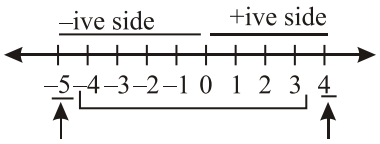
1 Integers

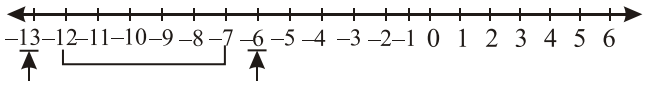
Exercise 1.1

1. (a) $|-4|=4$ (b) $|0|=0$ (c) $|+7|=7$
(d) $|-3|=3$ (e) $|-6|=6$

2. (a) $-4,-3,-2,-1,0,1,2,3$



(b) $-12,-11,-10,-9,-8,-7$

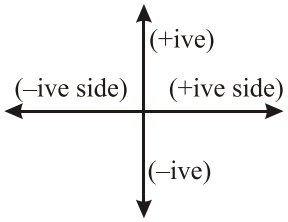


3. (a) $8+21=29$
(b) $25+(-13)=25-13=12$
(c) $-16+(-8)=-16-8=-24$
(d) $35+(-11)=35-11=24$

4. (a) 13°C below 0°C $=-13°C$

(b) -130m – 130m jup

(c) $+90$m (+ive) 90m Ground

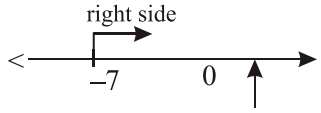


(b) $+50{,}000$ (+ive)

5. Preceding = "before to Prevous to" (-4)
So, $-5,-6,-7$

left side of number line

6. Suceeding = "after" (-7)
So, $-6,-5$



7. (a) $-5 \boxed{<} -3$
(b) $4 \boxed{>} 0$ (c) $-5 \boxed{<} 4$ (d) $-15 \boxed{<} 7$
(e) $-7 \boxed{>} -11$ (f) $13 \boxed{>} -25$

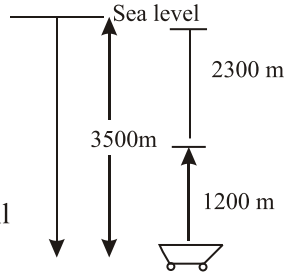
8. (a) $-30-(-68)=-30+68=38$
(b) $8-(-42)=8+42=50$
(c) $1091-591=500$
(d) $-5700-5700=-11400$
(e) $-1009-(-2009)=-1009+2009=1000$
(f) $-67-0=-67$
(g) $0-(-48)=0+48=48$
(h) $-38-17=-55$
(i) $57-(-17)=57+17=74$

9. (a) $15-(-25)=15+25=40$
(b) $9+23-(-25)-40=9+23+25-40$
$=9+23+25-40$
$=57-40=17$
(c) $-42-[(-30)+(-50)]$
$=-42-[-30-50]=-42-[-80]$
$=-42+80=38$
(d) $(-30+10)-(40-20)$
$=(-20)-(20)=-40$
(e) $[-437-1+8][234-(-10)]-[15+(-17)]$
$=[-430]+[234+10]-[15-17]$
$=-430+244-(-2)$
$=-430+244+2=-430+246=-184$
(f) $509-(-19)+(-19)+20+(-20)$
$=509+19-19+20-20$
$=509+0+0=509$

10. $-[18°C-(-3°C)]=-[18°C+3°C]=-21°C$

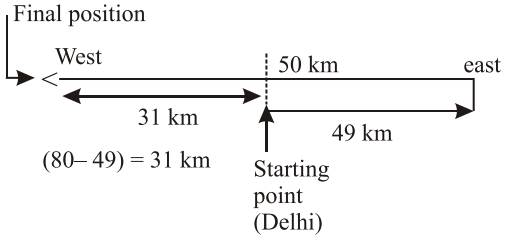
11. Let the second integer be x
So, $x+15=-30$
$x=-30-15 \Rightarrow x=-45$

12. $(3500-1200)$ m $= 2300$ m
-2300 or 2300 below Sea level



13. Initial amount (march 2018)
$=2000$
Amount after deposit (April 2018) $=2000+700=2700$
Amount after withdraw
$=2700-1000=1700$

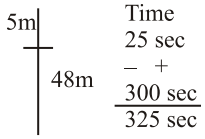
14.



So he was 31 km far from Delhi

15. He is taking 5 sec for 1 metre
So, in 25 sec he will cover $5-1=4$ m distance
this proless continus till 48 metre *i.e.*,
time taken $=25\times12=300$ sec
for the remain 5 metre he will take 25 sec more

Total tike taken $= 300 + 25$
$= 325$ sec



Exercise 1.2

1. (a) $(-9)\times 0\times(12)=0$

(b) $(-1)\times(-1)\times(+1)=1\times 1=1$

(c) $121\div(-11)=\dfrac{-121}{11}=-11$

(d) — $\div(-13)=13$

Let x

$x=\div(-13)=13 \quad\Rightarrow\quad \dfrac{x}{-13}=13$

$x=13\times -13 \quad\Rightarrow\quad x=-169$

(e) — $\div 25=0$

Let x

$\dfrac{x}{25}=0 \quad\Rightarrow x=0$

(f) $(-12)\div(-12)=$ —

$\dfrac{-12}{-12}=0 \quad\Rightarrow 1$

(g) $(-7)\times(-3)\times(-5)=-105$

$(+21)\times(-5)=-105$

(h) $(-10)\times 5\times(-10)=100\times 5=500$

(i) $(-13)\times(-13)=+169$

2. State true or false :

(a) $0\div(-7)=0 \quad\Rightarrow \dfrac{0}{-7}=0$ (T)

(b) $12\div 0=0 \quad\Rightarrow \dfrac{12}{0}=0$ (T)

$\infty\neq 0$ (F)

(c) $1\div 1=1 \quad\Rightarrow \dfrac{1}{1}=1$

(d) $0\div 4=0 \quad\Rightarrow \dfrac{0}{4}=0$ (T)

(e) $(2)\times(-3)=6 \quad\Rightarrow -6=6$ (F)

(f) $(-3)\times(-1)=3\Rightarrow(-3)\times(-1)=3\Rightarrow 3=3$ (T)

3. Find the product

(a) $6\times(-16)=-84$ (b) $(-300)\times 4=-1200$

(c) $(-14)\times -(-1)=210$ (d) $(-12)\times 12=-144$

(e) $62\times(-9)=-558$ (f) $(-25)\times(-25)=625$

4. (a) $(-a)\times(-b)\times c\times(-d)\times(-e)\times f\times g\times(-h)$

$=a\times b\times c\times d\times e\times f\times g\times(-h)$

$=-(a\times b\times c\times d\times e\times f\times h\times h)$

= Negative

(b) $a\times b\times c\times(-d)\times(-c)\times(-f)$

$=a\times b\times c\times(d\times e)\times(-f) \quad \{\because -\times -=+\}$

$=-(a\times b\times c\times d\times e\times f)$

= Negative

(c) 18 negative integers × 3 positive integers

5. Multiply the following :

(a) 0 and 30
$=0\times 30=0$

(b) (-12) and 0
$=(-12)\times 0=0$

(c) 8 and (-7)
$=8\times(-7)$
$\because[(+1)\times(-1)=-1]$
$=-56$

(d) (-25) and 8
$=-25\times 8$
$\{\because(-)\times(+)=(-)\}$
$=-200$

(e) 32 and (-9)
$=32\times(-9)$
$=-288$

(f) (-15) and (-12)
$=(-15)\times(-12)$
$=180$

6. (a) $(-9)\times 4=-36$ (b) $0\times(-52)=0$

(c) $7\times(-35)=-245$ (d) $(-17)\times(-2)=34$

(e) $(-7)\times(-49)=343$ (f) $(-18)\times(-13)=234$

(g) $(-1)\times(-3)\times(6)=3\times 6=18$

(h) $(-5)\times(-5)\times(-5)=-125$

(i) $(-10)\times 0\times(-18)=0$

(j) $10\times(-9)\times(-9)=810$

(k) $2\times(-3)\times 4\times(-5)=120$

(l) $(-3)\times(-3)\times 0\times(-6)=0$

7. (a) $0\div 8$

$= 8\overline{)\,0\,(}\;0$

$\underline{0}$

$\underline{0}$

quotient = 0

(b) $15\div(-3)$

$-3\overline{)\,15\,(}\;-5$

$\underline{15}$

$\underline{0}$

quotient = –5

(c) $0\div 32$
quotient $=0$

(d) $(-27)\div(-9)$
quotient $=3$

(e) $(-60)\div 4$
quotient $=-15$

(f) $(36)\div(-36)$
quotient $=-1$

(g) $-49\div(-7)$
quotient $=7$

(h) $(-72)\div 8$
quotient $=-9$

(i) $(+88)\div 11$
quotient $=8$

(j) $(95)\div(-19)$
quotient $=-5$

(k) $(-35)\div 6$
quotient $=5$

(l) $(-52)\div 4$
quotient $=-13$

8. (a) $6+3\times 11 \;\square\; (6+3)\times 11$

$39 \boxed{<} 99$

(b) $6-3\times 11 \;\square\; (6-3)\times 11$

$-27 \boxed{<} 33$

(c) $(-6)\times(-5)\times -2 \;\square\; (-6)\times(-5-2)$

$28 \boxed{<} 42$

(d) $7\times(-3) \;\square\; (-3)\times 7$

$-21 = -21$

(e) $11\times2+3\square3\times2+1$

$25\ \boxed{>}\ 7$

(f) $4\times[-3+(-5)]\square4\times(-3)+4\times(-5)$

$-32\ \boxed{=}\ -32$

9. Let x be a integer

$x\times(+1)=-67 \quad \Rightarrow x=-67$

10. Let x be a integer

$x\times(-1)+35 \quad \Rightarrow x=-35$

11. Let be integer $=x$

$\frac{x}{-2}=42 \Rightarrow x=-84$

12. Temperature covered in 8 hours

$=8\times5°C=40°C$

Final temperature $=50°C-40°C=10°C$

13. (a) David final marks $=(8\times5)+\{16\times(-2)\}$

$=40-32=8$

(b) Raveena final marks $=(16\times5)+(8\times-2)$

$=80-16=54$

(c) Hamid final marks $=(4\times5+12\times(-2)+8\times0)$

$=-4$

14. (a) $=(5000\times80)+(400\times-60)$

$=400000-24000$

Profit $=376000$

(b) Let the no of + v $=x$

$x\times80=4000\times60\Rightarrow x=3000$

Exercise 1.3

1. (a) $12\times7=84$ (b) $-8\times8=-64$

(c) $9\times(-11)=-99$ (d) $(-6)\times(-5)=30$

(e) $0\times(-45)=0$

2. (a) $2\times3\times(-8)=2\times(-24)=-48$

(b) $-5\times7\times(-4)=-5\times-28=140$

(c) $-6\times-7\times-9=63\times(-6)=-378$

(d) $(-11)\times(21)\times0\times(-34)=-121\times0\times-34=0$

(e) $(-2)\times(-5)\times(-4)\times(-10)=(10)\times(40)$

$=+400=400$

(f) $(-3)\times(-3)\times(-3)=9\times(-3)=-27$

3. (a) $(-35)\times5+(-3)\times3$

$=(-15)+(-9)=-15-9=-24$

(b) $7\times(-13)+7\times(-10)$

$=(-91)+(-70)=-91-70=-161$

(c) $10\times(-4)+5\times(-4)$

$=(-40)+(-20)=-40-20=-60$

(d) $(-12)\times(-7)+9(-12)\times(-3)$

$=(84)+(36)=120$

(e) $16\times(-68)+16\times(-32)$

$=(-1088)+(-512)=-1600$

(f) $(-3)\times57+(-3)\times47$

$=-171+(-141)=--171-141=-312$

4. (a) $36\times(-56)+(-56)\times(-46)$

$=(-56)[36+(-46)]=(-56)[-10]=560$

(b) $8\times48+(-125)$

$=384+(-125)=384-125=259$

(c) $7\times(48+2)=7\times50=350$

(d) $(-45)\times108=-4860$

(e) $725\times(-35)+(-725)\times65$

$=725[-35+(-1)\times65]=725[-35-65]$

$=725[-100]=-72500$

(f) $(-17)\times(-29)=493$

(g) $-57\times(-19)+57$

According to BODMAS {*i.e.*, first multiply than perform addition}

$=1083+57=1140$

(h) $83\times(-99)+(-8)$

$=83[-99+(-1)]=83[-100]=-8300$

(i) $46+(-79)\times(-49)$

$=46[1+(-79)(-1)]=46[1+79]$

$=46[80]=3680$

5. Divide the following

(a) 17 by -5

$=\frac{17}{-5}$

$=-3.4$

$-5\overline{)\ 17\ (}\ -3.4$

$\underline{15}$

20

$\underline{20}$

$\times$

(b) -36 by -12

$=\frac{-36}{-12}=3$

$-12\overline{)-36\ (}\ 3$

$\underline{-36}$

$\times$

(c) 34 by -17

$=\frac{34}{-17}=-2$

$-17\overline{)-34\ (}\ -2$

$\underline{-34}$

$\times$

(d) 0 by -98

$=\frac{0}{-98}=0$

$-98\overline{)\ 0\ (}\ 0$

$\underline{0}$

$\times$

6. Fill in the blanks :

(a) $(-27)\div27=\boxed{-1}$

(b) $\boxed{125}\div(-125)=-1$

$x\div(-125)=-1 \quad \Rightarrow x=(-1)\times(-125)$

$x=125$

(c) $\boxed{0}\div29=0$ (d) $(-13)-\boxed{-13}=0$

$-13-x=0\Rightarrow-13=x$

(e) $(-12)\boxed{-1}=-13$

$-12-x=-13 \Rightarrow -12-x=-13$

$-12+13=x \quad \Rightarrow 1=x$

(f) $7\times(-5)=\boxed{-5}\times7$

$7\times(-5)=x\times7\Rightarrow-35=7x$

$\frac{-35}{7}=x \Rightarrow -5=x$

(g) $(-15)\times0=\boxed{0}=0\times(-15)$

It should be equal to L.H.S. and R.H.S.

L.H.S. = M.H.S. = R.H.S.

L.H.S. $= -15 \times 0 = 0$

R.H.S. $= 0 \times (-15) = 0$

So M.H.S. is also 0

$\square = 0$

7. State true of false

(a) $0 \times (-4) = 0$ True

(b) $(-3) - 1 = -2 \Rightarrow -3 - 1 = -4$ So , False

(c) $(-16) - 0 = 0 \Rightarrow -16 - 0 = -16$ So, False

(d) $(-12) + (12) = 0$ True

(e) $(-16) \div 4 = -4$ True

(f) $(-8) \times (-1) = -8 \Rightarrow -8 \times -1 = 8$ So, False

8. Let the integer be x

$\frac{x}{-7} = 9 \qquad \Rightarrow x = 9 \times -7 \Rightarrow x = -63$

So, the integer is -63

9. Let the integer be x

$x \times (-1) = (-25)$

$x = \frac{-25}{-1} \qquad \Rightarrow x = 25$

10. Let the integer be x

$\frac{x}{-1} = -47$

$x = -47 \times (-1) \Rightarrow x = 47$

11. Rehan's earning per day = ₹175

So after 10 days his earning

$= ₹175 \times 10 = ₹1750$

12. Money withdraw everyday $= 200$

Withdraw for five days $= 200 \times 5 = ₹1000$

Exercise 1.4

1. $64 \div 16 \times (-3) + 2$

$= 4 \times (-3) + 2 = -12 + 2 = -10$

2. $-3 + \{(-4) \div 4 + 1\} + 3$

$= - + \{-1 + 1\} + 3 = -3 + 0 + 3 = 0$

3. $6 \div \overline{3 - 2} = 6 \div 1 = \frac{6}{1} = 6$

4. $18 \times (-6 + 4) \div 9$

$= 18 \times (-2) \div 9 = 18 \times \frac{-2}{9} = 2 \times (-2) = -4$

5. $-40 + \overline{(-1) - (-2)} \times 6 \div \overline{3 - 2}$

$= -40 + 1 \times 6 \div 1 \qquad \left[\begin{matrix}\overline{-1-(-2)} = 1 \\ \overline{3-2} = 1\end{matrix}\right]$

$= -4 + 1 \times 6 = -40 + 6 = -34$

6. $-4 \times -1[2 \times (-6) + 3(2 \times 6 - 4 - 2)]$

$= -4 \times -1[2 \times (-6) + 3(12 - 6)]$

$= -4 \times -1[2 \times (-6) + 3(6)]$

$= -4 \times -1[-12 + 18]$

$= -4 \times -1[6] = -4 \times -6 = 24$

7. $-4 \times (-2)[2 \times (-6) + 3 \times (\overline{2 \times 6} - 4 - 4)]$

$= -4 \times (-2)[2 \times (-6) + 3 \times (12 - 8)]$

$= -4 \times (-2)[2 \times (-6) + 3 \times (4)]$

$= -4 \times (-2)[-12 + 12]$

$= -4 \times (-2)[0] = 4 \times 0 = 0$

8. $-80 + 6[\overline{-3 \times 8} + 20] + 100$

$= -80 + 6 \times [-24 + 20] + 100$

$= -80 + 6 \times [-4] + 100 = -80 + (-24) + 100$

$= -80 - 24 + 100 = -104 + 100 = -4$

9. $[-15 + \{4 \div \overline{(-1) - (3)}\} \times 6]$

$= [15 - + \{4 \div -4\} \times 6]$

$= [-15 + (-1) \times 6] = [-15 + -6] = -21$

10. $-5 - (-48) \div (12) + (-2) \times 6$

$= -5 + 48 \div 12 + (-2) \times 6$

$= -5 + 4 + (-12) = -1 + (-12) = -13$

11. $7 + 4 - [3 - \{1 + 2 - (4 - 9)\}]$

$= 7 + 4 - [3 - \{1 + 2 - (-5)]\}$

$= 7 + 4 - [3 - \{3 + 5\}]$

$= 7 + 4 - [3 - 8] = 7 + 4 - [-5]$

$= 7 + 4 + 5 = 16$

12. $120 - 12]3 - 4\{2 \times 3 - 2 \times (-8)\}]$

$= 120 - 12[3 - 4\{2 \times 3 + 16\}]$

$= 120 - 12[3 - 4\{6 + 16\}]$

$= 120 - 12[3 - 4(22)]$

$= 120 - 12[3 - 88] = 120 - 12[-85]$

$= 120 + 1020 = 1140$

13. $10 + 4 - [3 - \{1 + 2 - (4 - 9)\}]$

$= 10 + 4 - [3 - \{1 + 2 - (-5)\}]$

$= 10 + 4 - [3 - \{3 + 5\}]$

$= 10 + 4 - [3 - 8] = 10 + 4 - [-5]$

$= 10 + 4 + 5 = 19$

14. $\{60 \times (-3)\} \div 45 \div (-2)$

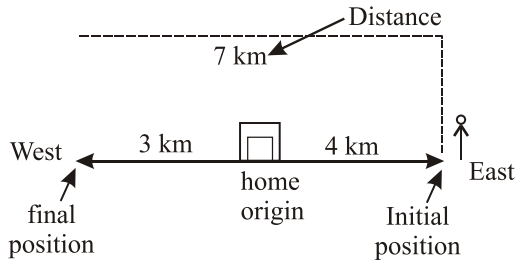
$= \{-150\} \div 45 \div (-2)$

$= -180 \div \frac{45}{-2}$

$= -180 \times \frac{-2}{45} = -4 \times -2 = 8$

Exercise 1.5

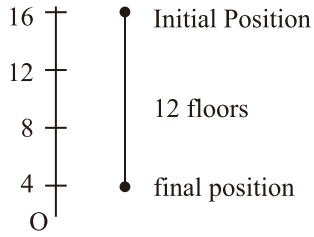
1.



So from 4 km east to 3 km west the distance travlled is undirection from 4 km east to 3 km west

i.e., 4 km + 3 km =7 km

2. Floors travel downward = 16 – 4 = 12 floors



3. Daytime temperature = 26 °C

Night time temperature = 36°C

temperature from Daytime to night time

= 33°C – 26°C = 7°C

4. **Step 1** 3 – 10 = –7 **Step 2** –7 – 1 = –8

Step 3 –8 × –3 = 24 **Step 4** 24 – 20 = 4

5. Initially I have 57 marbles

Finally I have 37 marbles

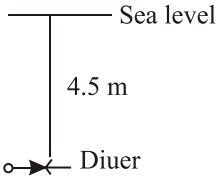
as finally I have less number of marbles

So it is a loss condition

loss = 57 – 34 = 23

loss of 23 marbles

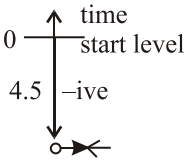
6.



