$

$S.I. = \frac{P \times R \times T}{100} = \frac{6000 \times 3 \times 25}{100} = ₹4500$

Profit $= 6000 - 4500 = 1500$

2. $S.I = \frac{P \times R \times T}{100} = \frac{12500 \times 15 \times 3}{100} = ₹5625$

$S.I. = \frac{P \times R \times T}{100} = \frac{2500 \times 18 \times 3}{100} = ₹1350 = ₹1350$

Total interest $= 5625 + 1350 = ₹6975$

3. $S.I. = \frac{P \times R \times T}{100} = \frac{8000 \times 8 \times 2}{100} = ₹1280$

Amount = Principal + S.I. = 8000 + 1280 = 9280

4. S.I. $= \frac{P \times R \times T}{100} = \frac{550 \times 4 \times 1}{100} = ₹22$

5. S.I. $= \frac{P \times R \times I}{100}$ Let the Principal Amount be x

$\frac{16}{25} \times x = \frac{x \times R \times R}{100}; \frac{16}{25} = \frac{R^2}{100}; \frac{16 \times 100}{25} = R^2; \frac{1600}{25} = R^2$

$R = \sqrt{\frac{1600}{25}}; R = \frac{40}{5} = 8\%$ $\therefore$ Time = 8 years

6. $S.I. = \frac{P \times R \times T}{100} = \frac{500 \times 4 \times 8}{100} = ₹160$

Amount = $P + S.I = 500 + 160$ $\therefore$ Amount = ₹660

7. $S.I = \frac{P \times R \times T}{100} = \frac{20000 \times 2 \times 2}{100} = ₹800;$

$S.I. = \frac{P \times R \times T}{100} = \frac{10000 \times 5 \times 2}{100} = ₹1000$

Total Interest Paid = ₹800 + 1000 = 1800

Amount of watch = ₹1800 – 800 = 1000

8. $S.I. = \frac{P \times R \times T}{100} = \frac{1300 \times 6 \times 1}{100}$ S.I. for Ist Year = ₹78

S.I. for 2nd year $= \frac{P \times R \times T}{100} = \frac{1378 \times 6 \times 1}{100} = ₹82.68$

S.I. for 3rd year $= \frac{P \times R \times T}{100} = \frac{1460.68 \times 6 \times 1}{100} = ₹87.64$

$\therefore$ Balance amount after 3 years = ₹1548.32 (approx)

9. Amount = Principal + S.I.

$44000 = P + \frac{P \times R \times T}{100}; 44000 = P\left(1 + \frac{5 \times 2}{100}\right)$

$44000 = P\left(\frac{100 + 10}{100}\right); 44000 = P\left(\frac{110}{100}\right); P = ₹40000$

$\therefore$ Principal Amount = ₹40000

$S.I. = \frac{P \times R \times T}{100} = \frac{40000 \times 5 \times 3}{100} = ₹6000$

As, Amount = $P + S.I. = 40000 + 6000 = ₹46,000$

Exercise 9.1

1. (a) $\angle a = \angle c$, $\angle b = \angle d$

(b) $(\angle a, \angle b)$, $(\angle b, \angle c)$, $(\angle c, \angle d)$, $(\angle d, \angle a)$

(c) $(\angle a + \angle b)$, $(\angle b + \angle c)$, $(\angle c + \angle d)$, $(\angle d + \angle a)$

(d) $80°$

(e) $\angle a = 105°$

$\angle a + \angle b = 180°$ (Linear pair)

$105° + \angle b = 180°$; $\angle b = 180° - 105°$; $\angle b = 75°$

$\angle a = \angle c$ (Vertically opposite angle)

$\therefore \angle c = 105°$

$\angle b = \angle d$ (Vertically opposite angle)

$\therefore \angle d = 75°$

2. (a) Zero angle (b) Complete angle

(c) Acute Angle (d) Straight angle

(e) Acute Angle (f) Obtuse angle

(g) Obtuse Angle (h) Acute Angle

3. $\angle a = 10° + 90° = 100°$

4. (a) $56°$ Complement of $56° = 90° - 56° = 34°$

(b) $65°$ Complement of $65° = 90° - 65° = 25°$

(c) $38°$ Complement of $38° = 90° - 38° = 52°$

5. (a) $80°$ Supplement of $80° = 180° - 80° = 100°$

(b) $38°$ Supplement of $38° = 180° - 38° = 142°$

(c) $105°$ Supplement of $105° = 180° - 105° = 75°$

6. (a) Complement of $\angle ABC = 90° - 60° = 30°$

(b) Supplement of $\angle ABC = 180° - 60° = 120°$

Supplement of $\angle XYZ = 180° - 90° = 90°$

(c) No (d) No

7. (a) $\angle DOC$ (b) $\angle DOE$

(c) $\angle AOC$ and $\angle COD$, $\angle AOE$ and $\angle DOE$

(d) $\angle COD$, $\angle AOE$

8. Let the first angle be $x°$

other angle be $\frac{2}{3}x°$

$x° + \frac{2}{3}x° = 180°$; $\frac{3x° + 2x°}{3} = 180°$; $5x° = 180° \times 3$; $x° = \frac{180 \times 3}{5}$

$x° = 108°$

Ist angle $= 108°$ 2nd angle $= \frac{2}{3} \times 108° = 72°$

9. (a) $x° + 2x° + 3x° = 180°$ (Linear pair)

$6x° = 180°$; $x° = \frac{180°}{6}$; $x° = 30°$

(b) $(4x + 20°) = (7x + 5)°$ (Vertically opposite angle)

$(7x - 4x)° = (20 - 5)°$; $3x° = 15°$; $x° = \frac{15}{3}$; $x = 5°$

(c) $(5x + 10)° + 148° - 4x° = 180°$ (Linear Pair)

$5x° + 10° + 148° - 4x° = 180°$; $x° = 180° - 158°$; $x° = 22°$

(d) $x° + 4x° = 180°$ (Linear Pair)

$x° + 4x° = 180°$; $5x° = 180°$; $x° = \frac{180}{5}$; $x° = 36°$

10. (a) False (b) True

(c) False (d) False

Exercise 9.2

1. (a) No (b) Yes

(c) No (d) Yes

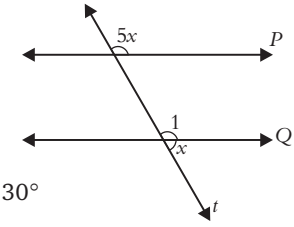
(e) No (f) Yes

2. (a) $x° + 110° = 180°$

(Interior angle on same side of the transversal are supplementary)

$x = 180° - 110°$

$x = 70°$



(b) $\angle 5x = \angle 1$ (Corresponding angle)

$\angle 1 + \angle x = 180°$ (Linear pair)

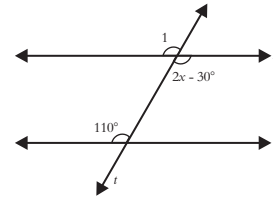
$\angle 5x + \angle x = 180°$; $\angle 6x = 180$; $x = \frac{180}{6} = 30°$

(c) $\angle 1 = 2x - 30°$

$\angle 1 = 110°$ (Corresponding angle)

$\therefore$ $2x - 30° = 110°$; $2x = 110° + 30°$

$2x = 140°$; $x = \frac{140}{2} = 70°$



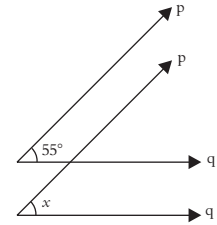
(d) $\angle 1 = 55°$ (corresponding angle)

When P || P

$\angle 1 = \angle x$ (corresponding angle)

When Q || Q

$\therefore$ $\angle x = 55°$



(e) $\angle 1 = x + 20$ (Vertically opposite angle)

$\angle 1 = 3x + 4$ (Corresponding angle)