For depth we conventionally take down word position as time

i.e., depth = 4.5 m

Now for height it is always taken from the level of ground/sea level upward direction. Shows the time height while downward direction shows the negative height



So, height = –4.5 m

7. Mr Nair amount on 01.01.2008 = ₹2500

amount after deposit *i.e.*, in January

= 2500 + 1250

= ₹3750

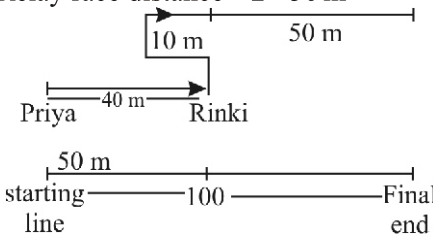
amount after withdrawal in February

= 3750 – 750 = ₹3000

On 01.04.2008 in march his amount

= 3000 + 500 – 300 = ₹3200

8. Total Relay race distance = 2 × 50 m



= 100 m

Now Priya run 50 m *i.e.*, 50 m race left

When he handed baton to Rinki

Now Rinki run 10 m in opposite direction

Distance travelled from the starting point

= 50m – 10m = 40m

So distance left for achieng final position

= (100 – 40) m = 60 m

9. Real cost of a book = ₹96

Mistaken readed cost of a book = 96 – 5 = ₹91

Bill (Real cost) = Total books × Real cost per book

= 60 × 96 = 5760

Bill (erron cost) = total books × 91

= 60 × 91 = 5460

Difference in bill = ₹(5760 – 5460) = ₹300

10. Total floors between 36 and 96th floor = 96 – 30 = 60 floors

height of each floor = 4m

Total height of 60 floor = 60 × 4 = 240 m

i.e., balloon have to six 240 min

other to reach 96th floor

for every 3 m rest time by the balloon = 1sec

for 240 m time taken by it

$$= \frac{240}{3}\text{sec} = 80\text{sec}$$

11. Total time gain in the 4 section by Satish

= 10 + 20 + 15 + 41 = 86sec

Total time lost in the 4 section by Satish

= –60 – 27 – 41 = 87 sec

Overall relative time taken by Satish to reach the final end point

= 86 – 87 = –1sec

here –ive dendtes he is lost by 1 sec

i.e., Satish lost by 1sec

12. Let the Second number be x

This product = 105

$x \times -7 = 105$

$$x = \frac{105}{-7} \Rightarrow x = -15$$

i.e., the second number is –15

13. Dept able to our per day by Rajan = 5m

This process continue incrementally till 5days *i.e.*,

depth covered = –5 – 5 – 5 – 5 – 5 = –5 × 5 = –25 m

here – indicates downward direction

So depth covered = 25 m

14. Total no of marbles = 60

Ranjan lost 5 marbles in 8 games

Total no of marble lost = 5 × 8 = 40 …(1)

then Ranjan gained 4 marbles in 4 games

total no of marbles gained $= 4 \times 4 = 16$ …(2)

from (1) & (2)

Overall no of marble lost $= 40 + -16 = 24$

Total no of marble at present $= 60 - 24 = 36$ marbles

MCQ

1. $-6 \times -2 = 12$ (b)

2. $-64 \div -8 = 8$ (a)

3. $-6 + (-2) = -8$ (a)

4. $24 - \{12 - (10 + \overline{7 - 8})\}$

$= 24 - \{12 - 10 - 1\} = 24 - \{12 - 9\}$

$= 24 - 3 = 21$ (a)

5. $6 \times (2 + 3) = 6 \times 2 + 6 \times$—

$6 \times 5 = 12 \times 6 \times x$

$30 - 12 = 6 \times x$

$18 = 6 \times x$

$3 = x$ (c)

6. $-2 \times -3 \times -1 \times -1 =$—

$6 \times 1 = 6$ (d)

7. $-a \times (b - c) =$

$-a \times b + a \times c$ (c)

8. $2 - [2 - \{2 - (2 - 2)\}]$

$= 2 - [2 - \{2 - 0\} = 2 - [2 - 2] = 2 - 0 = 2$ (b)

9. 1 is known as multiplication identity (b)

10. $(-1)^4 \times (-1)^7 =$—

$1 \times -1 = -1$ (b)

2 Fractions

1. For giving equivalent fraction we just simply have to multiply and finite its numerator & denominator by some number.

(a) $\frac{3}{5}$

Ist $= \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$ IInd $= \frac{3}{5} \times \frac{8}{8} = \frac{24}{40}$

IIIrd equation fraction $= \frac{3}{5} \times \frac{2}{2} = \frac{6}{10}$

IVth Equivalent fraction $= \frac{3}{5} \times \frac{5}{5} = \frac{15}{25}$

Vth Equivalent fraction $= \frac{3}{5} \times \frac{5}{5} = \frac{15}{25}$

$\frac{9}{15}, \frac{24}{40}, \frac{6}{10}, \frac{12}{20}, \frac{15}{25}$

(b) $\frac{5}{8}$

Ist Equivalent fraction $= \frac{5}{8} \times \frac{2}{2} = \frac{10}{16}$

IInd Equivalent fraction $= \frac{5}{8} \times \frac{3}{3} = \frac{15}{24}$

IIIrd Equivalent fraction $= \frac{5}{8} \times \frac{4}{4} = \frac{20}{32}$

Similarly we can find IVth & Vth

i.e., $\frac{10}{16}, \frac{15}{24}, \frac{20}{32}, \frac{30}{48}, \frac{35}{56}$

(c) $\frac{9}{17}$

Ist Equivalent fraction $= \frac{9 \times 2}{17 \times 2} = \frac{18}{34}$

IInd Equivalent fraction $= \frac{9 \times 3}{17 \times 3} = \frac{27}{51}$

IIIrd Equivalent fraction $= \frac{9 \times 4}{17 \times 4} = \frac{36}{68}$

$\frac{18}{34}, \frac{27}{51}, \frac{36}{68}, \frac{45}{85}, \frac{54}{102}$

2. Compare

(a) $\frac{3}{5} < \frac{4}{5}$

(b) $\frac{2}{7}$ $\frac{2}{3}$ LCM of $r = 21$

$\frac{6}{21} < \frac{14}{21}$ *i.e.*, we make equivalent fraction after making denominator same for both the fractions separately.

Hints : (i) No if denominator of the fraction is same then the numerator having larger number is large

(ii) If denominator if different than we hao to take lcm of denominator first is other to find the larger or smaller fraction.

(c) $\frac{9}{10}$ $\frac{11}{15}$

or L.C.M. $= 30$

$\frac{9 \times 3}{10 \times 3} \square \frac{11 \times 2}{15 \times 2}$

$\frac{27}{30} \boxed{>} \frac{22}{30}$

(d) $\frac{3}{5}$ $\frac{5}{7}$

or L.C.M. $= 35$

$\frac{3 \times 7}{5 \times 7} \square \frac{5}{7} \times \frac{5}{5}$

$\frac{21}{35} \boxed{<} \frac{25}{35}$

3. Arrange in ascending order

(a) $\frac{7}{9}, \frac{5}{9}, \frac{8}{9}, \frac{11}{9}$

Denominator is same so fraction having larger numerator is larger

$\frac{5}{9} < \frac{7}{9} < \frac{8}{9} < \frac{11}{9}$

(b) $\frac{1}{3},\frac{1}{10},\frac{1}{2},\frac{1}{2},\frac{1}{6}$

L.C.M. of Denominator $=3\times2\times5=30$

$\frac{1\times10}{3\times10},\frac{1\times3}{10\times3},\frac{1\times15}{2\times15},\frac{1\times5}{6\times5}$

$\frac{10}{30},\frac{3}{30},\frac{15}{30},\frac{5}{30} \Rightarrow \frac{3}{30}<\frac{5}{30}<\frac{10}{30}<\frac{15}{30}$

i.e., $\frac{1}{10}<\frac{1}{6}<\frac{1}{3}<\frac{1}{2}$

(c) $\frac{1}{2},\frac{5}{6},\frac{2}{3},\frac{3}{4}$

LCM of Denominator $=2\times3\times2=12$

Equivalent fractions

$\frac{1\times6}{2\times6},\frac{5\times2}{6\times2},\frac{2\times4}{3\times4},\frac{3\times3}{4\times3}$

$\frac{6}{12},\frac{10}{12},\frac{8}{12},\frac{9}{12} \Rightarrow \frac{6}{12}<\frac{8}{12}<\frac{9}{12}<\frac{10}{12}$

$\frac{1}{2}<\frac{2}{3}<\frac{3}{4}<\frac{5}{6}$

(d) $\frac{8}{15},\frac{19}{30},\frac{7}{10},\frac{3}{5}$

LCM of Denominator $=5\times2\times3=30$

$\frac{8\times2}{15\times2},\frac{19\times1}{30\times1},\frac{7\times3}{10\times3},\frac{3\times6}{5\times6}$

$\frac{16}{30},\frac{19}{30},\frac{21}{30},\frac{18}{30} \Rightarrow \frac{16}{30}<\frac{18}{30}<\frac{19}{30}<\frac{21}{30}$

$\frac{8}{15},\frac{3}{5},\frac{19}{30},\frac{7}{10}$

4. Solve

(a) $9+\frac{5}{11}$

Taking L.C.M. $\frac{99+5}{11}=\frac{104}{11}$ or $9\frac{5}{11}$

(b) $3\frac{3}{4}+5\frac{1}{2}$

$=3\frac{3}{4}+5+\frac{1}{2}$ (Mixed fraction of from $a\frac{b}{c}$ can

$=8+\frac{3}{4}+\frac{2}{4}$ also be written as $a+\frac{b}{c}$)

$=\frac{32+5}{4}=\frac{37}{4}$ or $9\frac{1}{4}$

(c) $4-\frac{3}{7}$

$\frac{4\times7-3}{7}=\frac{28-3}{7}=\frac{25}{7}$ or $3\frac{4}{7}$

(d) $\frac{13}{4}-\frac{16}{5}$

Taking L.C.M. $\frac{13\times5-16\times4}{20}=\frac{65-64}{20}=\frac{1}{20}$

(e) $8\frac{1}{3}-2\frac{5}{8}$

$=\frac{25}{3}-\frac{21}{8}$

$=\frac{25\times8-21\times3}{24}=\frac{200-63}{24}$

$=\frac{137}{24}$ or $11\frac{19}{24}$

$8\frac{1}{3}=\frac{5\times3+1}{3}=\frac{25}{3}$

$2\frac{5}{8}=\frac{8\times2+5}{8}=\frac{21}{8}$

(f) $5\frac{1}{7}+3\frac{1}{9}$

$=5+\frac{1}{7}+3+\frac{1}{9}=8+\frac{1}{7}+\frac{1}{9}$

$=\frac{8\times63+1\times9+1\times7}{63}=\frac{504+16}{63}$

$=\frac{520}{63}$ or $8\frac{16}{63}$

(g) $\frac{8}{9}+\frac{3}{2}+\frac{5}{6}$

$=\frac{8\times2+3\times9+5\times3}{18}=\frac{16+27+15}{18}$

$=\frac{58}{18}=\frac{29}{9}=3\frac{2}{9}$

(h) $4\frac{5}{7}-2\frac{2}{14}$

$=\frac{33}{7}-\frac{30}{14}=\frac{66-30}{14}=\frac{36}{14}=\frac{18}{7}=2\frac{4}{7}$

5. Let the number to be added be x

$\frac{27}{4}+x=9$

$x=9-\frac{27}{4} \Rightarrow x=\frac{36-27}{4}=\frac{9}{4}$ or $2\frac{1}{4}$

6. Distance covered by Sunit in 2 hours

$=7\frac{5}{12}=\frac{89}{12}$km

Distance covered by Sunit in 1 hour

$=4\frac{3}{8}=\frac{35}{8}$ km

Total distance covered in 3 hours $=\frac{89}{12}+\frac{35}{8}$

$=\frac{178+105}{24}$

$=\frac{283}{24}$ km or $11\frac{19}{24}$ km

7. Le the no to be subtracted from $12\frac{3}{5}$ be x

$12\frac{3}{5}-x=7\frac{1}{5} \Rightarrow \frac{63}{5}-x=\frac{36}{5}$

$\frac{63}{5}-\frac{36}{5}=x$

So the no is $\frac{27}{5}=x$

8. Length of sheet $=15\frac{1}{3}=\frac{46}{3}$ cm

breadth/width of sheet $=12\frac{1}{2}$ cm $=\frac{25}{2}$ cm

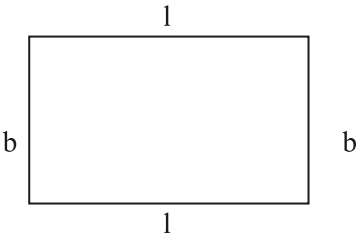
Perimeter of rectangle = sum of all sides

$=2(l+b)$

$=\left(\frac{46}{3}+\frac{25}{2}\right)$ cm

$=2\left(\frac{92+75}{6}\right)$ cm

$=2\times\frac{167}{6}=\frac{167}{3}$ cm



9. Side of square picture frame $17\frac{2}{9}$ cm

$=\frac{155}{9}$ cm

Perimeter of square $=4\times$ side

$=4\times\frac{155}{9}$ cm

$=\frac{620}{9}$ cm or $6\frac{8}{9}$ cm

10. Actual duration of the film =

Total film duration - aduertisent duration

$=3\frac{3}{4}=1\frac{1}{4}$ $=3+\frac{3}{4}=\left(1+\frac{1}{4}\right)$

$=3+\frac{3}{4}=1-\frac{1}{4}$ $=2+\frac{2}{4}$ hours

$=2\frac{2}{4}$ hours on $2\frac{1}{2}$ hours on $=\frac{5}{2}$hours

11. Time speed on other subject

By Simran = Total time $-$(Maths time +English time)

Consump time

$=7-2\frac{4}{5}-1\frac{1}{4}$ $=7-\frac{14}{5}-\frac{5}{4}$

$=\frac{40-56-25}{20}=\frac{170-81}{20}$

$=\frac{59}{20}$ hours or $2\frac{19}{20}$

12. (a) Perimeter = Sum of its all sides of any shape

Perimeters of triangle $=4\frac{1}{3}+5\frac{1}{4}+5\frac{1}{4}$

$=4\frac{1}{3}+10\frac{2}{4}$

$=14+\frac{1}{3}+\frac{2}{4}$

$=14+\frac{4+6}{12}=14+\frac{1}{12}=14\frac{5}{6}$

(b) Perimeter of 7 shapes = sum of all sides

$=9\frac{1}{4}+1\frac{1}{2}+3+2+11\frac{1}{4}$

$=9\frac{1}{4}+1\frac{1}{2}+5+11\frac{1}{4}=26+\frac{2}{4}+\frac{1}{2}$

$=26+\frac{4}{4}=26+1=27$ cm

Exercise 2.2

Multiply

1. (a) $\frac{3}{5}\times=\frac{21}{5}$ or $4\frac{1}{5}$ (b) $\frac{8}{3}\times4=\frac{32}{3}$ or $10\frac{2}{3}$

(c) $13\times\frac{2}{5}=\frac{26}{5}$ or $5\frac{1}{5}$ (d) $17\times\frac{4}{7}=\frac{68}{7}$ or $9\frac{5}{7}$

(e) $\frac{9}{2}\times10=9\times5=45$ (f) $20\times\frac{3}{4}=5\times3=15$

2. (a) $\frac{2}{5}\times5\frac{1}{4}=\frac{2}{5}\times\frac{4\times4+1}{4}$ $=\frac{2}{5}\times\frac{21}{4}=\frac{21}{10}$ or $2\frac{1}{10}$

(b) $\frac{13}{6}\times\frac{3}{26}=\frac{1}{6}\frac{3}{2}=\frac{1}{2}\times\frac{1}{2}=\frac{1}{4}$

(c) $\frac{3}{4}\times5\frac{2}{3}=\frac{3}{4}\times\frac{17}{3}=\frac{17}{4}$ or $4\frac{1}{4}$

(d) $\frac{8}{9}\times\frac{27}{4}=2\times3=6$ (e) $\frac{4}{5}\times\frac{12}{7}=\frac{48}{35}$ or $1\frac{13}{35}$

(f) $3\frac{3}{7}\times\frac{3}{5}=\frac{25}{7}\times\frac{3}{5}=\frac{5\times3}{7}=\frac{15}{7}$ or $2\frac{1}{7}$

(g) $6\frac{2}{3}\times\frac{9}{5}=\frac{20}{3}\times\frac{9}{5}=4\times3=12$

(h) $\frac{25}{3}\times\frac{25}{3}=\frac{625}{9}$ or $69\frac{4}{9}$

(i) $1\frac{9}{11}\times3\frac{3}{10}=\frac{20}{11}\times\frac{33}{10}=2\times3=6$

3. Find $\frac{1}{2}$ of

[Hint: Simply multiply number by $\frac{1}{2}$]

(a) $36\Rightarrow36\times\frac{1}{2}=18$ (b) $48\Rightarrow48\times\frac{1}{2}=24$

(c) $102\Rightarrow102\times\frac{1}{2}=51$ (d) $208\Rightarrow208\times\frac{1}{2}=104$

4. Find $\frac{1}{4}$ of

[Hints Simply multiply number by $\frac{1}{4}$]

(a) $\frac{3}{4}\Rightarrow\frac{3}{4}\times\frac{1}{4}=\frac{3}{16}$ (b) $\frac{20}{3}\Rightarrow\frac{20}{3}\times\frac{1}{4}=\frac{5}{3}$ or $1\frac{2}{3}$

(c) $\frac{16}{7}\Rightarrow\frac{16}{7}\times\frac{1}{4}=\frac{4}{7}$ (d) $\frac{28}{5}\Rightarrow\frac{28}{5}\times\frac{1}{4}=\frac{7}{8}=1\frac{2}{5}$

5. (a) $\frac{1}{4}$ of 60 mangoes $= \frac{1}{4} \times 60 = 15$ mangoes

(b) $\frac{5}{6}$ of a day $= \frac{5}{6} \times 24$ hours

[1 days = 24 hrs] $= 5 \times 4 = 20$ hours

(c) $\frac{9}{14}$ of a week [1 week = 7 days]

$= \frac{9}{14} \times 7$ days $= \frac{9}{2}$ days or

$= \frac{9}{2} \times 24 = 9 \times 12 = 108$ hours

(d) $\frac{2}{3}$ of a year

$= \frac{2}{3} \times 12$ months $= 2 \times 4 = 8$ months

(e) $\frac{3}{4}$ of a rupee $= \frac{3}{4} \times 100$ paise

[1 rupee = 100 paise] $= 3 \times 2$ pasie = 75 paise

(f) $\frac{2}{5}$ of a minute $= \frac{2}{5} \times 60 = 24$ sec

[1 minute = 60 seconds]

6. Total money Anjali and Vimla had together = ₹2500

Anjali share $= \frac{3}{5} \times 2500 =$ ₹1500

So Vimla's Share $= 2500 - 1500 =$ ₹1000

7. No. of girls $= \frac{2}{5}$ of total students

$= \frac{2}{5} \times 50 = 20$ girls

Number of boys = Total student − No. of girls

$= 50 - 20 = 30$ boys

8. No. of pages read by Preeti $= \frac{4}{5}$ of 550 pages

$= 4 \times 110 = 440$ pages

So, the read 440 pages

9. Length of rectangle $= 15\frac{1}{3} = \frac{46}{3}$ m

Width of rectangle $= 13\frac{1}{2} = \frac{27}{2}$ m

area of the rectangle = length ×width

$= \frac{46}{3} \times \frac{27}{2} = 23 \times 9 = 207\,m^2$

10. Income = Expenditure + Saving …(1)

Expenditure of Aman $= \frac{4}{3}$ of his salary

$= \frac{4}{5} \times 20{,}000 =$ ₹16000

So, Saving = Income − Expenditure

$= 20{,}000 - 16000 =$ ₹4000

11. Side of square $= 13\frac{3}{4}$ m

$= \frac{55}{4}$ m

area of square = side × side $= (\text{side})^2$

$= \frac{55}{4} \times \frac{55}{4} = \frac{3025}{16}\ m^2$

12. Cost of 1 kg tomatoes $= 19\frac{1}{4}$

cost of $3\frac{1}{2}$ kg of tomatoes $= 19\frac{1}{4} \times 3\frac{1}{2}$

$= \frac{77}{4} \times \frac{7}{2} = \frac{539}{8} =$ ₹$67\frac{3}{8}$

13. Motorcycle run in 1 litre petrol = 25 km

Motorcycle will run in $3\frac{1}{5}$ litre petrol $= 25 \times 3\frac{1}{5}$ km

$= 25 \times \frac{16}{5} = 80$ km

14. Side of equilateral $\Delta = 7\frac{3}{8}$ cm

Perimeter of equilateral triangle $= 3 \times$ side

$= 3 \times 7\frac{3}{8}$ cm

$\frac{1}{2}$ of perimeter $= 3 \times \frac{59}{8} \times \frac{1}{2}$

$= \frac{177}{16} = 11\frac{1}{16}$ cm

15. Maria's everyday Time consume in reading book $= 1\frac{5}{7} = \frac{12}{7}$ hours

This process will continue to 7 days till the book completed

So, *i.e.*, total time taken $= \left(\frac{12}{7} \times 7\right)$ hours = 12 hours

Exercise 2.3

[**Hints :** We can simply riciprocal of fraction by changing its numerator to denominator and vice versa]

1. (a) $\frac{7}{3}$ (b) $\frac{1}{9}$

reciprocal $= \frac{1}{\frac{7}{3}} = \frac{3}{7}$ reciprocal $1 \div \frac{1}{9} = 1 \times 9 = 9$

(c) $\frac{3}{5}$ reciprocal $= 1 \div \frac{3}{5} = 1 \times \frac{5}{3} = \frac{5}{3}$

(d) $\frac{6}{7} = 1 \div \frac{6}{7} = \frac{7}{6}$ (e) $\frac{7}{3} = 1 \div \frac{7}{3} = 1 \times \frac{3}{7} = \frac{3}{7}$

(f) $\frac{4}{9} = 1 \div \frac{4}{9} = 1 \times \frac{9}{4} = \frac{9}{4}$

2. Find

(a) $\frac{2}{15} \div 8 = \frac{2}{15} \times \frac{1}{8} = \frac{1}{60}$ (b) $3\frac{1}{2} \div 4 = \frac{7}{2} \times \frac{1}{4} = \frac{7}{8}$

(c) $\frac{4}{9} \div 5 = \frac{4}{9} \times \frac{1}{5} = \frac{4}{45}$ (d) $\frac{2}{3} \div 5 = \frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$

(e) $\frac{8}{19} \div 6 = \frac{8}{19} \times \frac{1}{6} = \frac{4}{57}$

(f) $5\frac{3}{7} \div 17 = \frac{38}{7} \times \frac{1}{14} = \frac{19}{49}$

3. Find

(a) $21 \div \frac{3}{7} = 21 \times \frac{7}{3} \times 49$

(b) $4 \div 2\frac{1}{5} = 4 \div \frac{11}{5} = \frac{4 \times 5}{11} = \frac{20}{11}$

(c) $14 \div \frac{5}{6} = 14 \times \frac{6}{5} = \frac{84}{5}$

(d) $16 \div \frac{4}{5} = 16 \times \frac{5}{4} = 4 \times 5 = 20$

(e) $4 \div \frac{8}{3} = 4 \times \frac{3}{8} = \frac{3}{2}$

(f) $12 \div 5\frac{4}{9} = 12 \div \frac{49}{9} = 12 \times \frac{9}{49} = \frac{108}{49}$

4. (a) $\frac{3}{8} \div \frac{3}{4} = \frac{3}{8} \times \frac{4}{3} = \frac{1}{2}$

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

(c) $\frac{4}{7} \div \frac{8}{9} = \frac{4}{7} \times \frac{9}{8} = \frac{9}{17}$

(d) $8\frac{1}{3} \div \frac{4}{37} = \frac{25}{3} \times \frac{37}{4} = \frac{925}{12}$

(e) $2\frac{1}{3} \div \frac{3}{5} = \frac{7}{3} \times \frac{5}{3} = \frac{35}{9}$

(f) $5\frac{1}{2} \div 6\frac{1}{5} = \frac{11}{2} \div \frac{31}{5} = \frac{11}{2} \times \frac{5}{31} = \frac{55}{62}$

(g) $\frac{3}{5} \div \frac{9}{4} = \frac{3}{5} \times \frac{4}{9} = \frac{4}{15}$

(h) $4\frac{3}{8} \div 2\frac{5}{6} = \frac{35}{8} \div \frac{17}{6} = \frac{35}{8} \times \frac{6}{17} = \frac{105}{68} = 1\frac{37}{68}$

5. Cost of $4\frac{3}{4}$ kg apples $= ₹300$

i.e., $\frac{19}{4}$ kg apples $= ₹300$

So, cost of 1 kg apple $= \frac{300 \times 4}{19} = ₹\frac{1200}{19}$

6. Water contain by1 jugs $= \frac{3}{5}$ liter

Water contain in bucket $= 18$ liter

Number of Jugs required $= \frac{\text{water contain in bucket}}{\text{water contain in one jug}}$

$= 18 \div \frac{3}{5} = 18 \times \frac{5}{3} = 6 \times 5 = 30$ jugs

7. Length of total wire $= 6\frac{1}{2}$ m $= \frac{13}{2}$ m

length of 13 equal pieces $= \frac{13}{2} \div 13 = \frac{13}{2 \times 13} = \frac{1}{2}$ m

8. Let the number be x

$4\frac{3}{4} \times x = 6\frac{1}{4}$ $\frac{19}{4} \times x = \frac{25}{4}$

$x = \frac{25}{4} \times \frac{4}{19}$ $x = \frac{25}{19}$

So, the required number is $\frac{25}{19}$

9. Requirement of milk by each student $= \frac{1}{3}$ litre

Total consumption $= 87\frac{2}{3}$ litre $= \frac{263}{3}$

Number of students in hostel

$= \frac{\text{total consumption}}{\text{milk consume by each boy}}$

$= \frac{263}{3} \div \frac{1}{3} = \frac{263}{3} \times 3 = 263$

M.C.Q.