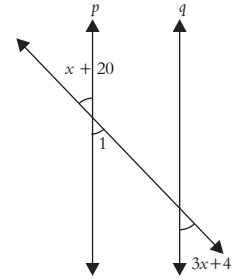
$\therefore$ $x + 20 = 3x + 4$

$3x - x = 20 - 4$

$2x = 16$

$x = \frac{16}{2}$

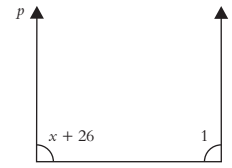
$x = 8$



(f) $\angle 1 + x + 26 = 180°$

Wrong question

(Interior angles on the same side of the transversal are supplementary)



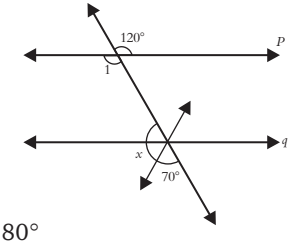
(g) $\angle 1 = 120°$

$\angle 1 = x + 70°$

$120° = x + 70°$

$x = 120° - 70°$

$= 50°$



(h) $2x - 24 + x = 180°$ (Linear Pair)

$3x = 180 + 24$

$3x = 204°$; $x = \frac{204}{3}$; $x = 68°$

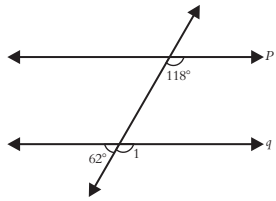
3. (a) $\angle 1 = 118°$

$\angle 1 + 62° = 180°$

$118° + 62° = 180°$

$180° = 180°$

LHS = RHS, Hence, $P \,||\, q$.



(b) No (c) No

(d) Yes because given angle are corresponding angle

(e) No

(f) $\angle 1 = 41°$ (vertically opposite angle)

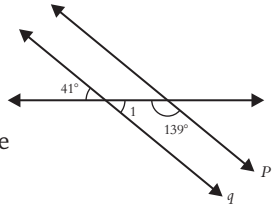
$\angle 1 + 139° = 180°$

$\therefore$ $\angle 1 + 139° = 180°$ (Interior angle on same side of the transversal are supplementary)

$\therefore$ $41° + 139° = 180°$

$\therefore$ $180° = 180°$

$\therefore$ LHS = RHS, Hence $p \,||\, q$



4. $\angle 1 = 45°$ (Vertically Opposite angles)

$\angle 8 = 45°$ (Corresponding angle)

$\angle 8 = \angle 7 = 45°$ (Vertically opposite angle)

$\angle 1 + \angle 2 = 180°$

$45° + \angle 2 = 180°$

$\angle 2 = 180 - 45°$

$\angle 2 = 135°$

So, $\angle 2 = \angle 3 = 135°$ (Vertically opposite angle)

$\angle 6 + \angle 7 = 180°$

$\angle 6 + 45° = 180°$

$\angle 6 = 180° - 45°$

$\angle 6 = 135°$

$\angle 6 = \angle 5 = 135°$ (Vertically opposite angle)

5. $\angle A = 130°$ (Vertically opposite angle)

$\angle B = 130°$ (Linear Pair)

$\angle B + \angle C = 180°$

$\angle C = 180° - 130°$

$\angle C = 50°$

$\angle C = \angle E = 50°$ (Corresponding angle)

$\angle E = \angle D = 50°$ (Vertically opposite angles)

6. $\angle A = 70°$ (Vertically Opposite angle)

$\angle A + \angle B = 180°$

$70° + \angle B = 180°$

$\angle B = 180° - 70°$

$\angle B = 110°$; $\angle C = 70°$ (Corresponding angle)

$\angle C = \angle D = 70°$ (Corresponding angle)

$\angle E + \angle D = 180°$ (Linear Pair)

$\angle E + 70° = 180°$; $\angle E = 180° - 70°$; $\angle E = 110°$

7. $\angle BAE = \angle CBD = 70°$ (Corresponding angle)

$\angle AEB = \angle EBD = 50°$ (alternate Interior angle)

$\angle EBC = \angle EBD + \angle DBC = 50° + 70°$; $\angle EBC = 120°$; $\angle EBA + 120° = 180°$

$\angle EBA + 120° = 180°$; $\angle EBA = 180° - 120°$; $\angle EBA = 60°$

8. (a) Yes, corresponding angles.

(b) Yes, corresponding angle

(c) Yes, $p || r$

(d) Yes, because $\angle A = \angle C$ (Corresponding angles)

9. As, $PQ || YZ$

$\therefore \quad \angle Y = \angle PXY = 70°$ (Alternate Interior Angles)

$\angle Z = \angle QXZ = 40°$ (Alternate Interior Angle)

10. As, AB || QP

$\angle B = \angle CPQ = 60°$ (Corresponding angles)

As, QR || BC; $\angle CPQ + \angle PQR = 180°$ (Interior angles on same side of the transversal are supplementary)

$60° + \angle PQR = 180°$; $\angle PQR = 180° - 60°$;

$\angle PQR = 120°$

Exercise 10.1

1. Let the common ratio be x

$1x + 2x + 3x = 180°$; $6x = 180°$

$\therefore \quad x = \frac{180}{6}$; $x = 30°$;

$1x = 1 \times 30 = 30°$; $2x = 2 \times 30 = 60°$; $3x = 3 \times 30 = 90°$

Thus, angles of a triangle are 30°, 60°, 90°

2. By angle sum property of a triangle

$\angle A + \angle B + \angle C = 180°$

$3\angle B + \angle B + 2\angle B = 180°$

$6\angle B = 180°$

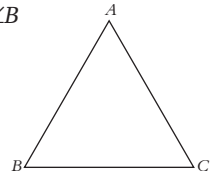
$\angle B = \frac{180}{6}$

$\angle B = 30°$

$3\angle B = 30°$

As $\angle A = 3\angle B$

and $\angle C = 2\angle B$



As, $\angle A = 3\angle B$

$\therefore \quad \angle A = 3 \times 30° = 90°$

$\therefore \quad \angle A = 90°$

$\angle C = 2\angle B$

$\therefore \quad \angle C = 2 \times 30°$

$\therefore \quad \angle C = 60°$

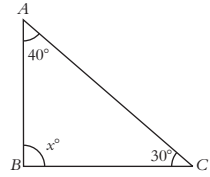
3. (a) By angle sum property of a triangle

$40° + 30° + x = 180°$

$70 + x = 180$

$x = 180 - 70$

$\therefore \quad x = 110°$



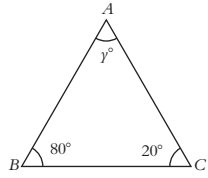
(b) By Angle sum property of a triangle

$80° + 20° + y = 180°$

$100° + y = 180°$

$\therefore \quad y = 180° - 100°$

$\therefore \quad y = 80°$



4. Let the common ratio be x.

$2x + 3x = 180°$; $5x = 180°$

$\therefore \quad x = \frac{180}{5}$ $\quad \therefore \quad x = 36°$

By Angle sum property of a triangle

$36°+90°+x = 180°;\ 126°+x = 180°;\ x = 180°-126°$

$\therefore \quad x = 54°$

Thus, angle are 54°, 36° and 90°

Exercise 10.2

1. By exterior angle property

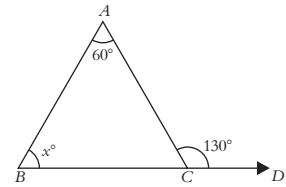
$x + 70° = 140°;\ x = 140°-70°$ $\quad \therefore \quad x = 70°$

By angle sum property of triangle

$70°+70°+y = 180°;\ 140°+y = 180°;\ y = 180°-140°$

$\therefore \quad y = 40°$

2. Let the another Interior angle be x



By Exterior Angle Property

$\Rightarrow \quad 60°+x° = 130°$

$x = 130°-60°$

$\therefore \quad x = 70°$

3. Let the common ration be x

$1x + 5x = 120°$

$6x = 120°$

$x = \dfrac{120°}{6}$

$\therefore \quad x = 20°$

$1x = 1 \times 20 = 20°;\ 5x = 5 \times 20 = 100°$

Let the another angle be y

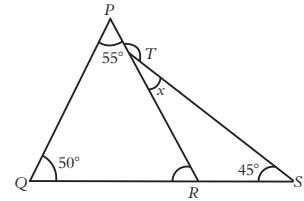
By Linear Pair

$y + 120° = 180°$

$\therefore \quad y = 180°-120°$ $\quad \therefore \quad y = 60°$

Thus, angles are 20°, 100° and 60°

4. In ΔPQR By angle sum property of triangle



$\angle P + \angle Q + \angle R = 180°\ \angle P = 55°$

$55°+50°+\angle R = 180°\ \ \angle Q = 50°$

$105°+\angle R = 180°;\ \angle R = 180°-105°$

$\therefore \quad \angle R = 75°$ $\quad \therefore \angle PRQ = 75°$

In ΔTSR by exterior Angle property

$x + \angle TSR = \angle PRQ$; $x + 45° = 75°$; $x = 75°–45°$

$\therefore \quad x = 30°$ $\qquad\qquad$ $\therefore \quad \angle RTS = 30°$

By Linear Pair

$\angle PTS + \angle RTS = 180°$; $\angle PTS + 30° = 180°$; $\angle PTS = 180°–30°$

$\therefore \quad \angle PTS = 150°$

Thus, $\angle PRQ = 75°$, $\angle RTS = 30°$ and $\angle PTS = 150°$

5. Value of x and y = ?

By Linear pair

$y + 120° = 180°$; $y = 180°–120°$; $y = 60°$

In ΔCED (By Angle sum property of triangle)

$\angle C + \angle E + \angle D = 180°$; $70°+60°+x = 180°$

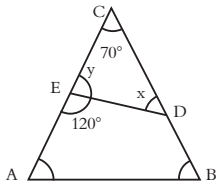
$130°+x = 180°$; $x = 180°–130°$ $\qquad \therefore \quad x = 50°$

Thus, value of $x = 50°$, $y = 60°$

As $\angle D = x$,

$\angle C = 70°$,

$\angle E = y$,



Exercise 10.3

1. (a) (5, 12, 13)

$5^2 = 25$; $12^2 = 144$; $13^2 = 169$

Also, $25 + 144 = 169$

$\therefore$ Thus, (5, 12, 13) is a Pythagorean triplet

(b) (8, 15, 17)

$8^2 = 64$; $15^2 = 225$; $17^2 = 289$ $\qquad$ Also, $64 + 225 = 17^2$

Thus, (8, 15, 17) is a pythagorian triplet

(c) (22, 10, 24)

$22^2 = 484$; $10^2 = 100$; $24^2 = 576$

Also, $484 + 100 \neq 576$ $\qquad\qquad$ $\therefore 22^2 + 10^2 \neq 24^2$

Thus, (22, 10, 24) is not a Pythagorean triplet

(d) (6, 8, 10)

$6^2 = 36$; $8^2 = 64$; $10^2 = 100$

Also, $36 + 64 = 100$ $\qquad\qquad$ $\therefore 6^2 + 8^2 = 10^2$

Thus (6, 8, 10) is a Pythagorean triplet.

2. Hypotenuse = 29 cm

side = 21 cm; other side = 20 cm

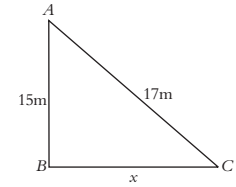
$H^2 = B^2 + P^2$; $(29)^2 = (21)^2 + (20)^2$; $841 = 441 + 400$; $841 = 841$

Thus, it is a right triangle

3. Height of wall = 15 m

Length of ladder = 17 m

Base = x



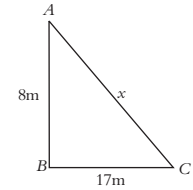
By Pythagoras theorem

$AC^2 = AB^2 + BC^2$; $(17)^2 = (15)^2 + (x)^2$

$289 = 225 + x^2$; $64 = x^2$; $x = \sqrt{64}$; $x = 8$

Thus, distance of the feet of the ladder from the building is 8 m.

4. Let the starting point be c



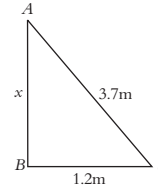
By Pythagoras theorem

$AC^2 = AB^2 + BC^2$

$x^2 = (8)^2 + (15)^2$; $x^2 = 64 + 225$; $x^2 = 289$; $x = 17$

Thus, he is 17 m away from the starting point.

5. By Pythagoras theorem.



$AC^2 = AB^2 + BC^2$

$(3.7)^2 = x^2 + (1.2)^2$; $13.69 = x^2 + 1.44$

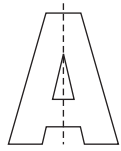
$x^2 = 13.69 - 1.44$; $x^2 = 12.25$; $x = 3.5$m

Thus, the height of the wall is 3.5 m.

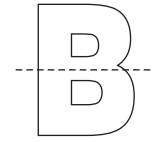
Exercise 11.1

1. *a, b, c, d, f, h* have lines of symmetry

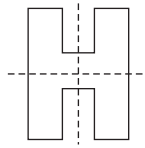
2. (a)



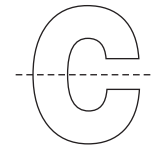
(b)

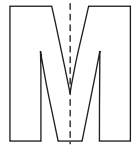


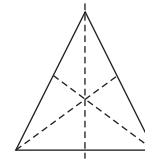
(c)

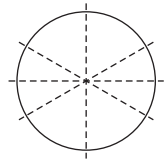


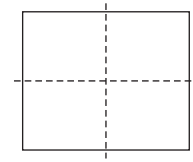
(d)

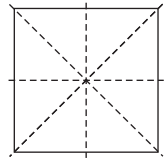


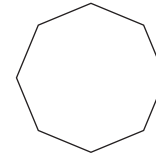
(e) 

(f) 

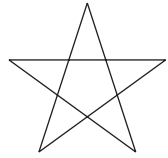
(g) 

(h) 

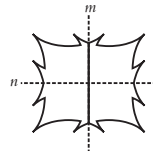
(i) 

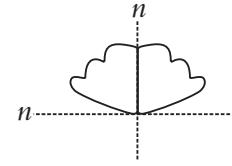
(j) 

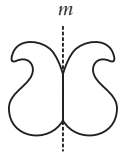
8 Lines of symmetry

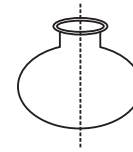
(k) 

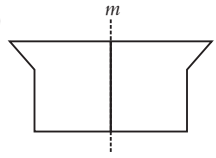
5 Line os symmetry

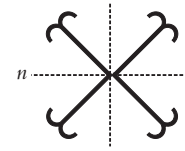
3. (a) 

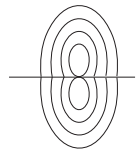
(b) 

4. (c) 

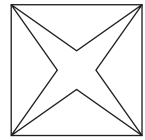
(d) 

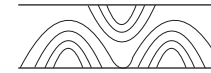
5. (e) 

(f) 

6. (g) 

(h) 

7. (i) 

(j) 

8. (a) *A*, *I*, *M* (b) *B*, *C*, *D*

(c) *H*, *I*, *O*

Exercise 11.2

1. (a) 180° (b) 180°

(c) 90°

2. (a) order of Rotation = 4 Angle of rotation = 90°

(b) order of rotation = 2 Angle of rotation = 180°

(c) Angle of rotation = 360° order of rotation = 1

(d) Angle of rotation = 180° order of rotation = 2

(e) Angle of rotation = 360° order of rotation = 1

(f) Angle of rotation = 360° order of rotation = 1

(g) Angle of rotation = 180° order of rotation = 2

4. P, R and G **5.** N, S and Z

6. B, C, D **7.** H, I, O

8. Angle of rotation = 45° rotational symmetry = 8

Exercise 12.1

1. (b) **2.** (b)

3. (b) **4.** (a)

5. (a) **6.** Do it yourself

7. Do it yourself **8.** Do it yourself

9. (a) 8 (b) 6

(c) 12 (a) 6

(e) edge

Exercise 12.2

1. Do it yourself

2. (a) (iv) (b) (iii)
(c) (i) (d) (ii)