1. $\frac{1}{9} \times \frac{1}{5} \times x = \frac{3}{6} \times \frac{1}{5} \times \frac{1}{9}$

let it be x

$\frac{1}{45} \times x = \frac{3}{9 \times 6 \times 5}$ $x = \frac{3}{9 \times 6 \times 5} \times 45$

$x = \frac{3}{6} = \frac{1}{2}$ $x = \frac{1}{2}$ (d)

2. 1 century $= 100$ years

$\frac{3}{5}$th of century $= \frac{3}{5} \times 100 = 60$ years

Month in 1 year $= 12$

Month in 60 years $= 12 \times 60 = 720$ months (c)

3. Reciprocal $= 1 \times \frac{-5}{6} = 1 \times \frac{6}{-5} = \frac{6}{-5}$ all options are wrong

4. $\frac{6}{4} \div \frac{1}{2} = \frac{6}{4} \times 2 = 3$

5. $\left(3\frac{3}{5} \div 1\frac{5}{7}\right) \div 2\frac{1}{10} = \left(\frac{18}{5} \times \frac{7}{12}\right) \div \frac{21}{10} = \frac{21}{10} \times \frac{21}{10} = 1$ (c)

3 Decimals

Exercise 3.1

1. (a) Already solution

(b) 106.23 = One hundred six point twenty three
= 1 hundredth + 6 one + 2 tenth + 3 hundredths

(c) 97.056 = ninety seven point zero fine six
= 9 tens + 7 ones +5 hundredth + 6 thousandths

(d) 342.009= Three hundred forty two point zero zero nine
= 3 hundred + 4 tens + 2 ones + 9 thousandths

2. (a) 8 cm as m [1 m 100 cm]
$= \frac{8}{100}$ m or 0.08 m

(b) 50 g as kg [1 kg = 1000 g]
$= \frac{450}{1000}$ kg = 0.45 kg

(c) 11 paise as rupee $= \frac{11}{100}$ rupe as [1 rupe = 100 paise]
= 0.11 paise

(d) 50 g as kg [1 kg = 1000g]
$= \frac{50}{1000}$ kg = 0.05 kg

3. Which is greater

(a) 0.4 or 0.04
$\frac{4}{10}$ $\frac{4}{100}$
$\frac{40}{100}$ > $\frac{4}{100}$ So, 0.4 > 0.04
So, $\frac{4}{10} > \frac{4}{100}$

(b) 0.8 or 0.5 So, 0.8 > 0.5
$\frac{8}{10} > \frac{5}{10}$

(c) 1.42 or 1.24 So, 1.42 > 1.24
$\frac{142}{100} > \frac{124}{100}$

(d) 3.33 or 33.3 So, 3.33 < 33.3
$\frac{333}{100} < \frac{333}{10}$

(e) 4.527 or 4.546 So, 4.527 > 4.546
$\frac{4527}{1000} < \frac{4546}{1000}$

(f) 12.05 or 12.005 So, 12.05 > 12.005
$\frac{1205}{100}$ $\frac{12005}{1000}$
$\frac{1205}{100} > \frac{12005}{1000}$

4. Add the followings

(a) 0.5, 0.02, 0.7
$\frac{5}{10} + \frac{2}{100} + \frac{7}{10}$
Taking LCM of dr
$= \frac{50+2+70}{100}$
$= \frac{122}{100} = 1.22$

(b) 1.1., 5.21, 0.44
$\frac{11}{10} + \frac{521}{100} + \frac{44}{100}$
$= \frac{110+521+44}{100}$
$= \frac{675}{100} = 6.75$

(c) 12.2, 13.32, 14
$\frac{122}{10} + \frac{1332}{100} + 14$
$= \frac{1220+1332+1400}{100}$
$= \frac{3952}{100} = 39.52$

(d) 582.25, 100.5, 63.41
$\frac{58225}{100} + \frac{1005}{10} + \frac{6341}{100}$
$= \frac{58225+10050+6341}{100}$
= 746.16

5. Subtract

(a) 0.752 from 2
2.000 $2 - 0.452 = 1.548$
− 0.452
1.548

(b) 7.91 from 18
$18 - 7.91 = 18.00 - 7.91 = 10.09$

(c) 45.2 from 62.5
$62.5 - 45.2 = 47.3$

(d) 102.25 from 250.52
$250.52 - 102.25 = 148.27$

6. Convert

(a) 4.5 hg to cg
[To convert hg to cg multiply hg $\times 10^4$]
$\frac{45}{10} \times 10000 = 45000$ cg

(b) 35745dag to kg
[1 kg = 100 dag]
So, $\frac{35745}{100} = 357.45$ kg

(c) 9180.5 dag to hg
[1 hg = 10 dag]
So $\frac{91805}{10} \times 10 = 91805$ hg

(d) 8.75 kg to g
[1 kg = 1000 g]

$= 8.75 \times 1000\text{g} = \frac{875}{100} \times 1000 = 8750\text{ g}$

(e) 95 dag to dg

$= 95 \times 100\text{ dg}$ [1 dag = 100 dg]

$= 9500\text{ dg}$

(f) 4.85 hg to c

[1 hg = 10000 cg]

$= 4.85 \times 10000 = \frac{485}{100} \times 10000 = 48500\text{ cg}$

(g) 30.65 hg to g

$= 30.65 \times 100\text{ g}$ [1 hg = 100 g]

$= \frac{3065}{100} \times 100\text{ g} = 3065\text{ g}$

(h) 45 g to dag $\left[\begin{matrix}1\text{dag} = 10\text{g} \\ \frac{1}{10}\text{dg} = 1\text{g}\end{matrix}\right]$

$= 45 \times \frac{1\text{dag}}{10} = 4.5\text{ dag}$

(i) 750 cg to g

$= 750 \times \frac{1}{100}\text{ g} = 7.5\text{ g}$ $\left[\begin{matrix}1\text{g} = 100\text{cg} \\ \frac{1}{100}\text{g} = 1\text{cg}\end{matrix}\right]$

(j) 450 dg to dag

$= 450 \times \frac{1}{100}\text{ dag}$ $\left[1\text{dg} = \frac{1}{100}\text{dag}\right]$

$= 4.5\text{ dag}$

(k) 5 hg to g

5 hg = 5×100 g = 500 g [1 hg = 100 g]

(l) 875 dag to kg

$875\text{ dag} = 875 \times \frac{1}{100}\text{kg}$ $\left[1\text{dag} = \frac{1}{100}\text{kg}\right]$

= 8.75 kg

7. (a) Sum of their lengths $= (3.42 + 2.83 + 1.78 + 1.66)\text{ m}$

$= 9.69$

$$\begin{array}{r} 3.42 \\ 2.83 \\ 1.78 \\ 1.66 \\ \hline 9.69 \end{array}$$

(b) Difference of the longest and smallest piece

$= 3.42 - 1.66 = 1.76\text{ m}$

Exercise 3.2

1. Find the following :

(a) $6.7 \times 10 = \frac{67}{10} \times 10 = 67$

(b) $98.61 \times 100 = \frac{8961}{100} \times 100 = 8961$

(c) $23.73 \times 100 = \frac{2373}{100} \times 100 = 2373$

(d) $155.44 \times 10 = \frac{15544}{100} \times 10 = 1554.4$

(e) $107.1 \times 100 = \frac{1071}{10} \times 100 = 10710$

(f) $66.5 \times 10 = \frac{665}{10} \times 10 = 665$

(g) $8.99 \times 10 = \frac{899}{100} \times 10 = 89.9$

(h) $23.05 \times 100 = \frac{2305}{100} \times 100 = 2305$

(i) $0.005 \times 10 = \frac{5}{1000} \times 10 = 0.05$

(j) $0.004 \times 100 = \frac{4}{100} \times 100 = \frac{4}{10} = 0.4$

(k) $0.11 \times 1000 = \frac{11}{100} \times 1000 = 110$

(l) $\frac{3050}{100} \times 100 = 3050$

2. Find the product

(a) $13 \times 2.5 = 13 \times \frac{25}{10} = \frac{325}{10} = 32.5$

(b) $0.5 \times 5 = \frac{7}{10} \times 5 = \frac{35}{10} = 3.5$

(c) $5.71 \times 11 = \frac{571 \times 11}{100} = \frac{6281}{100} = 62.81$

(d) $405.07 \times 4 = \frac{40507}{100} \times 4$

$= \frac{162028}{100} = 1620.28$

(e) $3 \times 0.96 = 3 \times \frac{96}{100} = \frac{288}{100} = 2.88$

(f) $28.15 \times 15 = \frac{2815 \times 15}{100} = 422.25$

3. Find the product

(a) $2,\ 0.07 = 2 \times \frac{7}{100} = \frac{14}{100} = 0.14$

(b) $18,\ 0.2 = 18 \times \frac{2}{10} = \frac{36}{10} = 3.6$

(c) $11.2,\ 1 = \frac{112}{10} \times 1 = 11.2$

(d) $22.1,\ 4 = \frac{221}{10} \times 4 = \frac{884}{10} = 88.4$

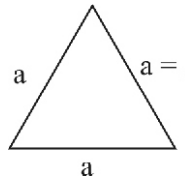
(e) $0.015,\ 2 = \frac{15}{1000} \times 2 = \frac{30}{1000} = 0.030$

(f) $43.1,\ 4 = \frac{431}{10} \times 4 = \frac{1724}{10} = 172.4$

(g) $3, 0.77 = 3 \times \frac{77}{100} = \frac{231}{100} = 2.31$

(h) $3.33, 7 = \frac{333}{100} \times 7 = \frac{2331}{100} = 23.31$

5. Perimeter of equilateral triangle = 3 × side



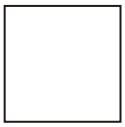
$= 3 \times 3.8$

$= 3 \times \frac{38}{10}$

$= \frac{114}{10} = 11.4 \text{ cm}$

6. (a) Area of square $= (\text{Side})^2$

or = Side × Side



side = (2.5) (a) cm

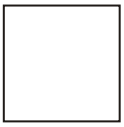
$= 2.5 \times 2.5$

$= \frac{25}{10} \times \frac{25}{10} = \frac{625}{100} = 6.25 \text{cm}^2$

(b) $\text{Area} = 3.4 \times 3.4$

$= \frac{34}{10} \times \frac{34}{10}$

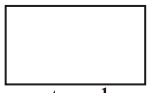
$= \frac{1156}{100} = 11.56 \text{ cm}^2$



side = 3.4 cm

7. Area of rectangle = length (l) breadth

l= 6.7 cm



b = 4.5 cm

rectangle

$= 6.7 \times 4.5 = \frac{67}{10} \times \frac{45}{10}$

$= \frac{3015}{100} = 30.15 \text{cm}^2$

8. Cost of 1 meter pipe = ₹18.75

Cost of 7.5 meter pipe $= 18.75 \times 7.5$

$= \frac{1875}{100} \times \frac{75}{10} = \frac{140625}{1000}$

= ₹140.625

9. Cost of 1 kg mangoes = ₹64.50

Cost of 10.5 kg mangoes $= 64.50 \times 10.5$

$= \frac{645}{10} \times \frac{105}{10} = \frac{67725}{100}$

= ₹677.25

10. Distance covered in 1 l petrol = 195 km

Distance covert 20 l petrol $= 19.5 \times 200$

$= \frac{195}{10} \times 20 = 195 \times 2 = 390 \text{ km}$

Exercise 3.3

1. Find

(a) $8.7 \div 10 = \frac{87}{10} \div 10 = \frac{87}{100} = 0.87$

(b) $14.6 \div 100 = \frac{14.6}{100} = \frac{146}{1000} = 0.146$

(c) $480 \div 100 = \frac{480}{100} = 4.8$

(d) $77.42 \div 1000 = \frac{77.42}{1000} = 0.07742$

(e) $7.36 \div 1000 = \frac{7.36}{1000} = 0.00736$

(f) $0.7 \div 1000 = \frac{0.7}{1000} = 0.0007$

(g) $0.082 \div 100 = \frac{82}{100} = 0.00082$

(h) $528.6 \div 1000 = \frac{528.6}{1000} = 0.5286$

(i) $0.5 \div 1000 = \frac{0.5}{1000} = 0.0005$

(j) $75.36 \div 10 = \frac{7536}{10} = \frac{7536}{1000} = 7.536$

2. Find

(a) $7.6 \div 4 = \frac{76}{40} = \frac{19}{10} = 1.9$ (b) $\frac{8.72}{2} = \frac{436}{100} = 4.36$

(c) $3.51 \div 9 = \frac{3.51}{9} = \frac{39}{100} = 0.39$

(d) $0.90 \div 15 = \frac{90}{100 \times 15} = \frac{6}{100} = 0.06$

(e) $46.2 \div 6 = \frac{432}{10 \times 6} = \frac{72}{10} = 7.2$

(f) $117.6 \div 21 = \frac{1176}{10 \times 21} = \frac{168}{10 \times 3} = \frac{56}{10} = 5.6$

(g) $5.480 \div 8 = \frac{5480}{1000 \times 8} = \frac{685}{100} = 0.685$

(h) $8.28 \div 9 = \frac{828}{100 \times 9} = \frac{92}{100} = 0.92$

(i) $\frac{3.468}{24} = \frac{3468}{24 \times 1000} = \frac{578}{4 \times 1000} = \frac{289}{2 \times 1000}$

$= \frac{144.5}{1000} = 0.1445$

(j) $16.30 \div 5 = \frac{1630}{5 \times 100} = \frac{326}{100} = 3.26$

3. Find

(a) $84 \div 12 = \frac{84}{12} \times 10 = 7 \times 10 = 70$

(b) $1.54 \times 1.1 = \frac{154}{100 \times 11} = 1.40$

(c) $0.196 \div 0.14 = \frac{196}{1000} \times \frac{100}{14} = \frac{14}{10} = 1.4$

(d) $26.4 \div 2.4 = \frac{264}{10} \times \frac{10}{24} = 11$

(e) $1.62 \div 0.009 = \frac{162}{100} \times \frac{1000}{9} = 180$

(f) $0.0015 \div 0.03 = \frac{15}{10000} \times \frac{100}{3} = \frac{5}{100} = 0.05$

(g) $4.03 \div 1.3 = \frac{403}{100} \times \frac{10}{13} = \frac{31}{10} = 3.1$

(h) $6.82 \div 0.22 = \frac{6.82}{100} \times \frac{100}{22} = 31$

(i) $0.5 \div 0.25 = \frac{5}{10} \times \frac{100}{25} = \frac{20}{10} = 2$

(j) $10.20 \div 20 = \frac{1020}{100} \times \frac{1}{20} = \frac{51}{100} = 0.51$

4. Distance couered in 1.1*l* by the vechice = 16.5 km

distance coured in 1 $l = \frac{16.5}{1.1} = \frac{165}{10 \times 11} \times 10 = 15$ km

5. Cost of 25 books = ₹ 4389.50

$$\text{Cost of 1 book} = \frac{43850}{100 \times 25} = \frac{1754}{100} = ₹17.54$$

6. Weight of potato carrying pack = 784 kg 320g

$$= 784 + \frac{320}{1000} \text{ kg}$$
$$= 784 + 0.321 \text{ kg}$$
$$= 784.32 \text{ kg}$$

Weight of each carrying pack after dividing it equally

$= \frac{78432}{100 \times 12}$ kg in 12 bags

$= \frac{6536}{100} = 65.36$ kg each

7. Let the second number be x product of number = 5.3508

$$x \times 1.96 = 53508$$
$$x = \frac{53508}{10000} \times \frac{100}{196}$$
$$= \frac{3822}{10000} \times \frac{100}{14} = \frac{273}{100} = 2.73$$

8. Each side of polygon = 8.1

Perimeter of polyon = 72.9

W.K.T.

Perimeter = sum of all sides on the each side of polygon are equal

So, $x \times 8.1 = 72.9$

$$x = \frac{729}{10} \times \frac{10}{81}$$
$$x = 9$$

Here, x = number of sides of polygon

MCQ

1. (a) 0.521×100

$= \frac{521}{1000} \times 100 = \frac{521}{10} = 5.21$ (a)

2. Value of 1.1×0.1

$= \frac{11}{10} \times \frac{1}{10} = \frac{11}{100} = 0.11$ (b)

3. 700 m when express in km

$= \frac{700}{1000}$ km = 0.7 km (c)

4. 3 kg 50 g in kg

$3\frac{50}{1000} = 3 + 0.050 = 3.050$ kg (c)

5. $3.6 \times 5 \times 2 = \frac{36}{10} \times 10 = 36$ (c)

6. $0.64 \div 4 = \frac{0.64}{4} = 0.16$

7. $₹0.08 = \frac{8 \leftarrow \text{eight out of 100 paisa}}{100 \leftarrow \text{paise}}$ So, (b)

8. $0.2 \times 0.3 \times 0.4 = \frac{2 \times 3 \times 4}{1000} = 0.024$ (d)

4 Rational Number

1. (a) $-2 = \frac{-2}{1}$ (b) $3 = \frac{3}{1}$ (c) $0.10 = \frac{10}{100} = \frac{1}{10}$

(d) $-6 = \frac{-6}{1}$ (e) $0.25 = \frac{25}{100} = \frac{1}{4}$

(f) $-12 = \frac{-12}{1}$

2. Write each with positive denominator

(a) $\frac{-2}{7} = \frac{-2}{+7}$ (b) $\frac{-3}{-8} = \frac{-3 \times (-1)}{-8 \times (-1)} = \frac{3}{8}$

(c) $\frac{-4}{-1} = \frac{-4}{-1} \times \frac{(-1)}{(-1)} = \frac{4}{1}$ (d) $\frac{5}{-7} = \frac{5}{-7} \times \frac{(-1)}{(-1)} = \frac{-5}{7}$

(e) $\frac{-3}{4} = \frac{-3}{4}$ (f) $\frac{-5}{6} = \frac{-5}{6}$

3. Which of the following are positive rational number?

(a) $\frac{2}{-5}$ = Negative fraction

(b) $\frac{-3}{-8} = \frac{-3}{8}$ =Positive fraction

(c) $\frac{-1}{-5}=\frac{1}{5}=$ Positive fraction

(d) $\frac{-3}{7}=$ Negative fraction

(e) $\frac{-1}{-3}=\frac{1}{3}=$ Positive fraction

(f) $\frac{3}{8}=$ Positive fraction

So, (b), (c), (e) & (f) are positive fraction.

4. Fill in the boxes

(a) $\frac{2}{-3}=\frac{\boxed{x}}{-12}=\frac{-10}{\boxed{y}}$

Let the first $\square$ be x Let the second $\square$ be y

Now,

$\frac{2}{-3}=\frac{x}{-12}$ $\frac{8}{-12}=\frac{-10}{y}$

$\frac{-24}{-3}=x$ $y=\frac{-10\times-12}{8}$

$8=x$ $=\frac{120}{8}=15$

(b) $\frac{-28}{32}=\frac{7}{\square}=\frac{56}{\square}$

Let the first $\square$ be x Let the second $\square$ be y

$\frac{-28}{32}=\frac{7}{x}$ $\frac{7}{-8}=\frac{56}{y}$

$x=\frac{7}{-28}\times32$ $y=\frac{56}{7}\times8$

$x=-8$ $y=-64$

(c) $\frac{-1}{-5}=\frac{20}{\square}=\frac{\square}{-50}$

Let it be $\square$ x Let it be $\square$ y

Now,

$\frac{-1}{-5}=\frac{20}{x}$ $\frac{20}{100}=\frac{y}{-50}$

$x=\frac{20}{1}\times5$ $\frac{-50\times20}{100}=y$

$x=100$ $-10=y$

5. Write three equivalent rational number of each

(a) $\frac{1}{7}$

Multiply numerator & denominator by same number in order to get equivalent fractions.

$\frac{1}{7}\times\frac{2}{2}=\frac{2}{17},\frac{1\times3}{7\times3}=\frac{3}{21},\frac{7\times4}{7\times4}=\frac{4}{28}$

$\frac{2}{14},\frac{3}{21},\frac{4}{28}$

(b) $\frac{-2}{3}$

$\frac{-2\times2}{3\times2}=\frac{-4}{6}$, $\frac{-2\times3}{3\times3}=\frac{-6}{9},\frac{-2\times4}{3\times4}=\frac{-8}{12}$

$\frac{-4}{6},\frac{-6}{9}$ and $\frac{-8}{12}$

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

Now,

$\frac{1\times2}{2\times2}=\frac{2}{4},\frac{1\times3}{2\times3}=\frac{3}{6},\frac{1\times4}{2\times4}=\frac{4}{8}$

$\frac{2}{4},\frac{3}{6}$ and $\frac{4}{8}$

6. Express in Standard form

(a) $\frac{64}{-80}=\frac{32}{-40}=\frac{16}{-20}=\frac{-4}{5}$

(b) $\frac{-72}{-324}=\frac{-18}{-81}=\frac{6}{27}=\frac{2}{9}$ (c) $\frac{100}{-700}=\frac{10}{-70}=\frac{1}{-7}$

7. Express $\frac{-2}{-5}$

(a) With numerator 20

In order to make numerator 20 we have to multiply its numerator & denominator by -10

$\frac{-2}{-5}\times\frac{-10}{-10}=\frac{20}{50}$

(b) With numerator -36

$\frac{-2}{-5}=\frac{-2\times18}{-5\times18}=\frac{-36}{-50}$

(c) With numerator 2

$\frac{-2}{-5}\times\frac{(-1)}{(-1)}=\frac{2}{5}$

8. Express $\frac{-6}{-24}$ as

(a) Standard form

$\frac{-16}{-24}=\frac{8}{12}=\frac{4}{3}$

(b) Denominator $=30$

$\frac{-16}{-24}\times\frac{4}{6}=\frac{2}{3}$

Now, $\frac{2\times10}{3\times10}=\frac{20}{30}$

(c) Numerator $=(-40)$

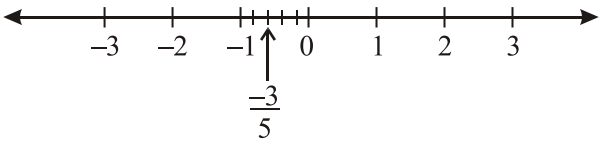
$\frac{-16}{-24}=\frac{4}{6}=\frac{2}{3}$, Now for numerator -40

$\frac{2}{3}\times\frac{(-20)}{(-20)}=\frac{-40}{-60}$

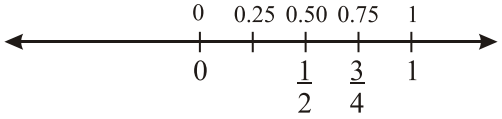
Exercise 4.2

1. Represent $\frac{9}{-15}$ on number line

$\frac{9}{-15}=\frac{3}{-5}$



2. $\frac{1}{2}=0.50$ $\frac{3}{4}=0.75$



3. (a) $\frac{1}{2} > \frac{1}{3}$

as $\frac{1}{2}=0.50$ and $\frac{1}{3}=0.6\overline{7}$

(b) $\frac{3}{7} < \frac{5}{9}$

$\frac{3\times9}{7\times9}=\frac{27}{63}, \frac{5\times7}{9\times7}=\frac{35}{63}$ so $\frac{5}{9}$ is greater

(c) $\frac{14}{9} < \frac{7}{3}$

$\frac{14\times3}{9\times3}=\frac{42}{27}, \frac{7\times9}{3\times9}=\frac{63}{27}$ is greater

(d) $\frac{5}{6} > \frac{3}{5}$ $\frac{25}{30}>\frac{18}{30}$ is greater

(e) $\frac{3}{-7} < \frac{-2}{5}$ $\frac{15}{-35}<\frac{-14}{35}$ is greater

(f) $\frac{-1}{4} < \frac{-1}{5}$ $\frac{-5}{20}<\frac{-4}{20}$ is greater

(g) $\frac{-5}{9} < \frac{-6}{11}$ $\frac{-55}{99}<\frac{-54}{99}$ is greater

(h) $\frac{-2}{4} < \frac{4}{7}$ Clearly $\frac{4}{7}$ is a positive fraction.]