3. (a) 6 (b) Top view = 6
Side view = 3, 4, 2

4. (a) False (b) True
(c) False (d) False
(e) True (f) True
(g) True

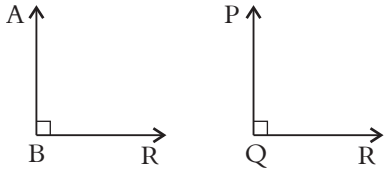
Exercise 13.1

1. $\angle POQ \cong \angle ROS$

Adding $\angle QOR$ on both the sides of the equation

$\angle POQ + \angle QOR \cong \angle ROS + \angle QOR$

$\angle POR \cong \angle QOS$, Hence proved



2. $\angle ABC \cong \angle PQR = 90°$

Hence, proved

3. $\angle MOP = \angle NOQ$ (Given)

Adding $\angle PON$ on both the sides of equation

$\angle MOP + \angle PON = \angle NOQ + \angle PON$; $\angle MON = \angle POQ$

$\therefore \quad \angle MON \cong \angle POQ$

Hence, proved

4. (a) True (b) False
(c) False (d) False

Exercise 13.2

1. (a) Not congruent

(b) In ΔAOB and ΔDOC

$OA = OD$; $OB = OC$; $\angle AOB = \angle DOC$

$\therefore \quad \Delta AOB \cong \Delta DOC$ (by SAS)

(b) ΔACB and ΔACD

$AC = AC$ (common)

$AB = AD = 4.8$ cm (given)

$BC = DC = 3.2$ cm (given)

$\therefore$ $\Delta ACB \cong \Delta ACD$ (By SSS)

(c) ΔACB and ΔACD

$Ac = AC$ (common)

$AB = AD = 4.8$ cm (given)

$BC = DC = 3.2$ cm (given)

$\therefore$ $\Delta ACB \cong \Delta ACD$ (By SSS)

(d) Not congruent

(e) In ΔABC and ΔQPR

$AB = QP = 4$ cm (given)

$AC = QR = 3$ cm (given)

$BC = PR = 5$ cm (given)

$\therefore$ $\Delta ABC \cong \Delta QPR$ (by SSS)

(f) In ΔXYZ and ΔPQR

$XZ = PR$ (given)

$YZ = QR$ (given)

$\angle XYZ = \angle PQR = 90°$ (given)

$\therefore$ $\Delta XYZ \cong \Delta PQR$ (by RHS)

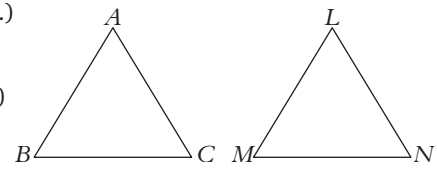
2. (a) $\Delta ABC \cong \Delta QPR$

$AB = QP$,

$AC = QR$, $BC = PR$ (C.P.C.T.)

$\angle A = \angle Q$,

$\angle B = \angle P$, $\angle C = R$ (C.P.C.T.)



(b) $\Delta BCA \cong \Delta PQR$

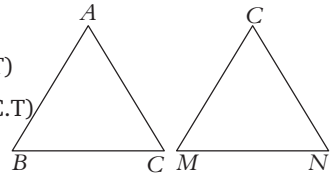
$BC = PQ$, $CA = QR$, $AB = RP$ (C.P.C.T)

$\angle B = \angle P$, $\angle C = \angle Q$, $\angle A = \angle R$ (C.P.C.T)

(c) $\Delta ABC \cong \Delta LMN$

$AB = LM$, $BC = MN$, $CA = NL$ (C.P.C.T)

$\angle A = \angle L$, $\angle B = \angle M$, $\angle C = \angle N$ (C.P.C.T)



3. (a),(c),(d) are not congruent

(b) $\Delta ACO \cong \Delta BOD$

$AO = BO$	(given)
$OC = OD$	(given)
$\angle AOC = \angle BOD$	(vertically oppositi angle)
$\therefore$ $\Delta AOC \cong \Delta BOD$	(By SAS)

Hence, proved

4. In ΔPQS and ΔRSQ

$PS = QR$	(Given)
$PQ = RS$	(Given)
$SQ = SQ$	(common)
$\therefore$ $\Delta PQS \cong \Delta RSQ$	(By SSS)

Hence, proved

5. In ΔABD and ΔACD

$\angle BAD = \angle CAD$	(as, AD is the bisector of $\angle A$)
$AD = AD$	(common)
$\angle ADB = \angle ADC = 90°$	($AD \perp BC$)
$\Delta ABD \cong \angle ACD$	(By ASA)

6. (a) In ΔLMO and ΔLNO

$LM = LN$	(given)
$MO = NO$	(given)
$LO = LO$	(common)
$\therefore$ $\Delta LMO \cong \Delta LNO$	(By SSS)
(b) $\angle LOM + \angle LON = 180°$	(Linear Pair)
$\angle LOM = \angle LON$	(By C.P.C.T)

$\therefore$ $\angle LOM + \angle LON = 180°$; $2\angle LOM = 180°$; $\angle LOM = \dfrac{180°}{2}$

$\angle LOM = 90°$ $\therefore$ $\angle LON = \angle LOM = 90°$

(c) $\angle M = \angle N$ (By C.P.C.T)

(d) $\angle MLO = \angle NLO$ (By C.P.C.T.)

7. In ΔABD and ΔACD

$AB = AC$ (given)

$AD = AD$ (common)

$\angle ADB = \angle ADC = 90°$ ($AD \perp BC$)

$\therefore \quad \Delta ABD \cong \Delta ACD$

Hence, $\angle B = \angle C$ (By C.P.C.T.)

8. Do it yourself

9. In ΔLMN and ΔLON

$\angle MLN = \angle OLN$ (LP bisects $\angle MLO$)

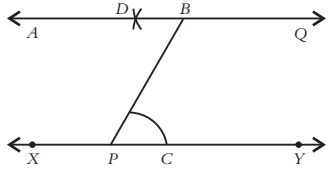
$\angle MNL = \angle ONL$ (LP bisects $\angle MNO$)

$\angle LN = \angle LN$ (common)

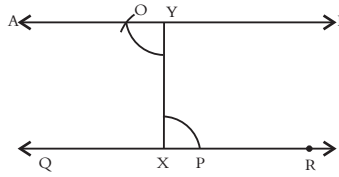
$\therefore \quad \Delta LMN \cong \Delta LON$ (By ASA)

Exercise 14.1

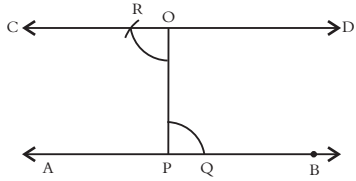
1.



2.



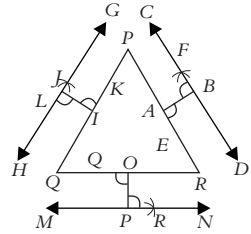
3.



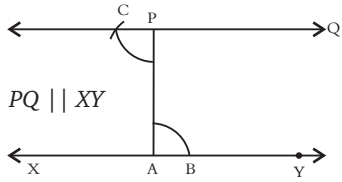
4. (1) $PR \| CD$

(2) $PQ \| GH$

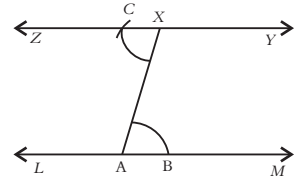
(3) $QR \| MN$



5.

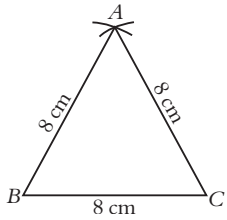


6.



Exercise 14.2

1.

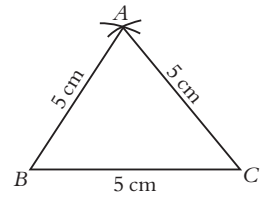


2. Perimeter of an

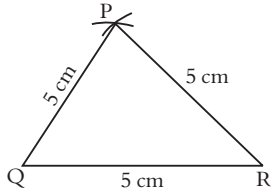
Equilateral triangle = 3× side

15 = 3× side

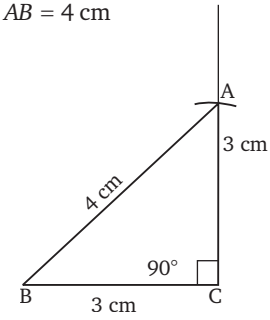
side = $\frac{15}{3}$ = 5 cm



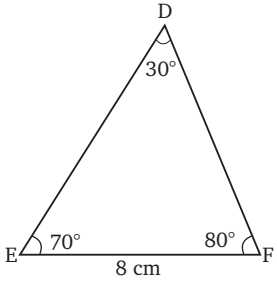
3. PR = 5 cm



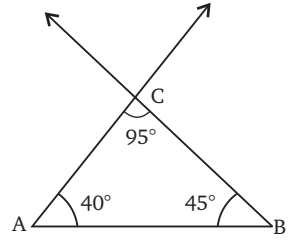
4. AB = 4 cm



5. $\angle D = 30°$



6. $\angle C = 95°$



Exercise 15.1

1. (a) Perimeter of a square = $4 \times$ side = $4 \times 17 = 68$ cm

(b) Perimeter of a square = $4 \times$ side = $4 \times 25 = 100$ cm

(c) Perimeter of a square = $4 \times$ side = $4 \times 45 = 180$ cm

(d) Perimeter of a square = $4 \times$ side = $4 \times 19 = 76$ cm

2. (a) SP = 14m, PQ = 19.3 m

Perimeter of a rectangle = $2(L + B) = 2(14 + 19.3) = 2 \times 33.3 = 66.6$ m

(b) AB = 51m BC = 45 m

Perimeter of a rectangle = $2(L + B) = 2(51 + 45) = 2 \times 96 = 192$ m

(c) RS= 13 cm, SP = 14 cm

Perimeter of a rectangle = $2(L + B)$

$= 2(13 + 14) = 2 \times 27 = 54$ cm

(d) MN = 2.6 cm, No = 3.7 cm

Perimeter of a rectangle = $2(L + B) = 2(2.6 + 3.7) = 2 \times 6.3 = 12.6$ cm

(e) PQ = 40 cm, QR = 30 cm

Perimeter of a rectangle = $2(L + B) = 2(40 + 30) = 2 \times 70 = 140$ cm

3. Perimeter of first square = 196 cm

Side of first square = $\frac{196}{4} = 49$ cm

perimeter of second square = 76 cm

Side of second square = $\frac{76}{4} = 19$ cm

4. Perimeter of rectangular Lown = $2(L + B) = 2(25 + 20) = 2 \times 45 = 90$ m

Number of Bamboo Pillars = $\frac{90}{5} = 18$

5. Let the breadth = x m

Length be $2x$ m; Perimeter = 36 m

Perimeter of a rectangular Lawn = $2(L + B)$

$36 = 2(2x + x)$; $36 = 2(3x)$; $36 = 6x$; $\frac{36}{6} = x$; $x = 6$ m

$\therefore$ Breadth is 6 m; Length is $2 \times 6 = 12$ m

6. Side of a square = 15 cm

perimeter of square = 4 × side = 4 × 15 = 60 cm

As, perimeter of square = Perimeter of rectangle

∴ perimeter of rectangle = 60 cm

Breadth of rectangle = 13 cm

Perimeter of rectangle = $2(L + B)$

$60 = 2(L + B)$; $60 = 2L + 26$; $2L = 60 - 26$; $2L = 34$; $L = \frac{34}{2} = 17$ cm

∴ Length of rectangle is 17 cm.

7. Perimeter of a rectangular wire = $2(L + B)$

$= 2(40 + 22) = 2 \times 62 = 124$ cm

Perimeter of square = Perimeter of rectangle

∴ Perimeter of square = 124 cm

Now, Perimeter of a square = 4 × side

124 = 4 × side

Side = $\frac{124}{4}$; Side = 31 cm ∴ Side of the square is 31 cm.

8. Let the breadth be x m

Length = $(4 + x)$ m

Perimeter of parallelogram = 100 m

Perimeter of parallelogram = $2(L + B)$

$100 = 2(4 + x + x)$; $100 = 2(4 + 2x)$; $100 = 8 + 4x$; $4x = 100 - 8$

$4x = 92$; $x = \frac{92}{4}$; $x = 23$ m ∴ Breadth is 23 m

Length is 4 + 23 = 27 m

9. Length of a parallelogram = 4.2 cm

Let the common ratio be x

So, $\frac{3x}{7} = 4.2$; $3x = 4.2 \times 7$; $x = \frac{4.2 \times 7}{3}$; $x = 9.8$

∴ breadth = $\frac{4x}{7} = \frac{4 \times 9.8}{7} = 5.6$

Perimeter of rectangle = $2(L + B) = 2(4.2 + 5.6) = 2(9.8) = 19.6$

∴ Perimeter of rectangle = 19.6

10. Perimeter of a rectangular hall = $2(L + B)$

$= 2(290 + 210) = 2 \times 500 = 1000$ m

Perimeter of a rectangular hall = distance covered in one round of the hall

$\therefore$ Distance covered in one round = 1000 m

Distance covered in 2 rounds = $2 \times 1000 = 2000$ m

Speed = 2.5 m/sec

$\text{Time} = \frac{\text{distance}}{\text{Speed}}$; $\text{Time} = \frac{2000}{2.5} = \frac{2000 \times 10}{2.5} = 800$ seconds

60 seconds = 1m; 1 seconds = $\frac{1}{60}$

800 seconds = $\frac{1}{60} \times 800 = \frac{40}{3}$ minutes = 13 minutes 33 seconds

11. (a) Perimeter = 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 = 32 cm

(b) Perimeter = 2 + 3 + 3 + 3 + 2 + 3 + 4 + 7 + 11 + 4 = 42 m

(c) Perimeter = 2 + 3 + 2 + 2 + 5 + 3 + 1 + 4 + 1 + 5 =

(Incomplete information and incorrect)

(d) Perimeter = 2 + 2 + 2 + 6 + 6 + 6 = 24 m

Exercise 15.2

1. (a) Base (b) = 20 m (1 m = 100 cm)

So, = 20 m = 20×100 cm = 2000 cm

Height (h) = 5 cm

Area of || gm = $b \times h = (2000 \times 5)$ cm^2 = 10000 cm^2

(b) Base (b) = 10 m (1m = 100cm)

So, = 10 m= 10×100 cm = 1000 cm

Height (h) = 6 cm

Area of|| gm = $b \times h = 1000 \times 6$ cm^2 = 6000 cm^2

(c) Base (b) = 22,500 cm; Height (h) = 6.5 cm

Area of|| gm = $b \times h$; $856 = b \times 40 b = \frac{856}{40} = 21.40$ m

$\therefore$ Base = 21.40 m

2. (a) Area = 856 m^2; Height = 40 cm

Area of || gm = $b \times h$

$856 = b \times 40$; $b = \frac{856}{40} = 21.40$ m $\quad \therefore$ Base = 21.40 m

(b) Area = $545\,cm^2$

Height = 0.5 cm

$545 = b \times .5$;

Area of || gm = $b \times h$

$b = \frac{545}{5} \times 10^2 = 1090$ cm

(c) Area = $348\ cm^2$

Height = 30 cm

$348 = b \times 30$

Area of || gm = $b \times h$

$b = \frac{348}{30}$

$\therefore$ Base = 11.6 cm

3. (a) Side (s)= 30.1 m

Area of square = side × side = $(30.1 \times 30.1)m^2 = 906.01m^2$

(b) Side (s) = 8 m

Area of square = side × side = $(8 \times 8)m^2 = 64m^2$

(c) Side (s) = 15.7 dm

Area of square = side × side = $(15.7 \times 15.7)dm^2 = 246.49dm^2$

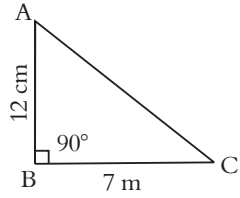
(e) Side (s) = 12 cm

Area of square = side × side = $(12 \times 12)cm^2 = 144cm^2$

(e) Side (s) = 19 m

Area of square = side × side = $(19 \times 19)cm^2 = 361cm^2$

4. (a) $AB = 12$ cm, $BC = 7$m, $\angle ABC = 90°$



Area of $\Delta ABC = \frac{1}{2}(b \times h)$

$BC = 7$m (As, 1m = 100 cm)