(i) $\frac{-5}{7} > \frac{-6}{8}$ $\frac{-40}{56} > \frac{-42}{56}$ is greater

(j) $\frac{-3}{8} < \frac{4}{5}$ Clearly $\frac{4}{5}$ is a +ive fraction

(k) $\frac{-4}{7} > \frac{-5}{8}$ $\frac{-32}{56}>\frac{-35}{56}$ is greater

(l) $\frac{-3}{9} < \frac{4}{7}$ Clearly $\frac{4}{7}$ is a positive fraction.

4. (a) $\frac{-3}{5}$ and $\frac{-2}{3}$

$\frac{-3\times3}{5\times3}=\frac{-9}{15}$ $\frac{-2\times5}{3\times5}=\frac{-10}{15}$

Clearly $\frac{-9}{15}$ *i.e.*, $\frac{-3}{5}$ is greater.

(b) $\frac{7}{-3}$ and -2

$\frac{7}{-3}$, $\frac{-2\times(-3)}{1\times(-3)}=\frac{6}{-3}$

Clearly $\frac{6}{-3}$ *i.e.*, -2 is greater

5. Which of the two is smaller?

(a) -3 and $\frac{-1}{2}$ -3 $\frac{-1}{2}=-0.5$

Clearly -3 is smaller.

(b) $\frac{-4}{5}$ and $\frac{5}{-6}$

$\frac{-4}{5}=\frac{-24}{30}$, $\frac{5}{-6}=\frac{25}{-30}$

Clearly $\frac{-25}{30}$ is smaller.

6. Arrange in ascending order

(a) $\frac{1}{3}, 1, -2, \frac{7}{3}$

$\frac{1}{3}\times\frac{-1}{-1}=\frac{-1}{-3}=\frac{-1}{3}, \frac{-2\times(-3)}{(-3)}=\frac{6}{-3}, \frac{7}{-3}$

$\frac{7}{-3}<-2<\frac{1}{3}$

(b) $\frac{-2}{7}, \frac{3}{-5}, \frac{2}{3}$

$\frac{2}{3}$ is largest as it is the only positive fraction

Now we have to check for $\frac{-2}{7}$ and $\frac{3}{-5}$

$\frac{-2}{7}=\frac{-10}{35}$, $\frac{3\times7}{-5\times7}=\frac{21}{-35}$

$\frac{3}{-5}<\frac{-2}{7}<\frac{2}{3}$

(c) $0, \frac{-4}{5}, 4$ $\frac{-4}{5}<0<4$

(d) $\frac{-5}{8}, \frac{-1}{2}, \frac{-1}{3}$

$\frac{-5\times3}{8\times3}=\frac{-15}{24}, \frac{-1\times12}{2\times12}=\frac{-12}{24}, \frac{1\times8}{3\times8}=\frac{-8}{24}$

$\frac{-5}{8}<\frac{-1}{2}<\frac{-1}{3}$

7. Arrange the following in descending order

(a) $\frac{1}{-2}, -3, 1$

$\frac{1}{2}, \frac{-3\times(-2)}{\times-2}, \frac{1}{-2}, \frac{-6}{2}$

$1>\frac{1}{-2}>-3$

(b) $0, -\frac{5}{9}, 6$

$6>0>\frac{-5}{9}$ as it is the only negative fractions.

(c) $\frac{9}{-13}, \frac{9}{-12}, \frac{9}{4}$

$\frac{9}{4} > \frac{9}{-13} > \frac{9}{-12}$ $\quad \frac{-9\times12}{13\times12}, \frac{-9\times13}{12\times13}$

$\frac{-108}{156} > \frac{-117}{156}$

(d) $\frac{-3}{5}, \frac{5}{6}, \frac{1}{2}$

$\frac{1}{2} > \frac{-3}{5} > \frac{5}{-6}$ $\quad \frac{-18}{30} > \frac{25}{-30}$

8. $\frac{3}{7}$ and $\frac{4}{7}$

$\frac{3}{7}\times\frac{11}{11}$ $\qquad \frac{4\times11}{7\times11}$

$\frac{33}{77}$ $\qquad \frac{44}{77}$

Ten rational numbers between $\frac{33}{77}, \frac{44}{77}$ are

$\frac{34}{77}, \frac{35}{77}, \frac{36}{77}, \frac{38}{77}, \frac{39}{77}, \frac{40}{77}, \frac{41}{77}, \frac{42}{77}, \frac{43}{77}$

9. Find the five rational numbers between -3 & -4

$-3\times\frac{6}{6}$ $\qquad -4\times\frac{6}{6}$

$\frac{-18}{6}$ $\qquad \frac{-24}{6}$

Rational number between them are

$\frac{-19}{6}, \frac{-20}{6}, \frac{-21}{6}, \frac{-22}{6}, \frac{-23}{6}$

Exercise 4.3

1. (a) $\frac{6}{7}+\left(\frac{-3}{5}\right) = \square + \frac{6}{7}$

$\frac{6}{7}-\frac{3}{5}-\frac{6}{7} = \square$ $\quad \frac{-3}{5} = \square$

(b) $\frac{-2}{5}+0 = \square$ $\quad = \frac{-2}{5}$

(c) $\frac{3}{5}+\frac{2}{3}+\left(\frac{-4}{7}\right) = \square + \frac{2}{3}+\frac{3}{5}$

$\frac{3}{5}+\frac{2}{3}-\frac{4}{7}-\frac{2}{3}-\frac{3}{5} = \square$ $\quad \frac{-4}{7} = \square$

(d) $\frac{4}{9}+\frac{2}{13}+\frac{8}{11}+\square = \frac{2}{13}+\frac{4}{9}+\frac{8}{11}$

$\square = \frac{2}{13}+\frac{4}{9}+\frac{8}{11}-\frac{4}{9}-\frac{2}{13}-\frac{8}{11}$

$\square = 0$

2. (a) $-3\,|-3| = 3$ $\qquad$ (b) $\frac{4}{-5} = \left|\frac{-4}{5}\right| = \frac{4}{5}$

(c) $\frac{7}{9} = \left|\frac{7}{9}\right| = \frac{7}{9}$ $\qquad$ (d) $\frac{-1}{2} = \left|\frac{-1}{2}\right| = \frac{1}{2}$

(e) $1 = |1| = 1$ $\qquad$ (f) $-1 = |-1| = 1$

(g) $\frac{-11}{-12} = \left|\frac{-11}{-12}\right| = \frac{11}{12}$

3. (a) $\frac{-2}{5}$ and $\frac{7}{3}$

$\frac{-2}{5}+\frac{7}{3} = \frac{-6+35}{15} = \frac{29}{15}$

(b) $\frac{1}{3}$ and $\frac{2}{-5}$

$\frac{1}{3}-\frac{2}{5} = \frac{5-6}{15} = \frac{-1}{15}$

(c) $\frac{-2}{-9}$ and 1

$\frac{-2}{-9}+1 = \frac{2}{9}+1 = \frac{11}{9}$

(d) $\frac{-11}{15}$ and $\frac{9}{-5}$

$\frac{-11}{15}-\frac{9}{5} = \frac{-11-27}{15} = -\frac{38}{15}$

4. (a) $\frac{3}{5}$ from $\frac{-3}{5}$

$= \left(\frac{-3}{5}\right)-\left(+\frac{3}{5}\right) = -\frac{3}{5}-\frac{3}{5} = \frac{-6}{5}$

(b) $\frac{-11}{15}$ from 2

$2-\left(-\frac{11}{15}\right) = 2+\frac{11}{15} = \frac{41}{15}$

(c) $\frac{4}{11}$ from $\frac{-1}{2}$

$\frac{-1}{2}-\frac{4}{11} = \frac{-11-8}{22} = \frac{-19}{22}$

(d) 6 from $\frac{-1}{3}$

$\frac{-1}{3}-6 = \frac{-19}{3}$

5. (a) $\frac{-1}{3}+\frac{1}{2}+\frac{1}{5} = \frac{-10+15+6}{30} = \frac{11}{30}$

(b) $\frac{2}{3}-\frac{3}{4}-\frac{1}{2} = \frac{8-9-6}{12} = \frac{-7}{12}$

(c) $\frac{1}{5}+\frac{1}{6}-\frac{3}{10} = \frac{6+5-9}{30} = \frac{2}{30} = \frac{1}{15}$

(d) $\frac{3}{8}-\frac{4}{9}-\frac{5}{12} = \frac{27-32-30}{72} = \frac{-35}{72}$

6. $\frac{-2}{7}+x = \frac{1}{5}$

$x = \frac{1}{5}+\frac{2}{7} = \frac{7+10}{35} = \frac{17}{35}$

7. $\frac{3}{7}-x = \frac{1}{3}$

$-x=\frac{1}{3}-\frac{3}{7}=\frac{7-9}{31}=\frac{-2}{21}, x=\frac{2}{21}$

8. (a) $\frac{3}{5}-\frac{2}{3}+\frac{1}{2}=\frac{1}{2}+\frac{3}{5}-\frac{2}{3}$

$\frac{3}{5}-\frac{2}{3}+\frac{1}{2}-\frac{1}{2}-\frac{3}{5}+\frac{2}{3}=0$ $\quad 0=0$ verify

(b) $\frac{3}{4}-\frac{2}{3}+\frac{1}{2}=\frac{1}{2}-\frac{2}{3}+\frac{3}{4}$

$\frac{3}{4}-\frac{2}{3}+\frac{1}{2}-\frac{1}{2}+\frac{2}{3}-\frac{3}{4}=0$ $\quad 0=0$ verified

9. (a) $\left|\frac{1}{2}-\frac{2}{3}\right|=\left|\frac{3-4}{6}\right|=\frac{1}{6}$

(b) $\frac{2}{5}\times\left|\frac{-1}{5}+\frac{1}{4}\right|=2\times\left|\frac{-4+5}{20}\right|=\frac{2}{5}\times\frac{1}{20}=\frac{1}{10}$

(c) $\left(-\frac{1}{4}\right)\times\left(-\frac{1}{4}\right)=\frac{-1}{16}$

(d) $\left|\frac{3}{5}+\frac{1}{2}\right|-2=\left|\frac{6+5}{10}\right|-2$

$=\frac{11}{10}-2=\frac{-9}{10}$

(e) $\left|\left(\frac{-7}{9}\right)+\frac{7}{9}\right|=\left|\frac{-7}{9}+\frac{7}{9}\right|=0$

(f) $-\left|\frac{1}{2}-\frac{3}{4}\right|=-\left|\frac{2-3}{4}\right|=-\frac{1}{4}$

10. $m=\frac{5}{6}$ and $n=\frac{3}{4}$

$|m+n|=|m|+|n|$

$\left|\frac{5}{6}+\frac{3}{4}\right|=\left|\frac{5}{6}\right|+\left|\frac{3}{4}\right|=\left|\frac{10+9}{12}\right|=\frac{109}{12}=\frac{19}{12}$

{$\because$ L.H.S. = R.H.S.}

Exercise 4.4

1. Fill in the blanks

(a) $\frac{-5}{7}\times\square=1$ $\quad\square=1\times\frac{7}{-5}=\frac{7}{-5}$

(b) $\frac{7}{-9}\times\square=0$ $\quad\square=0\times\frac{-9}{7}=0$

(c) $\square\times\frac{2}{-3}=1$ $\quad\square=\frac{-3}{2}$

(d) $\frac{-2}{3}\times\frac{4}{5}=\frac{4}{5}\times\frac{2}{\square}$

$\frac{-8}{15}=\frac{8}{5\square}$ $\quad\square$ $\quad\frac{8\times15}{5\times-8}=-1$

(e) $-1\times\square=1$ $\quad\square=\frac{1}{-1}=-1$

(f) $\frac{-3}{-5}\times\frac{-5}{-3}=\square$ $\quad 1=\square$

(g) $\frac{-3}{4}\times\left(\frac{-1}{2}+1\right)=\frac{-3}{4}\times\square+1\times\square$

$\frac{-3}{4}\times\left(\frac{1}{2}\right)=-\frac{3}{4}\times\square+1\times\square$

$\frac{-3}{8}=\left(\frac{-3}{4}+1\right)\square$ $\quad\frac{-3}{8}=\left(\frac{1}{4}\right)\square$

$\frac{-3}{4}\times4=\square$ $\quad\frac{-3}{2}=\square$

(h) $\frac{1}{3}\times\left(\frac{5}{6}-\frac{2}{3}\right)=\frac{1}{3}\times\frac{5}{6}+\frac{1}{3}\times\frac{\square}{3}$

$\frac{1}{3}\times\frac{5-4}{6}=\frac{5}{18}+\frac{\square}{9}$

$\frac{1}{18}-\frac{5}{18}=\frac{\square}{9}$ $\quad\frac{-4}{18}\times9=\square$ $\quad-2=\square$

2. Write the reciprocal of

(a) $\frac{-3}{2}=1\div\frac{-3}{2}=\frac{2}{-3}$ (b) $\frac{-5}{-3}=1\div\frac{5}{3}=\frac{3}{5}$

(c) $\frac{1}{6}=1\div\frac{1}{6}=6$ (d) $-1=1\div(-1)=-1$

(e) $0=1\div0=\frac{1}{0}=\infty$ (f) $4=1\div4=\frac{1}{4}$

(g) $\frac{1}{-4}=1\div\frac{1}{-4}=-4$ (h) $\frac{-2}{5}=1\div\left(\frac{-2}{5}\right)=\frac{-5}{2}$

(i) $\frac{13}{-15}=1\div\frac{13}{-15}=\frac{-15}{13}$

(j) $1=1\div1=1$ (k) $\frac{15}{17}=1\div\frac{15}{17}=\frac{17}{15}$

(l) $9=1\div9=\frac{1}{9}$

3. Multiply

(a) $\frac{1}{3}\times\frac{-3}{5}\times\frac{2}{3}=\frac{-1}{5}\times\frac{2}{3}=\frac{-2}{15}$

(b) $\frac{3}{5}\times\frac{-4}{7}\times\frac{1}{-2}=\frac{-12}{35}\times\frac{1}{-2}=\frac{6}{35}$

(c) $\frac{3}{5}\times\frac{1}{4}\times\frac{2}{-7}=\frac{6}{-140}=\frac{-3}{70}$

4. Simplify

(a) $\frac{1}{3}\times\left(\frac{11}{12}-\frac{1}{6}\right)=\frac{1}{3}\times\left(\frac{11-2}{12}\right)=\frac{1}{3}\times\frac{9}{12}=\frac{1}{4}$

(b) $\frac{1}{5}\times\left(\frac{3}{4}+\frac{1}{2}\right)=\frac{1}{5}\times\left(\frac{3+2}{4}\right)=\frac{1}{4}$

(c) $\frac{3}{5}\times\left(\frac{1}{2}-\frac{2}{3}+\frac{1}{5}\right)=\frac{3}{5}\times\left(\frac{15-20+6}{30}\right)$

$=\frac{3}{5}\times\frac{1}{30}=\frac{1}{50}$

5. Verify that :

(a) LHS. $=\frac{2}{5}\times\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{4}\right)$

$$\text{RHS} = \frac{2}{5}\times\frac{1}{2}-\frac{2}{5}\times\frac{1}{3}-\frac{2}{5}\times\frac{1}{4}$$

$$\text{LHS} = \frac{2}{5}\times\left(\frac{6-4-3}{12}\right)=\frac{2}{5}\times\frac{-1}{12}=\frac{-1}{30}$$

$$\text{RHS} = \frac{2}{5}\times\frac{1}{2}-\frac{2}{5}\times\frac{1}{3}-\frac{2}{5}\times\frac{1}{4}$$

Acc to BODMAS

$$=\frac{1}{5}-\frac{2}{15}-\frac{1}{10}=\frac{6-4-3}{30}=\frac{-1}{30}$$

Hence LHS = RHS

(b) $\frac{3}{5}\times\left(\frac{7}{8}+\frac{1}{4}\right)=\frac{3}{5}\times\frac{7}{8}+\frac{3}{5}\times\frac{1}{4}$

$$\text{LHS} = \frac{3}{5}\times\left(\frac{7}{8}+\frac{1}{4}\right)=\frac{3}{5}\times\frac{7+2}{8}=\frac{27}{40}$$

$$\text{RHS} = \frac{3}{5}\times\frac{7}{8}+\frac{3}{5}\times\frac{1}{4}=\frac{21}{40}+\frac{3}{20}=\frac{21+6}{40}=\frac{27}{40}$$

Hence LHS = RHS

6. (a) $\frac{3}{5}\times\left(\frac{-2}{3}\times\frac{1}{4}\right)=\left(\frac{3}{5}\times\frac{1}{4}\right)\times\frac{-2}{3}$

$$\text{LHS} = \frac{3}{5}\times\frac{-1}{60}=\frac{-1}{10}$$

$$\text{RHS} = \frac{3}{20}\times-\frac{2}{3}=\frac{-1}{10}$$

LHS = RHS

(b) $\left(\frac{1}{3}\times\frac{-1}{2}\right)\times\frac{5}{6}=\left(\frac{5}{6}\times\frac{1}{3}\right)\times\frac{-1}{2}$

$$\text{LHS} = \frac{-1}{6}\times\frac{5}{6}=\frac{-5}{36}$$

$$\text{RHS} = \frac{5}{18}\times\frac{-1}{2}=\frac{-5}{36}$$

Hence LHS = RHS

(c) $\left(\frac{2}{5}\times\frac{1}{-3}\right)\times\left(\frac{1}{4}\times\frac{5}{6}\right)=\left(\frac{1}{-3}\times\frac{5}{6}\right)\times\left(\frac{2}{5}\times\frac{1}{4}\right)$

$$\text{LHS} = \left(\frac{2}{-15}\right)\left(\frac{5}{24}\right)=\frac{-1}{3\times12}=\frac{-1}{36}$$

$$\text{RHS} = \left(\frac{5}{-18}\right)\times\left(\frac{2}{20}\right)=\frac{1}{-18\times2}=\frac{1}{-36}$$

So, LHS = RHS

(d) $\left(\frac{12}{13}\times\frac{1}{-5}\right)\times\frac{1}{2}=\frac{12}{13}\times\left(\frac{1}{-5}\times\frac{1}{2}\right)$

$$\text{LHS} = \frac{12}{-65}\times\frac{1}{2}=-\frac{6}{65}$$

$$\text{RHS} = \frac{12}{13}\times\frac{1}{-10}=\frac{-6}{65}$$

Hence LHS = RHS

7. If $a=2, b=-3, c=1$ & $d=5$

Fid the value of

(a) $a\times\left(\frac{b}{c}-\frac{c}{d}\right)$

$$=2\times\left(\frac{-3}{1}-\frac{1}{5}\right)=2\times\left(\frac{-15-1}{5}\right)$$

$$=2\times\frac{-16}{5}=\frac{-32}{5}$$

(b) $\frac{a}{b}\times\frac{c}{d}=\frac{2}{-3}\times\frac{1}{5}=\frac{2}{-15}$

(c) $a-\frac{b}{c}-\frac{a}{d}=2-\frac{(-3)}{1}-\frac{2}{5}$

$$=2+3-\frac{2}{5}=\frac{25-2}{5}=\frac{23}{5}$$

(d) $\frac{a}{b}-c=\frac{2}{-3}-1=\frac{-2-3}{3}=\frac{-5}{3}$

(e) $\frac{c}{d}\times\frac{d}{c}+\frac{b}{c}\times\frac{c}{b}$

$$=\frac{1}{5}\times\frac{5}{1}+\left(\frac{-3}{1}\right)\times\left(\frac{1}{-3}\right)=1+1=2$$

(f) $\frac{a}{c}\times\frac{c}{a}-\frac{b}{d}\times\frac{d}{b}$

$$=\frac{2}{1}\times\frac{1}{2}-\frac{(-3)}{5}\times\frac{5}{(-3)}=1-1=0$$

(g) $\frac{a}{b}\times\frac{b}{a}+\frac{c}{d}\times\frac{d}{c}$

$$=\frac{2}{-3}\times\left(\frac{-3}{2}\right)+\frac{1}{5}\times\frac{5}{1}=1+1=2$$

(h) $\frac{a}{b}\times\frac{b}{c}\times\frac{c}{d}\times\frac{d}{a}$

$$=\frac{2}{-3}\times\left(\frac{-3}{1}\right)\times\frac{1}{5}\times\frac{5}{2}=\frac{6}{3}\times\frac{5}{10}=\frac{30}{30}=1$$

8. Let the number be x

$$\frac{-15}{28}\times x=\frac{-5}{7}$$

$$x=\frac{-5}{7}\times\frac{28}{-17}=1\times\frac{4}{3}=\frac{4}{3}$$

Exercise 4.5

1. (a) $\frac{-15}{17}\div1=\square$ $\frac{-17}{17}=\square$

(b) $-1\div\square=\frac{3}{4}$ $\frac{-4}{3}=\square$

(c) $\frac{5}{6}\div\square=1$ $\square=\frac{5}{6}$

(d) $\square\div\frac{7}{9}=0$ $\square=\frac{0\times7}{9}=0$

(e) $\frac{3}{5}\times\square=-1$ $\square=\frac{-1\times5}{3}=\frac{-5}{3}$

(f) $\frac{4}{5}\times\square=0$ $\square=\frac{0\times5}{4}=0$

2. Divide the following

(a) $\frac{1}{2} \div \frac{-3}{4} = \frac{1}{2} \times \frac{4}{-3} = \frac{2}{-3}$

(b) $\frac{-5}{13} \div \frac{3}{13} = \frac{-5}{13} \times \frac{13}{3} = \frac{-5}{3}$

(c) $\frac{25}{-30} \div \frac{-5}{6} = \frac{25}{-30} \times \frac{6}{-5} = \frac{5}{5} = 1$

(d) $-15 \div \frac{1}{-3} = -15 \times -3 = 45$

(e) $10 \div \frac{-1}{2} = 10 \times -2 = -20$

(f) $35 \div \left(\frac{-7}{8}\right) = 35 \times \frac{8}{-7} - 40$

3. Let the number be x

$\frac{7}{-9} \div x = -3$

$\frac{7}{-9} \times \frac{1}{x} = -3 \qquad \frac{7}{27} = x$

4. Let the no. be x

$\frac{3}{5} \times x = \frac{5}{6} \qquad x = \frac{5}{6} \times \frac{5}{3} = \frac{25}{18}$

5. Let the other rational no be x

$-5 = \frac{-3}{4} \times x$

$x = \frac{-4}{3} \times -5 = \frac{+20}{3} = \frac{20}{3}$

6. Let the number be x

$x = \frac{99}{100} = 1 \qquad x \times \frac{100}{99} = 1 \quad x = \frac{99}{100}$

7. $m \times \frac{4}{5} = \frac{7}{8} \qquad m = \frac{7}{8} \times \frac{5}{4} = \frac{35}{32}$

8. Let the other no be x

$x \times \frac{11}{13} = -1$

$x = \frac{-1 \times 13}{11} = \frac{-13}{11}$

9. $\frac{15}{20} \div x = \frac{3}{2}$

$\frac{15}{20} \times \frac{1}{x} = \frac{3}{2} \qquad \frac{15}{20} \times \frac{2}{3} = x$

$\frac{5}{10} = x \qquad \frac{1}{2} = x$

Exercise 4.6

1. (a) False ex $-1.5 = \frac{15}{10}$ so it can be written.