$= 7 \times 100$ cm $= 700$ cm

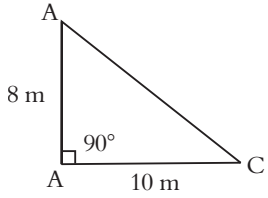
As, Area of $\Delta ABC = \frac{1}{2}(b \times h) = \frac{1}{2} \times 12 \times 700$

$\therefore$ Area of $\Delta ABC = 4200\ cm^2$

(b) Height (BA) = 8 cm

Base (AC) = 10 cm

As, area of $\Delta = \frac{1}{2} \times b \times h$



$\therefore$ Area of a $\Delta BAC = \frac{1}{2} \times AC \times BA$

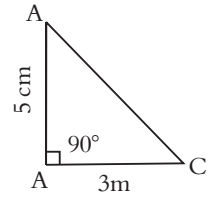
$= \frac{1}{2} \times 10 \times 8 = 40\ cm^2$

(c) Height (AB) = 8 cm

Base (BC) = 9 cm

As, Area of $\Delta = \frac{1}{2} \times b \times h$

$\therefore$ Area of $\Delta ABC = \frac{1}{2} \times BC \times AB = \frac{1}{2} \times 9 \times 8 = 36 \text{ cm}^2$

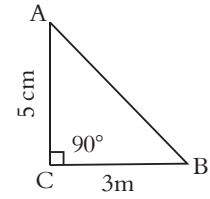


(d) Height (AC) = 5 m

Base (CB) = 3 m

As, Area of $\Delta = \frac{1}{2} \times CB \times AC$

$= \frac{1}{2} \times 3 \times 5 = \frac{15}{2}$ 7.5 cm^2



5. Area = 50 m^2; Height (h) = 20 m

Let the length of other leg be x m.

Area of $\Delta = \frac{1}{2} \times x \times 20$; $\frac{50 \times 2}{20} = x$; x = 5 m

6. Length (L) = 30 m Breadth (B)= 20 m

Area = $L \times b = (30 \times 20)\text{m}^2 = 600 \text{ m}^2$

New length = 30 – 8 = 22 m New breadth = 20 – 8 = 12 m

New Area = $L \times b = 22 \times 12 = 264\text{m}^2$

Area of strip = Area of Original carpet – Area of New carpet
= 600 – 264 = 336m^2

7. Area of rectangular hall = 784 m^2

Length (L) = 112 m Let the breadth be b m

Area of rectangle = $L \times b$; $b = \frac{784}{112}$ $\therefore$ $b = 7$ m

8. Side of Square park = 30 m (As, Area = side × side)

Area of square park = $30\text{m} \times 30\text{m} = (30 \times 30)\text{m}^2 = 900\text{m}^2$

Area of path = $L \times b = (30 \times 1)\text{m}^2 = 30\text{m}^2$

Area of remaining park = Area of square park– Area of path

= (900 – 30) m^2 = 870 m^2

Total cost of covering the park = ₹1176

Cost per sqm = $\frac{1176}{870}$ = ₹1.35

9. Length of poster = 12 cm Breadth of poster = 10 cm

Area of poster = $L \times b$ $= (12 \times 10)\ cm^2 = 120\ cm^2$

Length of cardboard = 12 + 1.75 + 1.75 = 12 + 3.5 = 15.5 cm

Breadth of cardboard = 10 + 1.75 + 1.75 = 10 + 3.5 = 13.5 cm

Area of Cardboard = $L \times b = (15.5 \times 13.5)\ cm^2 = 209.25\ cm^2$

Total area of margin = Area of cardboard – Area of poster

$= (209.25 - 120)\ cm^2 = 89.25\ cm^2$

10. Side of square garden = 56 m

Area of square garden = side × side $= (56 \times 56)\ m^2 = 3136 m^2$

As, area of rectangular hall = Area of Square garden

$\therefore$ Area of rectangular hall = $3136 m^2$

Breadth (b) = 28 m

Let the length be $L \times b$ Area of rectangle = $L \times b$

$3136 = L \times 28$ $L = \frac{3136}{28}$

$\therefore$ $L = 112$ m

11. Given $CM \perp AB$

$BL \perp AD$

(a) $AB = 16$ cm, $AD = 12$ cm, $CM = 10$ cm

Height (CM) = 10 cm

Base (AB) = 16 cm

Area of || gm $= b \times h = (16 \times 10)\ cm^2 = (160)\ cm^2 = 160\ cm^2$

If Area of 11 gm = 160 cm^2, $BL = x$

Base (AD) = 12 cm Let BL be x.

Height (BL) = x

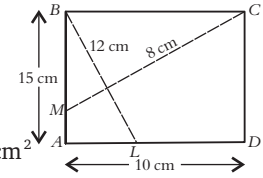
Area of || gm = $b \times h$

$160 = 12 \times x$ $12x = 160$

$x = \frac{160}{12}$ $x = 13.3$ cm

$\therefore$ Height (BL) = 13.3 cm

(b) $AD = 10$ cm, $CM = 8$ cm, $BL = 12$ cm



Height (BL)= 12 cm

Base (AD) = 10 cm

Area of 11 gm = $b \times h = (10 \times 12)\,\text{cm}^2 = 120\,\text{cm}^2$

If Area of 11 gm = cm^2, Let $AB = x$

Height (CM) = 8 cm; Base (AB) = x

Area of 11 gm = $b \times h$; $\quad 120 = x \times 8$

$x = \dfrac{120}{8}$ $\quad x = 15$ cm

$\therefore$ Base $AB = 15$ cm

12. Base of isosceles triangle= 12 cm

other side = 12 cm

Let the third side be x

perimeter of isosceles triangle = 32 cm

Perimeter of triangle = Two sides + another side

$32 = 12 + 12 + x$; $32 = 24 + x$; $x = 32 - 24$; $x = 8$

Area of triangle $= \dfrac{1}{2} \times b \times h = \dfrac{1}{2} \times 12 \times 8 = 48\,\text{cm}^2$

13. Area of triangle = $30\,\text{m}^2$

Three sides of a triangle

= 5 m, 12m, 13m

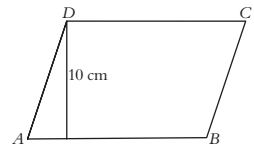
Let the height be AD $\quad$ Base (BC) = 13 m

Area of $\Delta = \dfrac{1}{2} \times b \times h$ $\quad 30 = \dfrac{1}{2} \times 13 \times h$

$\dfrac{30 \times 2}{13} = h$ $\quad h = \dfrac{60}{13} = 4.61$ m

$\therefore$ height = 4.61 m

14. Area of || gm = $2000\,\text{m}^2$



Area of || gm = Base × height

$2000 = \text{Base} \times 10$ $\quad \text{Base} = \dfrac{2000}{10} = 200$ m

Perimeter of a || gm = Sum of all sides

$1500 = AB + BC + CD + DA$ $\qquad$ $1500 = 200 + BC + 200 + DA$

As $BC = DA$ $\qquad$ $1500 = 200 + 200 + BC + BC$

$1500 = 4000 + 2BC$ $\qquad$ $1500 - 400 = 2BC$

$\frac{1100}{2} = BC$ $\qquad$ $\therefore \quad BC = \frac{1100}{2}\ 550\text{ m}$

$\therefore$ Length of sides is 200m and 550 m

15. Area of sheet of paper $= L \times b = (125 \times 85)\,\text{cm}^2 = 10625\,\text{cm}^2$

Area of one envelope $= L \times b = (17 \times 5)\,\text{cm}^2 = 85\,\text{cm}^2$

No. of envelopes $= \frac{\text{Area of sheet of paper}}{\text{Area of one envelope}} = \frac{10625}{85} = 125$

$\therefore$ 125 envelops were required.

16. Perimeter of square = 60 m

Perimeter of square $= 4 \times$ side

$60 = 4 \times \text{side};\ \text{Side} = \frac{60}{4}$ $\qquad$ $\therefore$ Side = 15 m

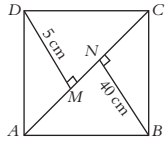
Area of square = Side $\times$ side $= (15 \times 15)\,\text{m}^2 = 225\,\text{m}^2$

17. Area of ABCD = Area of ΔADC + Area of ΔABC

$$= \frac{1}{2} \times AC \times DM + \frac{1}{2} \times AC \times BN$$

$$= \frac{1}{2} \times 50 \times 5 + \frac{1}{2} \times 50 \times 40 = \frac{1}{2}(50 \times 5 + 50 \times 40)$$

$$= \frac{1}{2}(250 + 2000) = \frac{2250}{2} = 1125\,\text{cm}^2$$



$\therefore$ Area of ABCD= $1125\,\text{cm}^2$

Exercise 15.3

1. (a) Radius (r) of circle = 133 m $\left(\pi = \frac{22}{7}\right)$

Circumference of circle= $2\pi r = 2 \times \frac{22}{7} \times 133 = 836\text{m}$

(b) Radius (r) of circle = 84 dm

circumference of circle = $2\pi r = 2 \times \frac{22}{7} \times 84 = \frac{3696}{7} = 528$ dm

(c) Radius (r) of circle = 12 mm $\left(\pi = \frac{22}{7}\right)$

Circumference of circle = $2\pi r = 2 \times \frac{22}{7} \times 12 = 75.42$ mm

(d) Radius (r) of circle = 4.9 cm $\left(\pi = \frac{22}{7}\right)$

Circumference of circle = $2\pi r = 2 \times \frac{22}{7} \times 4.9 = 30.8$ cm

(e) Radius (r) of Circle = 1.3 cm $\left(\pi = \frac{22}{7}\right)$

Circumference of circle = $2\pi r = 2 \times \frac{22}{7} \times 1.3 = 8.17$ cm

2. (a) Circumference of circle = 25.12 m $\left(\pi = \frac{22}{7}\right)$

Circumference of circle = $2\pi r$

$25.12 = 2 \times \frac{22}{7} \times r$; $\frac{25.12 \times 7}{2 \times 22} = r$ $\therefore$ $r = 3.996$ m

(b) Circumference = 3.14 m

Circumference of circle = $2\pi r$

$3.14 = 2 \times \frac{22}{7} \times r$; $\frac{3.14 \times 7}{2 \times 22} = r$; $r = 0.5$ m (approx)

(c) Circumference = 126 mm

circumference of circle = $2\pi r$

$126 = 2 \times \frac{22}{7} \times r$; $r = \frac{126 \times 7}{2 \times 22}$; $r = 20.4$ mm

(d) Circumference = 44 cm $\left(\pi = \frac{22}{7}\right)$

Circumference of circle = $2\pi r$

$44 = 2 \times \frac{22}{7} \times r$; $r = \frac{44 \times 7}{2 \times 22}$; $r = \frac{44 \times 7}{44}$; $r = 7$ cm

3. (a) diameter (d) = 196 cm

As, radius (r) = $\frac{d}{2}$ $\therefore$ radius (r) = $\frac{196}{2}$

$r = 98$ cm

Circumference of circle $= 2\pi r$

$= 2 \times \frac{22}{7} \times 98 = 616$ cm

(b) Diameter (d) = 56 cm

As, radius $(r) = \frac{d}{2}$

$\therefore$ radius (r) = 28 cm

Circumference of circle $= 2\pi r = 2 \times \frac{22}{7} \times 28 = 176$ cm

(c) Diameter (d)= 3.8 cm

As, radius (r) $= \frac{d}{2} = \frac{3.8}{2}$ $\left(r = \frac{22}{7}\right)$

$\therefore$ $r = 1.9$ cm

Circumference of circle $= 2\pi r = 2 \times \frac{22}{7} \times 1.9 = 11.94$ cm

(d) Diameter (d) = 37 mm

As, radius $(r) = \frac{d}{2}$

$\therefore$ $r = \frac{37}{2} = 18.5$ mm

Circumference of circle $= 2\pi r = 2 \times \frac{22}{7} \times 18.5 = 116.28$ mm

4. Radius (r) of base of circular house = 14 m

Circumference of circular house $= 2\pi r = 2 \times \frac{22}{7} \times 14 = 88$ m

$\therefore$ Circumference of circular house = 88 m.

5. Circumference = 44 cm

Circumference of circle $= 2\pi r$

$44 = 2 \times \frac{22}{7} \times r$; $r = \frac{44 \times 7}{22 \times 2}$ $\therefore$ $r = 7$ cm

Area of circle $= \pi r^2 = \frac{22}{7} \times r \times r = \frac{22}{7} \times 7 \times 7 = 154$ cm^2

6. Diameter (d) = 42 m

Radius (r) = 21 m

Area of circular plot = $\pi r^2 = \frac{22}{7} \times 21 \times 21 = 1386 \text{ m}^2$

New Radius (r) = 21 + 3.5

$r = 24.5 \text{ m}$

Area of bigger circle = $\pi r^2 = \frac{22}{7} \times r \times r$

$= \frac{22}{7} \times 24.5 \times 24.5 = 1886.5 \text{ m}^2$

Area of path = $1886.5 - 1386 = 500.5 \text{ m}^2$

Cost of making path per square meter = ₹4

Cost of making 500.5 m^2 path = $4 \times 500.5 =$ ₹ 2002.

7. Radius of a circle = 14 cm

Area of the circle = $\pi r^2 = \frac{22}{7} \times r \times r = \frac{22}{7} \times 14 \times 14 = 616 \text{ cm}^2$

Radius of new circle = $2 \times 14 = 28$ cm

8. Area of a square = 121 cm^2

According to question

$(\text{side})^2 = 121$; Side = 11 cm

Perimeter of a square = $4 \times$ side = $4 \times 11 = 44$ cm

Perimeter of square = Circumference of circle

$44 = 2\pi r$; $44 = 2 \times \frac{22}{7} \times r$; $\frac{44 \times 7}{2 \times 22} = r$; $r = 7$ cm

Area of circle = πr^2

$= \frac{22}{7} \times r \times r = \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$

Exercise 16.1

1. (a) Range = $95 - 6 = 89$

$11 + 37 + 45 + 49 + 76 + 30 +$

(b) Mean = $\frac{79 + 85 + 15 + 6 + 85 + 95 + 19 + 50}{14} = \frac{682}{14} = 48.71$