(b) $\frac{4}{15} = \frac{4}{5 \times 3}$ because of having 3 as a factor in denominator is cannot be a terminating decimal false.

(c) False

$\frac{5}{9} = \frac{5}{3^2}$ it is has termination

While $\frac{9}{8} = \frac{9}{2^3}$ it is terminating decimal expansion

(d) True

Ex $\frac{1}{3} = 0.33333... = 0.\overline{3} \qquad \frac{1}{2} = 05$

2. (a) $0.28 = \frac{28}{100} = \frac{7}{25}$ (b) $0.67 = \frac{64}{100} = \frac{16}{25}$

(c) $1.25 = \frac{125}{100} = \frac{25}{20} = \frac{5}{4}$

(d) $0.15 = \frac{15}{1000} = \frac{3}{200}$

(e) $0.152 = \frac{152}{1000} = \frac{76}{500} = \frac{38}{250} = \frac{19}{125}$

(f) $3.175 = \frac{3175}{1000} = \frac{635}{200} = \frac{127}{40}$

3. (a) $\frac{1}{13} = 0.\overline{076923}$

$$\begin{array}{r} 0.076 \\ 13\overline{)\,100\,(} \\ \underline{91} \\ 90 \\ \underline{78} \\ 12 \end{array}$$

(b) $\frac{1}{11} = 0.090909 = 0.\overline{09}$

$$\begin{array}{r} 0.0909 \\ 11\overline{)\,100\,(} \\ \underline{99} \\ 100 \\ \underline{99} \\ 1 \end{array}$$

(c) $\frac{2}{9} = 0.\overline{2}$

$$\begin{array}{r} 0.22 \\ 9\overline{)\,20\,(} \\ \underline{18} \\ 20 \\ \underline{18} \end{array}$$

(d) $\frac{3}{5} = 0.6$

$$\begin{array}{r} 0.6 \\ 5\overline{)\,30\,(} \\ \underline{30} \\ \times \end{array}$$

(e) $\frac{6}{7} = 0.\overline{857142}$

$$
\begin{array}{r|l}
7 & 0.857142 \\
\hline
 & 60 \\
 & 56 \\
\hline
 & 40 \\
 & 35 \\
\hline
 & 50 \\
 & 49 \\
\hline
 & 70 \\
 & 7 \\
\hline
 & 30 \\
 & 28 \\
\hline
 & 20 \\
 & 14 \\
\hline
 & 60
\end{array}
$$

(f) $\frac{8}{25} = 0.32$

$$
\begin{array}{r|l}
25 & 0.32 \\
\hline
 & 80 \\
 & 75 \\
\hline
 & 50 \\
 & 50 \\
\hline
 & \times
\end{array}
$$

4. (a) $\frac{-2}{3} = 0.\overline{6}$

$$
\begin{array}{r|l}
3 & 0.66 \\
\hline
 & 20 \\
 & 18 \\
\hline
 & 20 \\
 & 18 \\
\hline
 & 2
\end{array}
$$

(b) $\frac{-7}{5} = -14$

$$
\begin{array}{r|l}
5 & 1.4 \\
\hline
 & 7 \\
 & 5 \\
\hline
 & 20 \\
 & 20 \\
\hline
 & \times
\end{array}
$$

(c) $\frac{-1}{10} = -0.1$

(d) $\frac{-5}{11} = 0.4545 = -0.\overline{45}$

(e) $\frac{10}{7} = 1.\overline{428571428571}$

$= 1.\overline{428571}$

$$
\begin{array}{r|l}
7 & 1.428571 \\
\hline
 & 10 \\
 & 7 \\
\hline
 & 30 \\
 & 28 \\
\hline
 & 20 \\
 & 14 \\
\hline
 & 60 \\
 & 56 \\
\hline
 & 40 \\
 & 35 \\
\hline
 & 50 \\
 & 49 \\
\hline
 & 10 \\
 & 7 \\
\hline
 & 3
\end{array}
$$

5. Hint* terminating decimal expansion can only have 2^x & 5^x as there factors of (D^r) otherwise it will become non-terminating decimal expansion :

(a) $\frac{361}{25} - \frac{361}{5^2} \leftarrow$ No (b) $\frac{1000}{27} = \frac{1000}{3^3} \leftarrow$ yes

(c) $\frac{37}{14} = \frac{37}{2\times 7} \leftarrow$ yes (d) $\frac{116}{75} = \frac{116}{25\times 3} \leftarrow$ yes

(e) $\frac{127}{32} = \frac{127}{2^5} \leftarrow$ No (f) $\frac{961}{625} = \frac{961}{5^4} \leftarrow$ No

(g) $\frac{217}{143} = \frac{217}{11\times 13} \leftarrow$ yes

(h) $\frac{113}{90} = \frac{113}{10\times 9} \leftarrow$ yes

6. (a) $\frac{29}{30} = \frac{20}{10\times 3} \leftarrow$ No (b) $\frac{305}{108} = \frac{305}{2^4\times 3^3} \leftarrow$ No

(c) $\frac{27}{22} = \frac{27}{2\times 11} \leftarrow$ No (d) $\frac{371}{256} = \frac{371}{2^8} \leftarrow$ yes

(e) $\frac{57}{625} = \frac{57}{25^2} \leftarrow$ No (f) $\frac{613}{2000} = \frac{613}{2\times 10^3} \leftarrow$ Yes

(g) $\frac{131}{36} = \frac{131}{12\times 3} \leftarrow$ No (h) $\frac{103}{125} = \frac{103}{25\times 5} = \frac{103}{5^3} \leftarrow$ Yes

7. (a) $879.4 - (87.94 - 8.974)$

$879.4 - (78.966) = 800.434$

$= \frac{800434}{1000} = \frac{400217}{500}$

(b) $14.26 - 2.355 + 21.4$

$35.66 - 2.355 \Rightarrow 35.660 - 2.355$

$= 33.305$

$= \frac{33305}{1000} = \frac{6661}{200}$

(c) $25.32 \times 12.4 = 313.968$

$= \frac{313968}{1000} = \frac{78492}{250} = \frac{39246}{125}$

(d) $0.5 \times 0.005 \times 0.0005$

$$= \frac{125}{10^8} = \frac{125}{100\times100\times100\times100}$$
$$= \frac{1}{80000}$$

M.C.Q.

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

2. $\frac{5}{14}$ $\frac{4\times2}{7\times2}$ $\frac{5}{14}$ □— $\frac{8}{14}$

$\frac{1\times7}{2\times7}=\frac{7}{14}$ So, $\frac{1}{2}$ is the (a)

3. $\frac{3}{7}+\frac{7}{3}=\frac{9+49}{21}=\frac{58}{21}$ (d)

4. $\frac{-3}{4}\div\frac{8}{12}=\frac{-3}{4}\times\frac{12}{8}=-\frac{9}{8}$ (d)

5. Additive inverse $-\left(\frac{-3}{7}\right)=\frac{3}{7}$ (c)

6. $\frac{-5}{6}\times\frac{5}{6}=\frac{-25}{36}$ (d)

5 Exponents and Powers

Exercise

1. (a) $(11)^{13}$ base = 11 exponent = 13

(b) $(-37)^{12}$ base = –37 exponent = 12

(c) 7^{18} base = 7 exponent = 18

(d) $\left(\frac{5}{9}\right)^6$ base $=\frac{5}{9}$ exponent = 6

(e) $(789)^{-6}$ base = 789 exponent = –6

(f) $(4.28)^5$ base = 4.28 exponent = 5

(g) $\left(\frac{7}{3}\right)^7$ base $=\frac{7}{3}$ exponent = 7

(h) $(-95)^4$ base = –95 exponent = 4

2. (a) $x\times x\times x\times y\times y\times z\times z$

$=x^3\times y^3\times z^2=x^3y^3z^2$

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

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

(d) $(-4)\times(-4)\times(-4)\times(-4)\times(-4)\times(-4)=(-4)^6$

(e) $10\times10\times10\times4\times4\times4=10^3\times4^3=40^3$

(f) $25\times25\times25\times25\times25\times25\times25\times25=(25)^9$

3. (a) $\left(\frac{-1}{2}\right)^4=\frac{1}{2^4}=\frac{1}{16}$ (b) $\left(\frac{1}{3}\right)^4=\frac{1}{3^4}=\frac{1}{81}$

(c) $\left(\frac{1}{5}\right)^2=\frac{1}{5^2}=\frac{1}{25}$ (d) $\left(\frac{2}{-3}\right)^3=\frac{8}{(-3)^3}=\frac{-8}{27}$

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

(f) $\left(\frac{3}{4}\right)^{-3}=\frac{(3)^{-4}}{(4)^{-3}}=\frac{4^3}{3^2}=\frac{64}{27}$

(g) $\left(\frac{-3}{4}\right)^6=\frac{(-3)^6}{4^6}=\frac{729}{4^2\times4^2\times4^2}=\frac{729}{4096}$

(h) $\left(\frac{1}{7}\right)^3=\frac{1^3}{7\times7\times7}=\frac{1}{343}$

4. Express in exponential form

(a) $81=3\times3\times3\times3=3^4$

3	81
3	27
3	9
3	3
	1

(b) $3125=5\times5\times5\times5\times5=5^5$

5	3125
5	625
5	125
5	25
5	5
	1

(c) $343=7\times7\times7=(7)^3$

(d) $\frac{64}{729}=\frac{2\times2\times2\times2\times2\times2}{9\times9\times3\times3}=\frac{2^6}{3^6}$ or $\left(\frac{2}{3}\right)^6$

(e) $\frac{-1}{343}=\frac{-1\times-1\times-1}{7\times7\times7}=\left(\frac{-1}{7}\right)^3$

(f) $\frac{27}{-125}=\frac{3^3}{(-5)^3}=\left(\frac{-3}{5}\right)^3$

5. Simplify

(a) $(-1)^{111}\times(-1)^{65}=-1\times-1=1$

(b) $\left(\frac{2}{3}\right)^2\times\left(\frac{3}{5}\right)^2=\frac{4}{9}\times\frac{9}{25}=\frac{4}{25}$

(c) $\left(\frac{-1}{4}\right)^3\times\left(\frac{2}{-3}\right)^4=\frac{-1}{64}\times\frac{16}{81}=\frac{-1}{324}$

(d) $\left(\frac{7}{-16}\right)\times\left(\frac{4}{3}\right)^2=\frac{7}{-16}\times\frac{16}{9}=\frac{-7}{9}$

(e) $\left(\frac{-1}{2}\right)^3\times\left(\frac{-1}{3}\right)^3=\frac{-1}{8}\times\frac{-1}{27}=\frac{1}{216}$

(f) $\left(\frac{3}{5}\right)^3\times\left(\frac{3}{5}\right)^{-3}\times\left(\frac{1}{5}\right)^2=\left(\frac{3}{5}\right)^{3-3}\times\left(\frac{1}{5}\right)^2$

$=\frac{1\times1}{25}=\frac{1}{25}$

Exercise 5.2

1. (a) $10^\circ \square -10^\circ$ (b) $5^7\div5^2 \square 5^3\times5^3$

$1 \boxed{>} -1$ $5^5\boxed{<}5^6$

(c) $3^5\div3^2 \square (-3)^7\div(-3)^5$

$3^3 \boxed{>} (-3)^2$

(d) $0 \square (-1)^\circ$ $0\boxed{<}1$

2. (a) $4^2\times4^3\times4^6$

$=(4)^{2+3+6}=(4)^{11}=(2^2)^{11}=2^{22}$

(b) $a^2\times a^7\times a^8=(a)^{2+7+8}=a^{17}$

(c) $5^7\div5^3=(5)^{7-3}=5^4$

(d) $(2a)^5\times(2a)^6=(2a)^{5+6}=(2a)^{11}$

(e) $3^9\div(3^2\times3^3)=3^9\div(3^5)=(3)^{9-5}=3^4$

(f) $5^2\times r^2=(5r)^2$

6. (a) $2^x=16$ $2^x=2^4$

On comparing $x=4$

(b) $5^x=3125$ $5^x=(5)^5$

On comparing $x=5$

(c) $3^x\div3^3=91$ $(3)^{x-3}=(3)^4$

On comparing $x-3=4$ $x=7$

(d) $7^x=49^3$ $7^x=(7^2)^3$ $7^x=7^6$

On comparing $x=6$

(e) $3^4\times(-5)^4=(-15)^x$ $(-15)^4=(-15)^x$

On comparing $x=4$

(f) $4^3\div4^{-6}=4^x$

$(4)^{3-(-6)}=4^x$ $(4)^{3+6}=4^x$ $4^9=4^x$

On comparing $x=9$

4. Simplify & express in exponential form

(a) $[(3^2)^4\times(15)^3]\div5^3$ $\frac{[(9)^4\times(15)^3]}{5^3}$

$=\frac{9^4\times5^3\times3^3}{5^3}=9^4\times3^3$ $=9^4\times3^3=3^8\times3^3=3^{11}$

(b) $[(3)^2]^5\times7^{10}\times2^{10}$

$=3^{10}\times7^{10}\times2^{10}=(3\times7\times2)^{10}=(42)^{10}$

(c) $\frac{9^3\times a^7\times15^2\times80\times b^5}{3^4\times a^5\times5^3\times b^2}$

$=\frac{3^6\times a^2\times5^2\times3^2\times80\times b^3}{3^4\times5^3}$

$=3^2\times a^2\times3^2\times16\times b^3$

$=3^4\times2^4\times a^2b^3=(6)^4a^2b$

(d) $[(-3)^5\times(-3)^2]\div(-3)^7$

$\frac{(-3)^7}{(-3)^7}=1$ or $(-3)^0$

(e) $5^2\div[(-5)^0\times(-2)^0]$

$=5^2\div(-10)^0=\frac{5^2}{1}=(5)^2$

(f) $\frac{(9^3)^2\times7^4}{3^8\times21}=\frac{(3^6)\times7^4}{3^8\times7\times3}$

$=\frac{3^{12}\times7^4}{3^9\times7}=33\times7^3=(21)^3$

(g) $(x^2\times y^2)\div x^3\times y^3$

$=(x)^{2-3}\times(y)^{2-3}=x^{-1}y^{-1}=(xy)^{-1}$

(h) $[(4)^5\times(4)^2]\div(2^6\times2^4)$

$=[4^7]\div2^{10}$ $=\frac{2^{14}}{2^{10}}=(2)^4$

(i) $(-1)^{68}\times(-1)^{26}=1\times1=1=(1)^n$

where $n=0$

Exercise 5.3

1. (a) $110000000=11\times10^7=1.1\times10^8$

(b) $31200000000=312\times10^8=3.12\times10^{10}$

(c) $137000000000=137\times10^9=1.37\times10^{11}$

(d) $0.00000052=52\times10-8=5.2\times10^{-7}$

(e) $0.000325=325\times10^{-6}=3.25\times10^{-4}$

(f) $0.00000000014=14\times10^{-11}=1.4\times10^{-10}$

(g) $0.00037500=37500\times10^{-8}=3.75\times10^{-4}$

(i) $0.000093940=93940\times10^{-9}=9.394\times10^{-5}$

2. (a) $3.53\times10^7=35300000$

(b) $1.414\times10^{6}=1414\times10^{3}=1414000$

(c) $2.8\times10^{-5}=0.000028$

(d) $5.5\times10^{-8}=55\times10^{-9}=0.000000055$

(e) $1.1\times10^{-9}=11\times10^{-10}=0.0000000011$

(f) $3.05\times10^{7}=30500000$

(g) $0.0234\times10^{8}=234\times10^{4}=2340000$

(h) $2.3\times10^{-4}=0.00023$

3. Distance of moon from earth $=384400000$

$=3844\times10^{5}$ km

$=3.844\times10^{8}$ km

4. Mass of earth $=5.98\times10^{24}$ kg

$=5980000000000000000000000$ kg

5. Diameter of Sum is $=1384000000$ m

$=1384\times10^{6}$ m $=1.384\times10^{9}$ m

M.C.Q.

1. $(-1)^{25}=-1$ (c)

2. $2^{6}\div2^{6}=2^{6-6}=2^{0}=1$ (b)

3. $\left(\frac{-3}{4}\right)^{5}=\frac{-243}{4\times4\times4\times4\times4}=\frac{-243}{1024}$ (c)

4. Scientific form $=13000000=13\times10^{6}=1.3\times10^{7}$ (d)

5. $3.56\times10^{5}=356\times10^{3}=356000$ all options are wrong

6 Ratio & Proportion

Exercise 6.1

1. (a) ₹3 to 90 paise

₹3 $=300$ paise $=\frac{300}{90}=\frac{30}{9}=\frac{10}{3}$ or 10 : 3

(b) 1035 ml : 5 l 40 ml

$\frac{1035}{5000+40}=\frac{1035}{5040}$ $\qquad 1l=1000$ ml

$=\frac{207}{1008}=\frac{23}{112}=23:112$

(c) ₹12.80:320 paise

$=\frac{1200+80}{320}=\frac{1280}{320}=\frac{4}{1}=4:1$

(d) ₹3.15 :₹8.40

$=\frac{315}{840}=\frac{63}{168}=\frac{21}{56}=21:56$ or 3 : 8

2. (a) $\frac{\text{Salary}}{\text{Saving}}=\frac{12500}{2500}=\frac{5}{1}=5:1$

$\frac{\text{Saving}}{\text{Salary}}=1:5$

(b) $\frac{\text{Exp.}}{\text{Salary}}=\frac{10000}{2500}$

Exp. $=$ Inc $-$ Saving

$=12500-2500=1000$ $=\frac{4}{1}=4:1$

(c) $\frac{\text{Expenditure}}{\text{Salary}}=\frac{10000}{12500}=\frac{4}{5}=4:5$

3. No of students who like Hindi $=30-(18)=12$

(a) $\frac{\text{Studentwho like English}}{\text{Student who like Hindi}}=\frac{6}{12}=\frac{1}{2}=1:2$

(b) $\frac{\text{Student who like Maths}}{\text{Total no of student}}=\frac{12}{30}=\frac{2}{5}=2:5$

4. $\frac{\text{Price of a ball}}{\text{Price of a Shuttle cook}}=\frac{186}{12}\div\frac{9}{2}=\frac{186}{12}\times\frac{2}{9}$

$=\frac{62}{6\times39}=31:9$

12 ball $=$₹186 $\quad$ 1 ball $=\frac{186}{12}$

20 Shuttle cooks $=$₹90

1 Shuttle cook $=\frac{90}{20}=\frac{9}{2}$

5. Let the group be $5x:9x$

$5x=620$ $\qquad x=124$ student

Student in all school $=14x$

$=14\times124=1736$ Students

6. $\frac{\text{Privious salary}}{\text{New salary}}=\frac{2x}{3x}$

$2x=15000$ $\qquad x=7500$

New salary $=3x$

$=3\times7500=$₹22500

7. Total Students = 800

No. of boys $=550$

No. of girls $=800-550=250$ girls

(a) $\frac{\text{No of boys}}{\text{No of girls}}=\frac{550}{250}=\frac{11}{5}=11:5$

(b) $\frac{\text{No of girls}}{\text{No of boys}}=\frac{250}{550}=\frac{5}{11}=5:11$

(c) $\frac{\text{Total no of students}}{\text{No of girls}}=\frac{800}{250}=\frac{16}{5}=16:5$

8. For class VII A section

$$\frac{\text{Students getting A grade}}{\text{Total Students}} = \frac{6}{30} = \frac{1}{5} \text{ or } 20\%$$

For class VII B section

$$\frac{\text{Students getting A grade}}{\text{Total students}} = \frac{9}{40} \text{ or}$$

$$= \frac{9}{40} \times 100 = \frac{45}{2} = 22.5\%$$

So class VII A students has better record of A grade

9. Ratio of ages Arvind to Balvinder

$$= \frac{8}{12} = \frac{2}{3} = 2:3$$

Amount of money each getting $= 2x$ and $3x$

$$5x = 40 \qquad x = 8$$

Arvind get $= 2x = ₹16$

Balvinder get $= 3x = 3 \times 8 = ₹24$

10. Let the angles be $2x, 3x, 4x$

Sun of all interior angles of Triangle $= 180°$

$$2x + 3x + 4x = 180°$$

$$9x = 180° = x = 20°$$

Each angles $= 2x = 2 \times 20° = 40°$

$$= 3x = 3 \times 20° = 60°$$

$$= 4x = 4 \times 20° = 80°$$

11. Let the numbers be $5x$ and $7x$

Now $\qquad 5x = 100 \qquad x = 20$

So second number $= 7x$

$$= 7 \times 20 = 140$$

Exercise 6.2

1. (a) $x : 3 :: 4 : 6$

$$\frac{x}{3} = \frac{4}{6} \Rightarrow x = \frac{12}{6} = 2$$

(b) $80 : 32 :: x : 16$

$$\frac{80}{32} = \frac{x}{16} \qquad \frac{80 \times 16}{32} = x \qquad x = 40$$

(c) $33 : 132 :: x : 16$

$$\frac{33}{132} = \frac{x}{16} \qquad \frac{16}{4} = x \qquad x = 4$$

(d) $\frac{2}{5} \div x = \frac{7}{2} \div 4$

$$\frac{5}{2} \times \frac{1}{x} = \frac{7}{2} \times \frac{1}{4} \qquad \frac{5 \times 4}{7} = x$$

$$\Rightarrow \quad x = \frac{20}{7} \text{ or } 2\frac{6}{7}$$

(e) $\frac{80}{32} = \frac{40}{x}$

$$x = \frac{40 \times 32}{80} \qquad x = 16$$

(f) $\frac{0.9}{0.6} = \frac{x}{3} \qquad \frac{9}{6} \times 3 = x$

$$x = \frac{9}{2} \qquad \text{or } 4\frac{1}{2}$$

2. (a) $\frac{4}{7} + \frac{5}{9}$ No

(b) $\frac{18}{24} \quad \frac{9}{12} \quad \Rightarrow \frac{3}{4} \quad \frac{3}{4}$ yes

(c) $\frac{15}{16} \neq \frac{0.7}{0.9}$ No (d) $\frac{1.2}{2.7} \neq \frac{0.7}{0.9}$ No

(e) $\frac{12}{36} \neq \frac{18}{25}$ No

(f) $\frac{8}{12} = \frac{10}{18} \Rightarrow \frac{2}{3} = \frac{2}{3}$ yes

3. (a) Let this proportional be x

So $\qquad \frac{8}{12} = \frac{12}{x}$

$$x = \frac{12 \times 12}{8} = 6 \times 3 = 18$$

(b) $\frac{16}{20} = \frac{20}{x} \qquad \Rightarrow x = \frac{20 \times 20}{16} = 25$