(c) Median 6, 11, 15, 19, 30, 37, 45, 49, 50, 76, 79, 85, 85, 95

$= \frac{45+49}{2} = \frac{94}{2} = 47$

(d) Mode = 85

2. (a) Mean

(b) Mean $= \frac{27+10+13+10+4+30}{6} = \frac{94}{6} = 15.66$

3. (a) Mean $= \frac{3+13+12+10+17+1+7+8}{8} = \frac{71}{8} = 8.875$

Median 1, 3, 7, 8, 10, 12, 13, 17

$= \frac{8+10}{2} = \frac{18}{2} = 9$

Mode = No, Range = $17 - 1 = 16$

(b) Mean $= \frac{91+93+84+86+73+72+18}{7} = \frac{517}{7} = 73.85$

Median 18, 72, 73, 84, 86, 91, 93 = 84

Mode = No

Range = $93 - 18 = 75$

(c) Mean $= \frac{15+10+30+17+14+9+21}{7} = \frac{116}{7} = 16.57$

Median 9, 10, 14, 15, 17, 21, 30 = 15

Mode = No

Range = $30 - 9 = 21$

(d) Mean $= \frac{12+14+7+19+20+25+17}{7} = \frac{114}{7} = 16.28$

Median 7, 12, 14, 17, 19, 20, 25 = 17

Mode = No

Range = $25 - 7 = 18$

4. (a) Total weight of 5 friends

$= 83+75+60+55+60 = 333$ kg

(b) Mean $= \frac{333}{5} = 66.6$ kg

5. (a) Descending order

15, 15, 12, 11, 11, 11, 11, 10, 10, 10, 7, 7, 5, 4, 3

(b) Highest weight = 15 kg

(c) Lowest weight = 3 kg

(d) Range = 15 – 3 = 12

(e) Mean $= \frac{15+15+12+11+11+11+11+10+10+10+7+7+5+4+3}{15}$

$= \frac{142}{15} = 9.46$

Median = 10 Mode = 11

(f) 10 children

6. First 5 even numbers = 2, 4, 6, 8, 10

Mean of first 5 even numbers $= \frac{2+4+6+8+10}{5}$

$= \frac{30}{5} = 6$

7. Mean $= \frac{20+30+40+50}{4} = \frac{140}{4} = ₹35$

Mode = ₹20

Median $= \frac{30+30}{2} = \frac{60}{2} = ₹30$

8. Total students = Mean × No. of students = 18 × 5 = 90

New Students = Mean × No. of students = 16 × 4 = 64

Excluded number = 90 – 64 = 26

9. Mean $= \frac{12+5+3+18+10+17+x+6+6}{9}$

$9 = \frac{77+x}{9}$; $9 \times 9 = 77 + x$

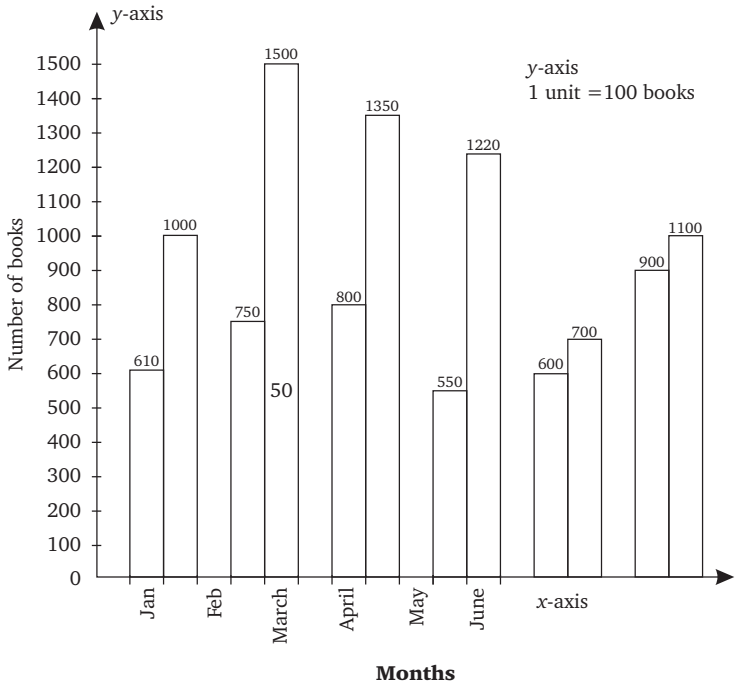
$81 = 77 + x$ $x = 81 - 77$

$x = 4$

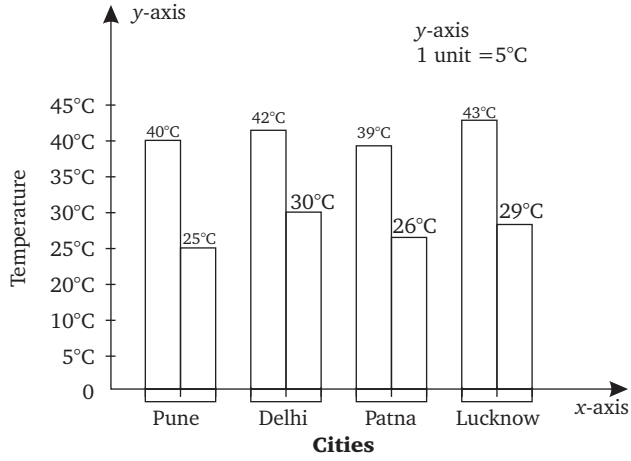
10. Mode = 6

Exercise 16.2

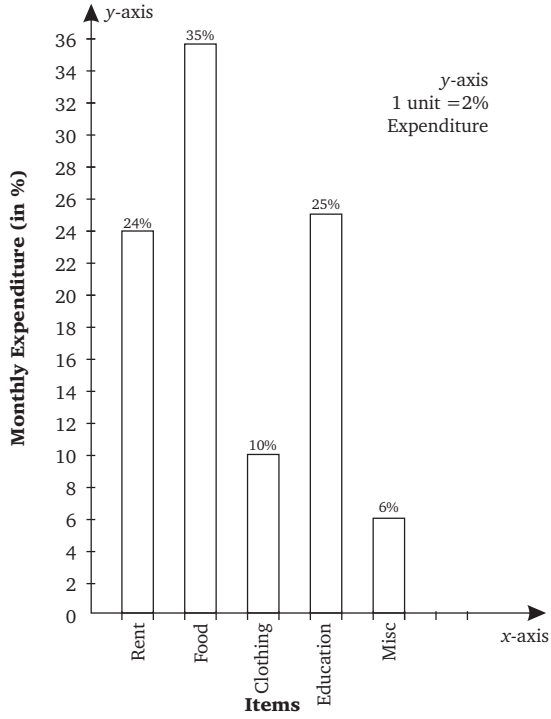
1.



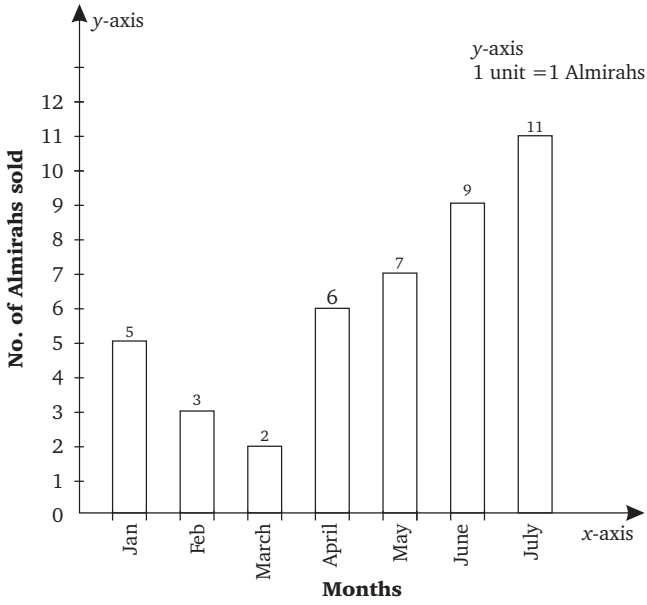
2.



3.


y-axis
y-axis
1 unit =2%
Expenditure
Monthly Expenditure (in %)
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
35%
24%
25%
10%
6%
Rent
Food
Clothing
Education
Misc
x-axis
Items

4.


y-axis
y-axis
1 unit =1 Almirahs
No. of Almirahs sold
12
11
10
9
8
7
6
5
4
3
2
1
0
5
3
2
6
7
9
11
Jan
Feb
March
April
May
June
July
x-axis
Months

Exercise 17.1

1. (a) $\frac{1}{2}$ (b) $\frac{1}{4}$

(c) $\frac{6}{8} = \frac{3}{4}$ (d) 0

2. (a) 5 (b) (i) $\frac{3}{5}$ (ii) $\frac{2}{5}$ (iii) $\frac{1}{5}$ (v) $\frac{1}{5}$ (vi) $\frac{1}{5}$ (vii) $\frac{1}{5}$ (viii) 0

3. (a) $\frac{2}{6} = \frac{1}{3}$ (b) $\frac{1}{6}$ (c) $\frac{1}{6}$

4. (a) $\frac{25}{150} = \frac{1}{6}$ (b) $\frac{21}{150} = \frac{7}{50}$

(c) $\frac{19}{150} = \frac{19}{150}$ (d) $\frac{24}{150} = \frac{4}{25}$

(e) $\frac{28}{150} = \frac{14}{75}$

MATHS MAGIC

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