(c) $\frac{3.6}{1.8} = \frac{1.8}{x} \qquad \Rightarrow x = \frac{1.8 \times 1.8}{3.6} = 0.9$

(d) $\frac{2.5}{8.5} = \frac{8.5}{x} \qquad \Rightarrow \frac{8.5 \times 8.5}{2.5} = 17 \times 1.7 = 28.9$

(e) $\frac{1}{2} \div \frac{3}{4} = \frac{3}{4} \div x$

$$\frac{1}{2} \times \frac{4}{3} = \frac{3}{4} \times \frac{1}{x} \qquad x = \frac{3}{4} \times \frac{6}{4} = \frac{9}{8}$$

(f) $2\frac{1}{4} \div 9 = 9 \div x$

$$\frac{9}{4 \times 9} = \frac{9}{x} \qquad x = 9 \times 4 = 36$$

4. (a) $\frac{30}{105} = \frac{42}{x}$

$$x = \frac{42 \times 105}{30} = 7 \times 21 = 147$$

(b) $\frac{57}{76} = \frac{108}{x}$

$$x = \frac{108 \times 76}{57} = \frac{108 \times 4}{3} = 36 \times 4 = 144$$

(c) $\frac{1}{2} \div \frac{1}{3} = \frac{1}{4} \div x$

$$\frac{1}{2} \times 3 = \frac{1}{4x} \qquad \Rightarrow \quad 4x = \frac{2}{3}$$

$$x = \frac{2}{12} = \frac{1}{6}$$

5. Hint for 3 nos a, b, c, Continue proportion should be follow

$$b^2 = ac$$

(a) $6, 9, x$

$81 = 6 \times x$ $\quad \frac{81}{6} = x$ $\quad 13.5 = \frac{27}{2} = x$

(b) 14, 21, x

$(21)^2 = 14 \times x$

$441 = 14 \times x$ $\quad \frac{441}{14} = x$ $\quad 31.5 = \frac{63}{2} = x$

(c) 12, 48, x

$48 \times 48 = 12 \times x8$

$4 \times 48 = x$ $\quad 192 = x$

6. Height of the should be in proportion

$\frac{x}{8} = \frac{3}{2}$ $\quad x = \frac{8 \times 3}{2} x = 12$ m

7. Let the boys and girls are $3x$ & $4x$

$4x = 20$ $\quad x = 5$

No. of boys $= 3x$

$= 3 \times 5 = 15$ boys

9. Distance covered in 3 hours = 180 km

Distance covered in 1 hours = 60 km

Time taken in 240 km $= \frac{240}{60} = 4$ hours

10. Let the no. of male & female teachers be $4x$ and $5x$

$5x = 40$ $\quad x = 8$

No. of male teachers $= 4x$

$= 4 \times 8 = 32$ male

Exercise 6.3

1. Cost of 20 mangoes = ₹16.80

Cost of 1 mango $= \frac{16.80}{20}$

Cost of 15 mangles $= \frac{19.80}{20} \times 15$

$= \frac{16.80}{4} \times 3 = \frac{420}{100} \times 3 = ₹12.6$

2. His earning of 30 days

$\frac{20}{500} = \frac{30}{x}$

$x = \frac{30 \times 500}{20} = 250 \times 30 = ₹750$

3. For pile of 150 sheets

$\frac{400}{60} = \frac{150}{x}$

$x = \frac{150 \times 6}{400} = \frac{3 \times 6}{8} = \frac{9}{4} = 2.25$ cm

4. For price of 50 kg it should follow the proportion

$\frac{20}{160} = \frac{50}{x}$

$x = \frac{50 \times 160}{20} = ₹400$

5. Cost of 10 chocolates = ₹60

Cost of 1 chocolates = ₹6.2

Cost of 1 dozen chocolates $= 6.2 \times 12 = ₹74.4$

6. Time taken to in on 12 clothes = 36 min

Time taken to iron 1 clothes $= \frac{36}{12} = 3$ min

Time taken for ironing 9 clothes $= 9 \times 3 = 27$ min

7. Cost of 7 tickets = ₹1050

Cost of 1 tickets = ₹150

Cost of 5 tickets = ₹150 × 5 = ₹750

8. Amount of milk 1 container can hold $= \frac{101}{4}$

Amount of milk 7 container can hold $= \frac{101}{4} \times 7 = \frac{707}{4}$

No of containers meted to hold

$252.5l = \frac{252.5}{101} \times 4 = \frac{25}{10} \times 4 = 10$ containers

9. Average rainfall in 1 week $= \frac{19.6}{4}$

Average rainfall is 1 day $= \frac{19.6}{4 \times 7}$

Average rainfall in 17 days $= \frac{19.6}{4 \times 7} \times 17$

$= \frac{196}{10 \times 4 \times 7} \times 17 = 11.9$

10. 16 boxes cover 1440 books

1 book can cover $= \frac{16}{1440}$ box

900 books can cover $= \frac{16}{1440} \times 900 = 10$ boxes

11. One packet of cereal weigh $= \frac{4500}{9}$

9 packet will weigh $= \frac{4500}{9} \times 4 = 2000$ g or 2 kg

12. Cost of 1 metre of clothe $= \frac{1028.50}{17}$

Cost of 80 metre of cloth $= \frac{1028.50}{17} \times 80$

$= \frac{6050}{100} \times 80 = \frac{121}{2} \times 80 = ₹4840$

13. Distance travel in one hour by plane $= \frac{5100}{6}$

for 4 hrs 36 minutes

i.e., $4 + \frac{36}{60} = 4 + \frac{6}{10} = \frac{4+3}{5} = \frac{23}{5}$ hr

Distance travel in 4 hr 36 minute $= \frac{5100}{60} + \frac{23}{5}$

$= 170 \times 23 = 3910$ km

14. Sheets printed in 1 minute $= \frac{150}{3} = 50$ sheets

(a) Time taken to print 3000 sheets

$$= \frac{3000}{50} = 60 \text{ minute}$$

(b) Sheets printed in 1.5 hr $= 50 \times \frac{15}{10} \times 60$

$$= 4500 \text{ sheets}$$

M.C.Q.

1. $\frac{15}{20} = \frac{30}{x}$ $\quad x = \frac{600}{15} = 40$ (d)

2. $\frac{\text{Rato of 42 days}}{\text{one luck}} = \frac{42}{7} = \frac{6}{1}$ (a)

3. Let the no of children and adults are $7x$ & $5x$

$$5x + 7x = 72$$

$$x = 6$$

No. of children $= 7x = 7 \times 6 = 42$ children (b)

4. $x^2 = 49 \times 4$ $\quad x = 7 \times 2x = 14$ (d)

5. Let the two no.s be $3x$ & $4x$

$\frac{3x+6}{4x+6} = \frac{4}{5}$ $\quad 15x + 30 = 16x + 24$ $\quad 6 = x$

No.s are $3x = 3 \times 6 = 18$

Second no $4x = 4 \times 6 = 24$ (a)

7 Percentage and Its Applications

Exercise 7.1

1. (a) $15\% = \frac{15}{100} = 0.15$ (b) $5\frac{1}{2}\% = \frac{11}{200} = \frac{5.5}{100} = 0.055$

(c) $24\% = \frac{24}{100} = 0.24$

Hints for conuerties in percentage we multiply the number by 100

2. (a) $\frac{1}{5} \times 100 = 20\%$ (b) $2.4 = \frac{24}{10} \times 100 = 240\%$

(c) $2:5 = \frac{2}{5} \times 100 = 40\%$

(d) $1.25 = \frac{125}{100} \times 100 = 125\%$

(e) $\frac{1}{20} = \frac{1}{20} \times 100 = 5\%$

(f) $1.5 = \frac{15}{10} \times 100 = 150\%$

(g) $1 : 4 = \frac{1}{4} \times 100 = 25\%$

(h) $3\frac{1}{5} = \frac{16}{5} \times 100 = 320\%$

(i) $3.51 = \frac{351}{100} \times 100 = 351\%$

(j) $2.65 = \frac{265}{100} \times 100 = 265\%$

Hints : Convert % into fraction digit by 100

3. (a) $25\% = \frac{25}{100} = \frac{1}{4}$ (b) $41\frac{1}{2}\% = \frac{83}{2 \times 100} = \frac{83}{200}$

(c) $5.2\% = \frac{52}{10 \times 100} = \frac{26}{5 \times 100} = \frac{13}{5 \times 50} = \frac{13}{250}$

(d) $35\% = \frac{35}{100} = \frac{7}{20}$

(e) $11\frac{3}{4}\% = \frac{47}{4 \times 100} = \frac{47}{400}$

(f) $1.1\% = \frac{11}{10 \times 100} = \frac{11}{1000}$

4. Express in ratio

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

(b) $2\frac{1}{2}\% = \frac{5}{2 \times 100} = \frac{1}{40} = 1:40$

(c) $13.5\% = \frac{135}{10 \times 100} = \frac{27}{200} = 27:200$

(d) $2.5\% = \frac{25}{10 \times 100} = \frac{5}{2 \times 100} = \frac{1}{40} = 1:40$

(e) $8\% = \frac{8}{100} = \frac{2}{25} = 2:25$

(f) $\frac{15}{2}\% = \frac{15}{200} = \frac{3}{40} = 3:40$

5. (a) $x \times \frac{30}{100} = 57$

$$x = \frac{54 \times 100}{30} = 18 \times 10 = 180$$

(b) $1800 \times \frac{x}{100} = 81$

$$x = \frac{81 \times 100}{1800} = \frac{27}{6} = \frac{9}{2} = 4:5$$

(c) $x \times \frac{25}{100} = 20$

$$x = 20 \times 4 = 80$$

(d) $1750 \times \frac{x}{100} = 350$

$$x = \frac{350 \times 100}{1750} = \frac{350 \times 2}{35} = 20$$

6. $20\%\text{ of }250 = 250 \times \frac{20}{100} = 50$

$20\%\text{ more than }250 = 250 + 50 = 300$

7. $350 \times \frac{x}{100} = 21$

$$x = \frac{21 \times 100}{350} = \frac{3}{5} \times 10 = 6$$

8. Let the no be x

$x \times \frac{8}{100} = 50 \;= \frac{5000}{8} = 625$

Exercise 7.2

1. Passing marks of exam $= 262 + 200 = 462$

$$\text{Total marks} \times \frac{33}{100} = 462$$

$$\text{Total marks} = \frac{462 \times 100}{33} = 1400 \text{ marks}$$

2. Let B income $= ₹100$

Then A's income $= ₹123.67$

$$= \frac{26.67}{126.67} \times 100 = 0.210547..... \times 100 = 21.05$$

Near about 21.05% or $\frac{2105}{100} = \frac{421}{20}\%$

3. $\text{Total marks} = \frac{45}{100} \times 135$

$\text{Total marks} = \frac{13500}{45} = 300 \text{ marks}$

4. $\text{Percentage in class} = \frac{\text{gain in population}}{\text{initial population (2006)}} \times 100$

$$= \frac{(22000 - 19000)}{19000} \times 100$$

$$= \frac{3000}{19000} \times 100$$

$$= \frac{300}{19} = 15.8\%$$

5. So 8/% of total candidate $= 92$ person

$$\text{Total candidate} \times \frac{8}{100} = 92$$

$\text{Total candidate} = \frac{92 \times 100}{8} = 46 \times 25 = 1150$

6. Ranjeet performance percentage $= \frac{492}{600} \times 100 = 82\%$

Rajnjeet's brother $= \frac{435}{500} \times 100 = 87\%$

So Ranjeet brother perform will.

7. Remaining percentage for stitching

$$= (100 - 50 - 20)\% = 30\%$$

Amount spend on stitching $= 2050 \times \frac{30}{100} = ₹615$

8. Percentage of lost match $= (100 - 80)\% = 20\%$

No of matches lost $= 25 \times \frac{20}{100} = 5 \text{ match}$

9. Percentage of marks obtained by Vandana in English

$$= \frac{40}{80} \times 100 = 50\%$$

10. *i.e.*, let the total marks be x

Ramesh passing marks $= x \times \frac{28}{100} + 55$

Suresh passing marks $= x \times \frac{37}{100} - 17$

Passing marks will be equal for both the condidate *i.e.*,

$x \times \frac{28}{100} + 55 = x \times \frac{37}{100} - 17$

$$x = x \times \frac{9}{100}$$

800 marks $= x$

Passing marks $= \frac{800 \times 28}{100} + 55 = 224 + 55 = 289 \text{ marks}$

Total marks $= 800$ marks

Passing marks $= 279$ marks

11. The population after two years

$$= 8000 \times \frac{110}{100} \times \frac{120}{100}$$

$$= 8 \times 11 \times 120 = 11 \times 960 = 10560$$

12. Percentage of students who get failed

$$= (100 - 65)\% = 35\%$$

$\text{Total students} \times \frac{35}{100} = 420$

$\text{Total students} = \frac{420 \times 100}{35}$

Total students $= 1200$

Exercise 7.3

1. (a) Loss = 560 (b)Profit = 200

(c) Loss = 5 (d) Profit = 40

2. $\text{gain /loss} = \frac{(\text{profit / loss})}{\text{CP}} \times 100$

(a) $\text{gain\%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100 = \frac{1100 - 1000}{1000} \times 100$

$$= \frac{100}{1000} \times 100 = 10\% \text{ gain}$$

(b) $\text{loss\%} = \frac{(\text{CP} - \text{SP})}{\text{CP}} \times 100 = \frac{6200 - 5270}{6200} \times 100$

$$= \frac{930}{6200} \times 100 = \frac{930}{62} = 15\% \text{ loss}$$

(c) $\text{loss \%} = \frac{720 - 640}{720} \times 100 = \frac{80}{720} \times 100$

$$= \frac{100}{9} = 11\frac{1}{9}\%$$

(d) $\text{gain\%} = \frac{4025-3500}{3500} \times 100$

$= \frac{525}{3500} \times 100 = \frac{21}{140} \times 100$

$= \frac{3 \times 100}{20} = 15\%$ profit

3. Let the cost price of watch for vinay be x

$x \times \frac{95}{1000} = 1140$

$x = \frac{1140 \times 100}{95}$

for 5% gain

$x \times \frac{105}{100} = 1140 \times \frac{100}{95} \times \frac{105}{100}$

$= 1140 \times \frac{20}{19} \times \frac{21}{20} = 60 \times 21 = 1260$

4. CP of two tv = Rs 800

SP of tv horse = 4000

gain = 25%

CP of this tv = $\text{Rs}\left(\frac{100}{125}\right) \times 4000 = 3200$

CP of another tv $= 8000 - 3200 = 4800$

So $\text{loss\%} = \frac{4800-4000}{4800} \times 100$

$= \frac{800}{4800} \times 100$

$= \frac{1}{6} \times 100 = 16\frac{2}{3}\%\text{loss}$

5. Total CP per 50 kg potatoes

$= 6 \times 20 + 7 \times 30 = 120 + 210 = ₹330$

SP for gaining $25\% = 330 \times \frac{125}{100} = \frac{330 \times 5}{4}$

Price per kg for 50 kg potatoes

$= \frac{330 \times 5}{4 \times 50} = \frac{33}{4} = ₹8.25\,\text{kg}$

6. Let the CP of cycles be x & $1040 - x$

SP or 1^{st} cycle = SP or 2^{nd} cycle

$x \times \frac{85}{100} = (1040 - x) \times \frac{136}{100}$

$85x = 1040 \times 136 - 136x$

$85x + 136x = 1040 \times 136$

$x = \frac{1040 \times 136}{221}$

CP of first cycle $x = ₹640$

CP of second cycle $= 1040 - 640 = ₹400$

7. CP of anuj shirt $= 725 + 25 = ₹750$

SP for gaining $20\% = 750 \times \frac{120}{100} = ₹900$

8. Let the CP of Aript watch be x

$x \times \frac{105}{100} \times \frac{104}{100} = 91$

$x \times \frac{21}{20} \times \frac{26}{25} = 91$

$x = \frac{91 \times 20 \times 25}{21 \times 26} = ₹8.33$

9. Let the article CP $₹x$

article sold at $\frac{110x}{100}$

It it is sold at double then Price $= \frac{220}{100}x$

$\text{gain\%} = \frac{\frac{120}{100}x}{x} \times 100$

$= \frac{120 \times x}{100x} \times 100 = 120\%$

10. Total actual CP 60 kg of rice

$= 25 \times 6 + 35 \times 7$

$= 150 + 245 = 395$

SP of 60 kg rice $= 6.75 \times 60 = 405$

gain = SP − CP $= 405 - 395 = ₹10$ gain

11. Let the CP be x

SP of transiton $= \frac{116}{100}x$ …(1)

$\text{SP} + 20₹ = \text{CP} + \frac{20}{100}\text{CP}$

$= \frac{120}{100}x$ …(2)

Divide (1)/(2)

$\frac{\text{SP}}{\text{SP} + 200} = \frac{116}{120} = \frac{29}{30}$

$\text{SP} = 29 \times 20 = ₹580$

$\text{CP} = \frac{580 \times 100}{116} = ₹500$

12. CP 1 banana $= ₹\frac{20}{12} = \frac{5}{3}$

SP = CP − loss

So $= \frac{5}{3} - \frac{10}{100} \times \frac{5}{3}$

$= \frac{9}{10} \times \frac{5}{3} = \frac{3}{2} = ₹1.5$

13. CP of 10 article = SP of gartich

$\frac{\text{CP}}{\text{SP}} = \frac{9}{10}$ or 9 : 10

$\text{gain\%} = \frac{1}{9} \times 100 = 11\frac{1}{9}\%$

14. CP deepa $= 1850 + 150 = ₹2000$

SP to gain 5% profit $= \frac{2000}{100} \times 105 = ₹2100$

15. CP of 250 cups $= 250 \times 7 = ₹1750$

SP to gain $10\% = 1750 \times \frac{120}{100}$

$= 175 \times 12 = 2100$

SP of 240 cups $= 2100$

SP of each cup $= \frac{2100}{240} = ₹8.75$

16. *i.e.*, if a man is selling 200 books

he get the CP to buy 400 books or we can say

ratio of $\frac{CP}{SP} = \frac{2}{1}$

gain $\% = \frac{1}{2} \times 100 = 50\%$

Exercise 7.4

1. (a) $SI = P \times R\% \times T$

$= 100 \times 2 \times \frac{5}{100} = ₹10$

(b) $SI = 400 \times 2 \times \frac{5}{100} = ₹40$

(c) $750 \times \frac{3}{2} \times \frac{10}{100} = SI \frac{225}{2} = SI$

$112.5 = SI$

(d) $1600 \times \frac{6}{12} \times \frac{7}{200} = SI$

$\frac{8 \times 6 \times 7}{12} = SI \qquad 28 = SI$

2. $SI = 96 \qquad SI = \frac{P \times R \times T}{100}$

$T = 3$ years $\qquad P = 800$

$96 = 800 \times \frac{R}{100} \times 3$

$\frac{96 \times 100}{800 \times 3} = R \qquad 4\% = R$

3. $P = 6050, A = 7229.75, I = 7229.75 - 6050 = ₹\ 1179.75$

Rate = 6.5% $\qquad T = ?$

$1179.75 = 6050 \times \frac{65}{1000} \times T$

$\frac{1179750}{650 \times 65} = T$ 3 years = T

4. Rate of Interest $= \frac{\text{Interest}}{\text{Principle} \times T} \times 100$

$= \frac{1000}{5000 \times 4} \times 100 = 5\%$

5. $P = 7050 \qquad R = 6.5\% \quad T = \frac{5}{2}$

$= \frac{7050 \times 65}{2 \times 200} = \frac{705 \times 65}{2 \times 20} = 1145.625$

Amount = P + Interest

$= 7050 + 1145.625 = ₹8195.625$

6. P = 8400, R = 12.5%

Days from 11 Jan 1988 to 4th June 1988

Jan $\rightarrow$ 21

Feb $\rightarrow$ 29 (as 1988 is a leap year)

March $\rightarrow$ 31

April $\rightarrow$ 30

May $\rightarrow$ 31

June $\rightarrow$ 4

146 days

So, Interest = Principle × Rate % × time

$= 8400 \times \frac{125}{100} \times \frac{146}{366}$

in year as 1988 is a leap year

Case 2 if bank consider leap year also as 365 days then interest $= ₹400$

$= 8400 \times \frac{146}{366} \times \frac{1}{8} = 1050 \times \frac{146}{360} = \frac{153300}{366}$

$= 418.8 \sim ₹419$ real

Amount $= 8400 + 418.8 = 8818.8 = \sim\ 8819$

7. Interest on Rs 15000

$SI = 15000 \times \frac{13}{100} \times 3$

$= 150 \times 39 = 5850$

Total money to be paid $= 20850$

After paying ₹8000 the amount left is scooter

$= 20850 - ₹8000 = ₹12850$

8. Total interest $= 2000 \times 2 \times \frac{12}{100} + 3000 \times 2 \times \frac{15}{100}$

$= ₹480 + 9000 = ₹1380$

9. Total interest $= 4200 \times \frac{8}{100} + 1400 \times \frac{6}{100}$

$= 336 + 84 = ₹420$

Rate of interest $= \frac{420}{4200 + 1400} \times 100 = \frac{420}{5600} \times 100$

$= \frac{15}{2} = 7.5\%$

10. Let be bent x & $(4000 - x)$ Rs

then Total Interest $= x \times \frac{5}{100} + (4000 - x) \times \frac{4}{100}$

$190 = \frac{x}{20} + 160 - \frac{x}{25}$

$30 = \frac{x}{100} \qquad 300 = x$

So amount lend at 4% interest $= (4000 - 3000) = ₹1000$

11. Interest of 1.5 year $= 3282.50 - 2990 = 292.50$

Interest of 1 year $= \frac{292.50}{1.5} = 195$

Sum of money $= 2990 - 195 \times 2 = ₹2600$

Rate of interest $= \frac{195}{2600} \times 100 = 7.5\%$

R = 7.5% Sum = ₹2600

12. Interest earn by dimpe on one year $= \frac{177}{3} = ₹49$

Ratio of rate $7x : 100x$

$7x = 49 \qquad x = 7$

$100x = 100 \times 7 = ₹700$

13. $SI = 430 \times \frac{12}{100} \times \frac{219}{365}$

$= 43 \times \frac{6}{5} \times \frac{219}{365} = ₹30.96$

Amount $= P + I = 430 + 30.96 = ₹460.96$

14. Time to receive 800 as in interest

$= 5000 \times \frac{800}{5000 \times 8} \times 100$

Time = 2 years

SI = P × R ×T $\qquad \frac{SI \times 100}{R \times T} = R$

15. Time $= \frac{SI \times 100}{R \times P}$

Time $= \frac{(448 - 400) \times 100}{4 \times 400}$

$= \frac{48}{400} \times \frac{100}{4} = 3$ years

M.C.Q.

1. (a) Rarav Percentage $= \frac{350}{500} \times 100 = 707$ (a)

2. $SI = \frac{200 \times 5 \times 2}{100} = ₹20$ (a)

3. $\frac{30 \times 15}{100} = 3 \times \frac{3}{2} = ₹4.50$ (b)

4. $\frac{24}{20} \times 100 = 24 \times 5 = 120\%$ N o option is correct

5. $0.03 = \frac{3}{100} \times 100 = 3\%$ (b)

6. Profit % $= \frac{30}{120} \times 100 = 25\%$ (a)

7. Cost of 1 book $\frac{120}{20} = 6$

cost of 12 books $= 12 \times 6 = ₹72$ (c)

8 Algebraic Expressions

Exercise 8.1

1. (a) $9m^2n^2$ (b) $8rS$ (c) $24xy^2$

(d) $-\frac{7}{2}x^2y^3 - 4p^4q^4$

2. (a) difference $= x - y$

(b) Sum of square of $x(x^2)$ and cube of $y(y^3)$

$x^2 + y^3$

(c) $3 \times -4 = 24$ [Let the no be x]

$3x - 4 = 24$

(d) $3 \times x + 14 = 47$

$3x + 14 = 47$

(e) $(x + y) - rS$

3. (a) $21x^2 - 4xy - 5z^2$

Coeff of $x^2 = 21$ Coeff of $xy = -4$

Coeff of $z^2 = -5$

(b) $7x^2 7 - 5xy^2 - 4xy$

Coeff of $x^2y = 7$ Coeff of $xy^2 = -5$

Coeff of $xy = -4$

(c) $11y^3 - 9xy^2 + 3y + 8$

Coeff of $y^3 = 11$ Coeff of $xy^2 = -9$

Coeff of $y = 3$ Constent term = 8

(d) $7x^2 - y^2 + xy^3 + 9x^3y - 3$

Coeff of $x^2 = 7$ Coeff of $y^2 = -1$

Coeff of $xy^3 = +1$ Coeff of $x^3y = +9$

Coeff of constat term = −3

4. (a) Coeff of S = 31 (b) Coeff of r = 4

(c) Coeff of $x^3 = \frac{-7}{6}y$ (d) Coeff of $x = -15y^3z^2$

5. (a) Constant term = 3 (b) Constant term = 0

(c) Constant term = −6 (d) Constant term = 5

6. Degree is the heighest power of the variable in the given polynomial

(a) $3x^2$

each term here = 2

Degree of the polynomial = 2

(b) $\frac{3}{5} - 4x + x^2 - 6x^3$

Degree of $\frac{3}{5} = 0$ Degree of $-4x = 1$, Degree of $x^2 = 2$

Degree if $-6x^3 = 3$

Degree of the polynomial =3

(c) $4x^3 - 3x^2yh2 + 7xy + 52$

Degree	terms
3	$4x^3$
4	$3x^2y^2$
2	$7xy$
1	$5z$

Degree of the polynomial = 4

d) $11x^4 + 7x^3 - 5x^2 - 1$

Degree	terms
4	$11x^4$
3	$7x^3$
2	$-5x^2$
0	1

Degree of the polynomial = 4

(e) $P^2 + 4Pq + 7Pq$

Degree	Term
2	P^2
2	4Pq
3	$5P^2q$
2	$7Pq$

Degree of the polynomial = 3

(f) $2x^3 - 3x + 6$

Degree	Term
3	$2x^3$
1	$3x$
0	6

Degree of the polyominal $x = 3$

7. monomial = 1 term binomials = 2 terms trinomials = 3 terms

(a) $-\frac{9}{5}x$ Term = 1 So monomial

(b) 4 Term = 1 monomial

(c) $\frac{7}{4}p^2 - \frac{1}{7}pq + 4q$ term = 3 So trinomial

(d) $4x - 3y$ Term = 2 binomial

(e) $4x^2 - \frac{4}{3}x + \frac{7}{4}$ Term = 3 Trinomial

(f) $\frac{4}{6}a^2bc + c$ Term = 2 binomial

(g) $\frac{3}{2}pqr$ Term = 1 monomial

(h) $x^2 + y^2 + 2xy$ Term = 3 Trinomial

Exercise 8.2

Add

1. (a) $2p + 5p = 7p$

(b) $4xy, 3xy, 9xy = 9xy + 4xy - 3xy = 10xy$

(c) $6abc + 3abc + 6abc - 4abc = 11abc$

(d) $8xyz + (-2zyx) + (-6xzy) = 8xyz - 8xyz = 0$

2. Add

(a) $7p + 2p + q + 3q = 9p + 4q$

(b) $12mn - 7mn + 9mn + 8 - 2 = 14mn + 11$

(c) $4x^2y + 2x^2y(-3xy^2) + (-5xy^2)$

$= 6x^2y - 8xy^2$ or $= 2xy(3x - 4y)$

(d) $4xy + (-2xy) + (-xy) + 3x^2y$

$= xy + 3x^2y$ or $= xy(1 + 3x)$

3. Add

(a) $3ab + 7ab - 4ab - 5ab = 10ab - 9ab = ab$

(b) $x - 3xy + 7xy - y + y - x = 4xy$

(c) $12x - 10y + 16xy - 8 + 12y - 6x - 10xy + 16$

$= 6x + 2y + 6xy + 8$ or $= 2(3x + y + 3xy + 4)$

4. (a) $2a - 3b + 4c + a - b - 2c$

$= 3a - 4b + 4c - 2c = 2a - 4b + 2$

(b) $4a^3 - 3a^2 + 2 + 2a^2 - a - 1 + a^3 + 2a + 3$

$= 5a^3 - a^2 + a + 2 + 3 - 1$

$= 5a^3 - a^2 + a + 4$

(c) $3x + 2y - 52 + 2x - 5y + 22$

$= 5x - 3y - 32$

(d) $4x^2 - 5xy + 3y^2 + xy^2 - 6x^2 - 4xy + (-2xy)$

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

$= -5x^2 - 11xy - y^2 + xy^2$

(e) $3 + x - x^2 + 5x^3 - 7 - 3x + 5x^2 - x^3$

$+1 + x^2 + 2 - x^3 - 4x + 2x^2$

$= 3x^3 + 7x^2 - 6x - 1$

(f) $8a - 7ab + 5b - 6a - ab - 8b - 5a - 2ab + 3b$

$= -3a - 10ab - 3b + 3b = -3a - 10ab$

(g) $3x^3 + 8 - 2x^2 - 7x + 4x^2 - 5x^3 + 6x$

$-10 + 3 - 4x - 5x^2 + x^3$

$= -x^3 - 3x^2 - 5x + 1$

Exercise 8.3

1. Subtract

(a) $5a - 3a = 2a$

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

(c) $7xy - 11xy = -4xy$

(d) $7m^2n-(-8m^2n)=7m^2n+8m^2n=15m^2n$

2. (a) $2x^4-3x^2y^2+4y^4-(x^4-y^4-x^2y^2)$

$=2x^4-3x^2y^2+4y^4-x^4+y^4+x^2y^2$

$=x^4+5y^4-2x^2y^2$

(b) $3x-6y+3z-(x-4y-5z)$

$=3x-6y+3z-x+4y+5z=2x-2y+8z$

(c) $10-x+4x^2+x^3-(7+4x-5x^2+6x^3)$

$=10-x+4x^2+x^3-7-4x+5x^2-6x^3$

$=-5x^3+9x^2-5x+3$

(d) $4+6p^2-5pq-6q^2-(5+p^2-6pq+q^2)$

$=4+6p^2-5pq-6q^2-5-p^2+6pq-q^2$

$=5p^2+pq-7q^2-1$

(e) $10a+15b+9c-(5a+6b+4c)$

$=10a+15b+9c-5a-6b-4c$

$=5a+9b+5c$

(f) $5xy-4x^2+3y^2-(3x^2-5y^2-4xy)$

$=5xy-4x^2+3y^2-3x^2+5y^2+4xy$

$=9xy-7x^2+8y^2$

3. $2x^2-5x+7+$ second expression $=x^2+9x-13$

Second expression $=-x^2+14x-20$

4. $3x^3-2x^2+3x-1+$ Polynomial added $=x^3+2x^2-6x+5$

Polynomial added $=x^3+2x^2-6x+5-3x^3+2x^2$

$=-2x^3+4x^2-9x+6]$

5. $0-(3x^3+8x^2+4x-5)$

$=-3x^3-8x^2-4x+5$

6. Sum of two expression =

$6x^2+8x-9+(-3)+5x-3x^2$

$=3x^2+13x-12$

Subtraction of the result from 10 =

$10-3x^2-13x+12$

$=-3x^2-13x+22$

7. Sum of all the three expression

$=x+4x-2x+3y-y+3y-4z+9z-z$

$=3x+5y+4z$

Now subtract from

$3x+5y+4z-2x+3y-4z=x+8y+0$

$=x+8y$

8. $\frac{-2}{3}x^2+\frac{3}{2}xy+2y^2-$(expression) $=3x^2-2xy-\frac{4}{2}y^2$

Expression $=3x^2-2xy-\frac{7}{2}y^2+\frac{2}{3}x^2-\frac{3}{2}xy-2y^2$

$=\left(3\frac{+2}{3}\right)x^2+\left(-2xy-\frac{3}{2}xy\right)-\frac{7}{2}y^2-2y^2$

$=\frac{11}{3}x^2-\frac{7xy}{2}-\frac{11y^2}{2}$

Exercise 8.4

1. (a) Let $p(x)=3x^2+2x-1$

$p(-1)=3(-1)^3+2(-1)-1$

$=-3-2-1=-6$

(b) Let $p(x)=-x^3$

$p(-1)=-(-1)^3+1$

$=1+1=2$

(c) $2x^2-x+6=p(x)$

$2(-1)^2-(-1)+6=p(-1)$

$2+1+6=p(-1)\qquad 9=p(-1)$

2. (a) $p=3a-2$

$P(3)=3\times3-2=9-2=7$

(b) $P(a)=7-2a$

$p(3)=7-2\times3=7-6=1$

(c) $2a^2-a+1=p(a)$

$2(6)^2-3+1=p(3)18-3+1=p(3)$

$16=p(3)$

(d) $\frac{3}{2}a+1=\frac{3}{2}\times3+1$

$=\frac{9}{2}+1=\frac{11}{2}$

3. $a=-1,b=2,c=-3$

(a) $ab-b^2+c^2$

$=(-1)\times2-(2)^2+(-3)^2=-2-4+9=3$

(b) $a^2+b-5+c^2$

$=(-1)^2+2-5+(-3)^2=1-3+9=7$

(c) a^2-b^2+ac

$=(-1)^2-(2)^2+(-1)(-3)=1-4+3=0$

(d) $a^2+2(b^2-3)+a^2c^2$

$=(-1)^2+2(2^2-3)+(-1)^2(-3)^2$

$=1+2+9=12$

(e) $3a+2-a-1$

$=3(-1)+2-(-1)-1=-3+2+1-1=-1$

(f) $3b^2+2b-b2+2$

$=3(2)^2+2\times2-(2)+2=12+4-4+2=14$

4. Putting $x=3$ and $y=5$

(a) x^2+y^2

$=3^2+5^2=25+9=34$

(b) x^2+xy-2

$=3^2+3\times5-2=9+15-2=22$

(c) $x^3 - y^3$

$= (3)^3 - (5)^3 = 27 - 125 = -98$

(d) $3x^2y + 2xy - xy^2$

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

$= 27 \times 5 + 30 - 75 = 135 + 30 - 75 = 90$

5. Simplify

(a) $a - (b - c)$

$= a - b + c$

(b) $(x^2 - xy) - (xy - y^2)$

$= x^2 - xy - xy + y^2 = x^2 - 2xy + y^2$

(c) $3x - (2y - 5x + 3z)$

$3x - 2y + 5x - 3z \qquad 8x - 2y - 3z$

(d) $x - [2y - \{3x - (2y - 3z)\}]$

$= x - [2y - \{3x - 2y + 3z\}]$

$= x - [2y - 3x + 2y - 3z]$

$= x - [4y - 3x - 3z]$

$= x - 4y + 3x + 3z = 4x - 4y + 3z$

(e) $-x + [3y - \{x - (4y + 4z)\}]$

$= -x + [3y - \{x - 4y - 4z\}]$

$= -x + [3y - x + 4y + 4z\}]$

$= -x + 3y - x + 4y + 4z$

$= -2x + 7y + 4z$

(f) $-[(5x^2 - 3y^2) - (3y^2 - 4z^2) - (4z^2 - 5x^2)]$

$= -[5x^2 - 3y^2 - 3y^2 + 4z^2 - 4z^2 + 5x^2]$

$= -[10x^2 - 6y^2 + 0] = -10x^2 + 6y^2$

(g) $5x^3 + x^2 - \{3x^2 - (2x^2 - 3x^3 + 1)\}$

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

$= 5x^3 + x^2 - x^2 - 3x^3 + 1$

$= 2x^3 + 0 + 1 = 2x^3 + 1$

(h) $(3x^2 - 4y + 3x) - [x^2 - (x^2 + y) - 2y + 4]$

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

$= 3x^2 - 4y + 3x + 3y - 4$

$= 3x^2 - y + 3x - 4$

Exercise 8.5

1. No of dots required to make 50th triangles number

$= \frac{50 \times 51}{2} = 25 \times 51 = 1275$

No of dots required make 200th triangle numbers

$= \frac{200 \times 201}{2} = 201 \times 100 = 20100$

1275, 20100

2. $p(n) = x^2$

So 20 dots in a row $n = 20$

$p(20) = 20^2 = 400$ dots

3. for 39 equlilateral triangles

$n = 39$

$2n + 1 = 2 \times 39 + 1 = 78 + 1 = 79$ lines

4. To make 25 and 51 letters

$n = 25$ and $n = 51$

$= 4n + 1 \qquad = 4x + 1$

$= 25 \times 4 + 1 \qquad = 51 \times 4 + 1$

$= 101 \qquad = 205$

M.C.Q.

1. 1 (c) as it is to having degree of $x = 2$ ratehr than 3

2. $a + 5a + (-3a) + (-7a) = 6a - 10 = -4a$

3. $p(x) = 5x - 2$

$p(-2) = 5(-2) - 2 = -10 - 2 = -12$ (c)

4. $p(y) = y^2 - 2(y + 10)$

$p(10) = 10^2 - 2(10 + 10) = 100 - 40 = 60$ (b)

5. Perimeter = Sum of all sides

$= 2x + 3 + 3x - 1 + x + 7$

$= 6x + 9$ (b)

6. Sum $= 3x - 3x + 2y - 2y = 0$ (c)

7. $4m - 5n + 3m - 2n$

$7m - 7n$ (a)

9 Linear Equation in One Variable

1. (a) $x + 7 = 10$ (b) $3x + 2 = 17$

(c) $4x = 32$ (d) $2x - 4 = 16$

(e) $\frac{1}{5}x = 5$ (f) $\frac{2x}{6} = 12$

(g) $20 - 3x = 2$ (h) $7x = 42$

2. (a) $30 - 5x = x$

$30 = 6x$

$5 = x$

(b) $4x + 3x = 31 - 6x$

$9x = 27$

$x = 3$

(c) $x + \frac{x}{3} = 8$

$\frac{3x + x}{3} = 8$

$4x = 24$

$x = 6$

(d) $x + \frac{4x}{5} = 18$

$9x = 18 \times 5$

$x = \frac{90}{9}$

$x = 10$

(e) $\frac{2}{3}(x + 3) = 4$ (f) $\frac{1}{2}x + \frac{1}{3}x = 15$

$\frac{2}{3}x+2=4$ $3x+2x=90$

$\frac{2}{3}x=2$ $5x=90$

$x=3$ $x=18$

(g) $\frac{x}{5}+5-\frac{x}{6}+\frac{x}{4}=0$

$\frac{12x-10x+15x}{60}=-5$ $17x=-300$

$x=\frac{-300}{17}$

(h) $\frac{3(m-4)}{15}-\frac{(m-5)}{10}=\frac{2(3-m)}{5}$

$\frac{3m-12}{15}-\frac{m+5}{10}=\frac{6-2m}{5}$

$\frac{3m-12}{15}-\frac{m+5}{10}-\frac{6+2m}{5}=0$

$\frac{6m-24-3m+15-36-12m}{30}=0$

$15m-45=0$

$15m=45$ $m=3$

3. (a) $15x=225$ (b) $17y=255$

$x=\frac{225}{15}=15$ $y=\frac{255}{17}=15$

(c) $\frac{x}{7}=12 \Rightarrow x=12\times 7=84$

(d) $3x-7=5x-9$

$9-7=2x$

$2=2x$

$1=x$

(e) $2(x+3)+3(x+6)=54$

$2x+6+3x+18=54$

$5x=30$

$x=6$

(f) $8+5x-(3x-8)=0$

$8+5x-3x+8=0$

$8+8+2x=0$

$2x=-16$ $x=-8$

(g) $13(x-5)=104$

$13x-65=104$

$13x=169$

$x=13$

(h) $2x-\frac{2x}{5}=8$

$\frac{10x-2x}{5}=8$

$8x=40$

$x=5$

(i) $1+4x=-11$

$4x=-12$

$x=-3$

(j) $\frac{2y}{3}-5=\frac{3y}{4}+1$

$\frac{2y-15}{3}=\frac{3y+4}{4}$

$8y-60=9y+12$

$-12-60=y$

$-72=y$

(k) $2y+5=7$

$2y=7-5$

$2y=2$

$y=1$

(l) $4x-2=3x+5 \Rightarrow 4x-3x=5+2$

$x=7$

Exercise 9.2

1. Let the three constitutional numbers be $x, x+1, x+2$

$x+x+1+x+2=69\, 3x=69-3\, x=\frac{66}{3}$

$x=22$ No's are $x+1=21\, x+2=22+2=24$ **Ans**

2. Let the no. be x

$3x+7=40\, 3x=40-7\, x=\frac{33}{3}\, x=11$

So the number is 11 **Ans**

3. Let the two parts be x and $(16-x)$

$x=3(16-x)\, x=48-3x\, 4x=48\, x=12$

Two parts are 12 and 4 **Ans**

4. Let the no. be x

$3x+6=33\, 3x=27\, x=\frac{27}{3}=9$

Number is 9 **Ans**

5. Let the total cost of flat be x

so $x-\frac{5}{8}x-\frac{1}{4}x=4$ lakh

$\frac{8x-5x-2x}{8}=400000\, \frac{x}{8}=400000$

$x=3200000$ ₹ or 32 lakhs **Ans**

6. Let the no. be x

$x-19=11\, x=19+11\, x=30$

So, the number is 30 **Ans**

7. Let the distance of his village from town be x

Now, $x-\frac{3}{4}x-\frac{1}{8}x-\frac{1}{12}x=4$ km

$\frac{24x-18x-3x-2x}{24}=4$ km

$24x-23x=23\, 4\times 4\, x=96$ km **Ans**

8. Let the two constitutional multiples be $5x$ and $5(x+1)$

$5x+5(x+1)=65\, x+x+1=13\, 2x=12\, x=6$

So the two multiple are 5×6 and $5\times(6+1)$ 30 and 35 **Ans**

9. Let the number be x

$x+\frac{1}{3}x=52\, \frac{3x+x}{3}=52\, 4x=52\times 3$

$\Rightarrow \quad x=\frac{52\times 3}{4}=39$ **Ans**

10. Let the no. be x

$3x-x=40\, 2x=40\, x=20$

So the number is 20 **Ans**

11. Let the number be x

So $x-9=59-x\, 2x=68\, x=34$

So the number is 34 **Ans**

12. Let the cost of pencil be x then the cost of a pen be $7x$

3 pencils + 2 pens $=34\, 3\times x+2(7x)=34\, 3x+14x=34$

$17x=34\, x=2$

So the cost of a pencil is 2 ₹

and the cost of a pen is $2\times 7=14$ ₹ **Ans**

13. Raman's age = 30 year Raman's son age = 5 year

Ratio of Raman's age to his son will be 2 : 1

$\frac{30+x}{5+x}=\frac{2}{1}\, 30+x=10+2x\, 30-10=x\, 20=x$

After 20 years **Ans**

14. Let the Bhagwat polled x times then Sunil polled $=4x$

Total polled = Total strigents

$4x+x=45\, 5x=45\, x=9$

Bhagwat get $=9$ votes Sunil get $=4\times 9=36$ votes **Ans**

15. Let the Meena's present age be x Shakshi's mother present age be $9x$ after 3 years

$\frac{9x+3}{x+3}=\frac{5}{1}\, 9x+3=5x+15\, 4x=12\, x=3$

Shakshi's mother age $=9x=9\times 3=27$ years Meena's present age $=x=3$ years **Ans**

16. Let Pradeep's brother age be x then age of Pradeep (present age) $=x+5$

$x+x+5=25\, 2x+5=25\, 2x=20\, x=10$

Pradeep's age = 15 years Pradeep's brother age = 10 years **Ans**

17. Let Anil's age be A Let Vimal's age be V

$A+V=16$...(i) four years ago, Anils age $3x$ Vimal age x

Sum of ages $=16-8=8\, 3x+x=8\, 4x=8\, x=2$

Anil's age $=3\times 2=6$ years $+4=10$ years

Vimal's age $=16-10=6$ years **Ans**

18. Let the cost of total property be x ₹ $=\frac{x}{2}$

each children got $=\frac{x}{2}\div 3=\frac{x}{6}$

So $\frac{x}{6}=50{,}000\, x=300000$ ₹

Product worth = 3 lakh Wife got $=\frac{x}{2}=\frac{300000}{2}=150000$ ₹ or 1.5 lakh **Ans**

19. Let the number be x $\frac{x\times 5+10}{8}=x-1$

$5x+10=8x-8\, 18=8x-5x$

$18=3x\, \frac{18}{3}=x\, 6=x$

So, the number is 6 **Ans**

20. Let the cost of Science book be x Let the cost of Maths book be $5x$

$5x+3(5x)=300\, 5x+15x=300\, 20x=300\, x=15$ ₹

Maths book cost $=5x=15\times 5=75$ ₹

Science book cost $= x = 15$ ₹ **Ans**

MCQ

1. Let the length and breadth be $3x$ and x perimeter $= 72 = 3x + x$

$72 = 4x \; 18 = x$ (b) **Ans**

2. Let the no be x

$x - \frac{x}{3} = 24 \; \frac{3x - x}{3} = 24 \Rightarrow 2x = 72 \; x = 36$ (b) **Ans**

3. $3x + 7 = 13 \; 3x = 6 \; x = 2$ (c) **Ans**

4. $\frac{1}{3}x + 11 = 14 \; \frac{1}{3}x = 14 - 11 \; x = 13 \times 3 \; x = 39$ **Ans**

5. Let the two supplementary angles be x and $(180 - x)$

$180 - x - x = 60° \; 180 - 2x = 60°$

$120 = 2x \; 60 = x$ grater angle $= 120°$ **Ans**

6. Let Anni's age be x Anni's father age be $6x$

$6x = 48 \; x = \frac{48}{6} = 8$ Anni's age $= 8$ years **Ans**

7. (a) $2x + 8 = 2 \; 2x = -6 \; x = -3$ **Ans**

8. Let the whole number be x

$2x + 6 = 20 \; 2x = 14 \; x = 7$ (b) **Ans**

9. Let Kabin's present age be x

$x + 20 = 3(x - 12) \quad x + 20 = 3x - 36$

$56 = 2x \quad 28 = x$ (a) **Ans**

10. $1 - 4x = -11 \; 12 = 4x \; 3 = x$ (b) **Ans**

10 Lines and Angles

Exercise 10.1

Complement of an angle $90° - \theta$

1. (a) $28° \; \theta = 28°$ Complement of $28° = 90° - 28°$

$= 62°$ **Ans**

(b) $46° \; \theta = 46°$ Complement of $46° = 90° - 46°$

$= 44°$ **Ans**

(c) $35°$ Complement of $35° = 90° - 35° = 55°$ **Ans**

(d) $69°$ Complement of $69° = 90° - 69° = 21°$ **Ans**

(e) $81°$ Complement of $81° = 90° - 81° = 9°$ **Ans**

(f) $1°$ Complement of $1° = 90° - 1° = 89°$ **Ans**

(g) $53°$ Complement of $53° = 90° - 53° = 37°$ **Ans**

(h) $45°$ Complement of $45° = 90° - 45° = 45°$ **Ans**

2. Supplement of $\theta° = 180° - \theta°$

(a) $5°$ Supplement of $5° = 180 - 5° = 175°$

(b) $148°$ Supplement of $148° = 180° - 148° = 32°$ **Ans**

(c) $86°$ Supplement of $86° = 180 - 86° = 94°$ **Ans**

(d) $62°$ Supplement of $62° = 180° - 62° = 118°$ **Ans**

(e) $121°$ Supplement of $121° = 180° - 121° = 59°$ **Ans**

(f) $92°$ Supplement of $92° = 180° - 92° = 88°$ **Ans**

(g) $36°$ Supplement of $36° = 180° - 36° = 144°$ **Ans**

(h) $73°$ Supplement of $73° = 180 - 73° = 107°$ **Ans**

3. Sum of two angles

$\theta_1 + \theta_2 = 90° =$ Complementary pair

$\theta_1 + \theta_2 = 180° =$ Supplementary pair

(a) $129°, 151°$ sum of angles $= 129° + 151° = 280°$ **Ans**

(b) $18°, 72°$ Sum of angles $= 18° + 72° = 90°$

$=$ Complementary pair **Ans**

(c) $0°, 90°$ Sum of angles $= 0 + 90°$

$= 90°$ Complementary pair

(d) $63°, 117°$ Sum of angles $= 63° + 117° = 180°$

$=$ Supplementary angles **Ans**

(e) $45°, 45°$ Sum of angles $= 45° + 45° = 90°$

$=$ Complementary pairs **Ans**

(f) $169°, 11°$ Sum of angles $= 169° + 11° = 180°$

$=$ Supplementary angles **Ans**

(g) $165°, 25°$ Sum of angles $= 165° + 25° = 180°$

$=$ Supplementary angles **Ans**

(h) $135°, 45°$ Sum of angles $= 135° + 45° = 180°$

$=$ Supplementary angles **Ans**

4. Let the magnitude be x

$x = 90 - x \; 2x = 90° \; x = \frac{90°}{2} \; x = 45°$

Magnitude $= 45°$ **Ans**

5. Let the two complementary angles be x and $(90 - x)$ by condition

$x = 2(90 - x) \; x = 180° - 2x \; 3x = 180° x = 60°$

measurement of each angle $= 60°$ Second angles $= 90 - x = 90 - 60° = 30°$

$60, 30°$ **Ans**

6. Let the complementary pair be x and $90 - x$ By condition

$\frac{4}{5}x = 90 - x \; 4x = 450 - 5x$

$9x = 450 \; x = 50°$ magnitude

$= \frac{4}{5} \times x = \frac{4}{5} \times 50° = 40°$ **Ans**

7. Let the angles are $\theta°$ and $180 - \theta°$

By condition $\theta = \frac{2}{3}(180 - \theta) \; 3\theta = 360 - 2\theta$

$5\theta = 360 \; \theta = 72°$ magnitude $= 72°$ **Ans**

8. Let the two angles are $\theta°$ and $180° - \theta$

$\therefore$ both are equals $50 \; \theta° = 180 - \theta°$

$2\theta° = 180° \; \theta = 90°$ magnitude $= 90°$

9. (a) 15 complement of $15° = 90° - 15° = 75°$ **Ans**

(b) $47°$ complement of $47° = 90 - 47 = 43°$ **Ans**

(c) $55°$ complement of $55° = 90 - 55° = 35°$ **Ans**

10. a^2 Adjacent angles : Two angles are adjacent if they have common verten and common side and don't overlap from figure

(a) $\angle 50T$ and $\angle 10V$ are adjacent Yes

(b) No as they overlap

(c) No do not share common verten

(d) No both overlap

(e) No does not form $180°$ angle or a straight line

11. (a) $\angle m = 105° \; \angle n =$ complete angle $- \angle m$

$= 360° - 105° = 255°$ **Ans**

(b) if $\angle n = 195°$ then $\angle m = 360° - \angle n$

$= 360° - 195° = 165°$ **Ans**

(c) If $\angle m = \frac{5}{3} \times 90° \; \angle m = 150°$

so $\angle n = 360° - 150° = 210°$ **Ans**

12. Let the two angles be x and $180° - x$

By condition $x = 2(180° - x) \; x = 460° - 2x$

$3x = 360° \qquad x = 120°$

First angle $= 120°$ Second angle

$= 180° - x = 180° - 120° = 60°$

angles are $60°$, 120 **Ans**

13. From Fig 10.13

(a) $\angle AOB + \angle BOC = 80° + 120° = 200°$

So it is not a lines pair No **Ans**

(b) $\angle COD = 360° - 120° - 80° - 85° = 360° - 285 = 75°$

So $\angle COD \neq \angle BOA$ No,

hence they are not vertically opposite angle **Ans**

(c) $\angle AOD + \angle COD = 85° + 75° = 160° \neq 180°$ No

14. Let the two angles be x and $180° - x$

by condition $\frac{1}{3}x = 180 - x$

$x = 540 - 3x$

$4x = 540 \qquad x = 135°$

So the angle is $180 - 135 = 45°$ **Ans**

Exercise 10.2

1. (a) Yes it is transursal as it is cutting two sides at two different points

(b) No

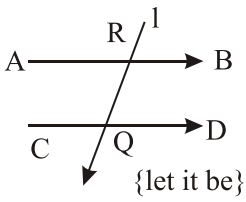
(c) Yes cutting two different lines at diff point

(d) Yes cutting two different lines at diff point

Fig 10.23 (i)

2. (a) Interior angles are $\angle APO, \angle BPQ \; \angle CQP, \angle DQP$

Exterior angles are $\angle APR, \angle BPR \; \angle DQ \; \angle CQ$ **Ans**



(b) fig 10.23 (ii)

all alternate interior angles $\angle 3 = \angle 5 \; \angle 4 = \angle 6$ **Ans**

all alternate interior angles $\angle 1 = \angle 7 \; \angle 2 = \angle 8$ **Ans**

(c) fig 10.23 (ii)

Corresponding angles are $\angle 2 = \angle 6$

$\angle 8 = \angle 4 \; \angle 3 = \angle 7$ **Ans**

3. From Fig. 10.24

as $PQ \| BC$ {given} So $\angle y = \angle ABC$ {Quirnate interior angles}

Now ABC is a triangle So $\angle A + \angle B + \angle C = 180°$

$\angle A + 60 + 50° = 180° \; \angle A = 180° - 110° = 70°$

Now PA 0 is a line So $\angle y + \angle A + \angle x = 180°$

$\angle x = 180° - 130° = 50°$

$y = 60° \; x = 50°$ **Ans**

4. From fig 10.25

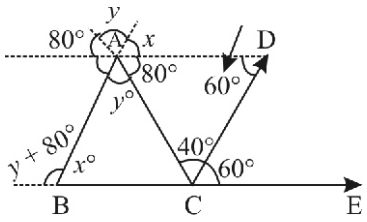
$\angle DCE = 60° \; \angle ACD = 40°$ {given} as BCE is a line

$2° + \angle ACD + \angle DCE = 180°$ {l.p.}

$2° + 60° + 40° = 180°$

$z = 180 - 100 \qquad z = 80°$

Now Constration Draw a line $AD \| BC$



$z = 180 - 60 - 40 = 80°$

So $x + y = 100°$ {as sum of all interior angles of a and is $180°$}

$\angle AOC = \angle DCE$ {alternate interior angles}

$\angle DAC + \angle ADE \; \angle DAC = 180° - 100 = 80°$

In this question the value of x and y can be any pair whose sum is 100 i.e,

Possible and for x and y

$x + y = 100$
$z = 80$
10 90
30 70
40 60
50 50

$z = 80°$ **Ans**

from figure best possible and is $40° \; 60°$ in order to make as congrent $x = 40, \; y = 60° \; z = 80°$ **Ans**

Question does not have proper information about other angles

5. As l and m are parallel lines {given} and $\angle 1 = 55°$

Now $\angle 1 = \angle 5$ ...(1) (corresponding angles)

$\angle 2 = \angle 8 = 180° - \angle 1 = 180° - 55 = 125°$ ...(2) {corresponds angle}

$\angle 1 = \angle 3$ and $\angle 5 = \angle 7$ {vertically opposite angles}

$\angle 2 = \angle 4$ $\angle 8 = \angle 6$ ...(3) By (1) (2) and (3)

$\angle 1 = \angle 5 = \angle 7 = \angle 3 = 55°$

$\angle 2 = \angle 4 = \angle 8 = \angle 6 = 125°$ **Ans**

6. $l \parallel m$ (given) PQR is a triangle so $50° + \angle y + 45° = 180°$ (sum of all interior angles)

$\angle y = 180° - 95$ $\angle y = 85°$ $x = 50°$ $z = 45°$

{Alternate interior angle}

So $\angle x = 50°$ $\angle y = 85°$ $\angle z = 45°$ **Ans**

7. In fig 10.28 $AB \parallel CD$ (given)

So $\angle 1 = 180° - \angle 2$ $\angle 1 = 180° - (7x + 5)$

$3x + 5 = 180° - 7x - 5$ $10x = 180° - 10$ $x = 17°$

So $\angle 1 = 3x + 5 = 3x\ 7 + 5 = 56°$

$\angle 1 = \angle 4 = 56°$ (Alternate interior angles)

$\angle 2 = \angle 3 = 7x + 5 = 7x\ 17 + 5 = 124°$

{Alternate interior angles)

$\angle 1 = \angle 4 = 56°$ $x = 17$ $\angle 2 = \angle 3 = 124°$ **Ans**

8. In fig 10.29 $PQ \parallel QS$ {given} $m \parallel n$ $\angle d = 70°$

{vertically opposite angle}

$\angle d = \angle b$ $\angle a = \angle c$ $\angle c = \angle a$

{corresponding angles}

So, $\angle a = \angle b = \angle c = \angle d = 70°$ (all) **Ans**

9. In fig 10.30

$l \parallel m$ and its transversal {given}

$\angle 1 = 55°$ $\angle 1 = \angle 5 = 55°$ ...(1) (corresponding angles)

$\angle 1 = \angle 3, \angle 5 = \angle 7$ ...(2) {vertically opposite angles)

By (1) and (2) $\angle 1 = \angle 3 = \angle 5 = \angle 7 = 55°$

$\angle 1 + \angle 4 = 180°$ {lines pair} $\angle 4 = 180° - 55 = 125°$

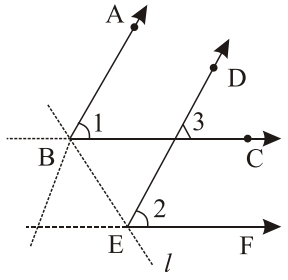
$\angle 4 = \angle 2$ $\angle 6 = \angle 8$ ...(4) {vertically opposite angles}

By 3rd and 4rd $\angle 4 = \angle 2 = \angle 6 = \angle 8 = 125°$

$\angle 1 = \angle 3 = \angle 5 = \angle 7 = 55°$ **Ans**

10. In fig 10.31

as arms of two angles are parallel Constinution : Draw a transversal l from B to E



$\angle l = \angle 3$ ...(1) $\angle 3 = \angle 2$ ...(2)

{corresponding angles as $AB \parallel DE$ and $BC \parallel EF$}

By (1) and (2)

$\angle 1 = \angle 2 = 70°$ So $\angle 2 = 70°$ **Ans**

MCQ

1. Complement of $10° = 90° - 10° = 80°$ (c) **Ans**
2. $x = (180 - x) + 10\ 2x = 190\ x = 95°$ (c) **Ans**
3. Let it be x and $(180 - x)\dfrac{x}{180 - x} = \dfrac{3}{1}$

   $x = 540 - 3x\ 4x = 540\ x = 135°$ **Ans**
4. Supplement of $150° -$ Complement of $60°$

   $= (180 - 160) - (90 - 60)$

   $= 30 - 30 = 0°$ (a) **Ans**
5. Complement of $15 = 90 - 15 = 75°$ Supplement of $75°$

   $= 180° - 75 = 105°$ (b) **Ans**

11 Properties of Triangles

Exercise 11.1

1. (a) False {Can't possible}

(b) False {can be only one}

(c) False {it may or may not be isosceles}

(d) True {because there is only one obtuse angle in an Δ}

(e) False {can't possible as the sum of interior angle will $180°$}

2. In fig 11.14

There are 3 triangles i.e. $\Delta AED + \Delta ADC + \Delta ABC$

Sum of all interior angles = $180°$ Sum of all interior angles of 3 triangle $= 180 \times 3 = 540°$

So $\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 + \angle 9$

$= 540°$ **Ans**

3. Let the angle be $x, 2x$ and $3x$ So $x + 2x + 3x = 180°$ {Sum of all interior angles of a}

$6x = 180°$ $x = 30°$ angles are $x, 2x, 3x$ angles are $30°, 60°, 90°$

i.e. it is a Right angle Δ **Ans**

4. In isosceles Δ sum two angles are equal and also there can be only one obtuge angle in an triangle so
$110° + x + x = 180°$ $2x = 70°$ $x = 35°$ The other two angles are 35, 35° **Ans**

5. Find x, y In fig 11.15

(a) In ΔABC $AB = AC$ so $\angle x = 35°$ {angle opposite to equal sides are equal in Δ}
Now $x + y + 35° = 180°$ $y + 70° = 180°$
$y = 110°$ $x = 35°$ **Ans**

(b) Here $AB = BC$ So $\angle A = \angle y = 45°$
{angle opposite to equal sides are equal in *a* Δ}
$\angle A + \angle y + x = 180°$ $x = 180° - 2 \times 45$
$y = 45°$ $x = 90°$ **Ans**

(c) Here $AB = AC$ So $\angle x = 52°$
{Angle opposite to equal sides are equal}
$\angle x + 52° + y = 180°$ $2 \times 52° + y = 180°$
$y = 180° - 104$ $y = 76°$ $x = 52°$ **Ans**

(d) In ΔABC $AB = AC$ So $\angle y = \angle A$ $\angle B$ ...(1)
$\angle y + \angle A$ $\angle B + 110° = 180°$
z $\angle y = 180° - 110°$
z $\angle y = 70°$ $\angle y = 35$
$110° + y = x$ {interior angle properly of as}
$145° = x$ $x = 145°$ $y = 35$ **Ans**

6. (a) No as sum will be come less than 180° (all interior angles)
(b) No as the sum of all interior angles of Δ will become grater than 180° **Ans**
(c) Yes possible in equilateral triangle **Ans**
(d) Yes it is possible {as there can be aonly one abtuse angle in *a* Δ}
(e) Not possible {as the third angle can not be 0° in order to make it a Δ}
(f) No it two angle will be obtuse then the angle sum property will not followed **Ans**

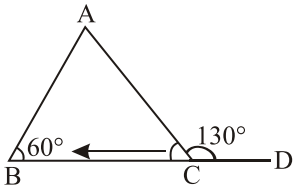
Exercise 11.2

For any Δ Sum of its any two sides will be grater than third side

1 (a) No as $8.8 + 4.9 \not> 16.4$
or $8.8 + 4.9 < 16.4$ $13.7 < 16.4$
(b) No $45 + 50 < 135$ $95 < 135$
(c) Yes $5.6 + 6.8 > 7.8$ ✓
$6.8 + 7.8 > 5.6$ ✓
$7.8 + 5.6 > 6.8$ ✓
(d) No because $8 + 7 < 17$ $15 < 17$
(e) Yes because $1.4 + 4 > 2.8$ ✓
$1.4 + 2.8 > 8$ ✓
$2.8 + 4 > 1.4$ ✓
(f) Yes $3 + 4 > 5$ ✓
$4 + 5 > 3$ ✓
$3 + 4 > 5$ ✓
(g) No $1.5 + 3.5 < 6$ $5 < 6$
(h) No as $2 + 3 = 5$ $5 = 5$ it should be grater
(i) No as $15 + 11 < 30$ $26 < 30$

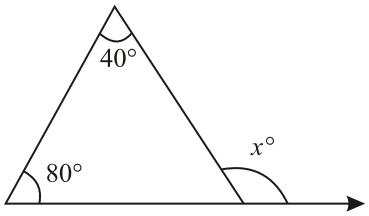
2. In fig 11.26
(a) $OB + OC < BC$ Yes as OBC is a Δ
(b) $OA + OC = AC$ No as AOC is a Δ
(c) $OA + OB > AB$ Yes as AOB is a Δ

3.



So $\angle ACD = 180° - 130°$ {linear pair} $= 50°$
Now $60° + 50° + \angle A = 180°$ $\angle A = 180° - 110° = 70°$
Remaining angles are $A = 70°$ $C = 50°$ **Ans**

4.



$40° + 80° = x°$ $x = 120°$
{interior angle property of a triangle}
(b) $\angle x = 90° + 50°$ $\angle x = 140°$
{interior angle property of a Δ}
(c) $\angle x = 70 + 70°$ $\angle x = 140°$ **Ans**
(d) $\angle x = 45° + 45° = 90°$ **Ans**

5. **In fig 11.28**
$\angle ACO = \angle BAC + \angle ABC$
{by interior angle property of a Δ}
$\angle ACO° = 35° + 70° = 105°$
$\angle ABP = 35° + (180° - 105°) = 35 + 75 = 110°$ **Ans**

6. As AM is the median so $CM = MB$
{Median divides line in two equal parts}
In ΔAMC $AC + CM > AM$ ...(1)
In ΔABM $AB + BM > AM$ ...(2)
Adding eq (1) & (2)
$BM + AC + AB + CM > 2AM$ ...(3)
Putting $MB + CM$ in eq (3)
$BM + AC + AB + MB > 2AM$
$(CM + MB = CB)$ So $AC + AB + BC > 2AM$
Hence proved Yes **Ans**

7. In fig 11.30
(a) $A \times < AC + CX$ ...(1)

{as sum of any two sides in a Δ must be greater than the third side}

(b) $A \times < AB + BY$ ...(2)

(c) AE + Adding eq (1) & (2)

$2AY < AB + BX + CX + AC$

$2AX < AB + BC + AC$ Hence

8. Length of two sides of a Δ are 6 & 10 So $6 + 10 >$ 3rd side

$16 >$ 3rd side

So value can be 1 to 15

$6 + 1 < 10 \propto$ $6 + 2 < 10 \propto$

$6 + 3 < 10 \propto$ $6 + 4 < 10 \propto$ $6 + 5 > 10$

So value must be from 5 to 15 which is lie between 4 to 16 **Ans**

Exercise 11.3

1. (a) By Pythagoras theorem

$X^2 = 3^2 + 4^2$ $X^2 = 9 + 16$

Sq root on both side

$X = \sqrt{25}$ $X = \sqrt{5 \times 5} = 5$ **Ans**

(b) $X^2 = 5^2 + 12^2$ $X^2 = 25 + 144$

$X^2 = 169$ $X = \sqrt{169} = \sqrt{13 \times 13} = 13$ **Ans**

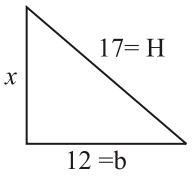
(c) $17^2 = x^2 + 12^2$

$17^2 - 12^2 = x^2$

$289 - 144 = x^2$

$\sqrt{145} = x$ $\sqrt{5 \times 29} = x$

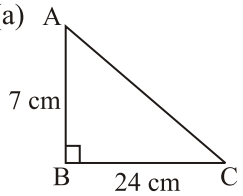
$\sqrt{145} = x$ **Ans**



(d) $25^2 = X^2 + 24^2$ $625 = X^2 + 576$

$625 - 576 = X^2$ $49 = X^2$ $\sqrt{49} = X$ $7 = X$ **Ans**

2. (a)

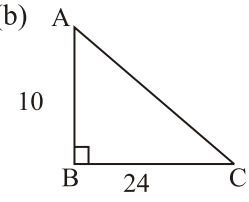


By Pythagoras theorem $AC^2 = AB^2 + BC^2$

$AC^2 = 7^2 + 24^2$

$AC^2 = 49 + 576$ $AC^2 = 625$ $AC = \sqrt{625} = 25$ cm **Ans**

(b)

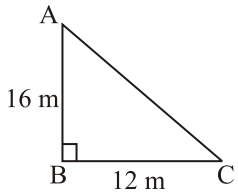


$AC^2 = AB^2 + BC^2$ $AC^2 = 10^2 + 24^2$

$AC^2 = 100 + 576$ $AC^2 = 676$

$AC = \sqrt{676} = \sqrt{2 \times 13 \times 2 \times 13} = 26$ **Ans**

3.



Let AB is the pole of height 16 m

i.e ⊥ to ground Now, by Pythagoras theorem

$AC^2 = AB^2 + BC^2$

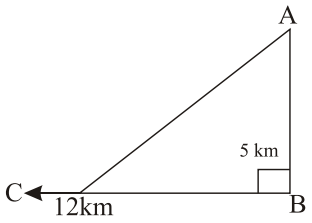
$AC^2 = 16^2 + 12^2$ $AC^2 = 256 + 144$

$AC^2 = 400$ $AC = \sqrt{400}$

$= \sqrt{2 \times 10 \times 2 \times 10} = 20$ cm

i.e. Distance $= 20$ cm **Ans**

4.



Let both start from the same point now not and are ⊥ to each other

So it is a Right angle Δ By Pythagoras theorem

$AC^2 = AB^2 + BC^2$ $AC^2 = 5^2 + 12^2$

$AC^2 = 25 + 144$ $AC^2 = 169$ $AC = \sqrt{169}$

$= \sqrt{13 \times 13} = 13$ km

ie they are 13 km apart **Ans**

5. By Pythagoras theorem

(a) $12^2 = 7^2 + 8^2$ $144 = 49 + 64$

144 cm $\neq 113$ cm No **Ans**

(b) 25, 24, ... Third side is not press

(c) 8, 9, 10 $10^2 < 8^2 + 9^2$

$100 < 64 + 81$ 100 cm < 145 cm

i.e. $100 \neq 145$ No **Ans**

(d) $25^2 = 20^2 + 15^2$ $625 = 400 + 225$ 625 cm

$= 625$ cm Yes **Ans**

(e) $17^2 = 15^2 + 8^2$ $289 = 225 + 64$ 289 cm

$= 289$ cm Yes they can form right angles **Ans**

(f) 14^2 $13^2 + 8^2$ $169 + 64$ $196 <$ 233 cm i.e. No

(g) $20^2 = 400$ $16^2 + 12^2 = 144 + 256 = 400$ i.e. 20^2 cm

$= 16^2 + 12^2$ Yes **Ans**

(h) $6.5^2 = 42.25$ $2.5^2 + 6^2 = 36 + 6.25$

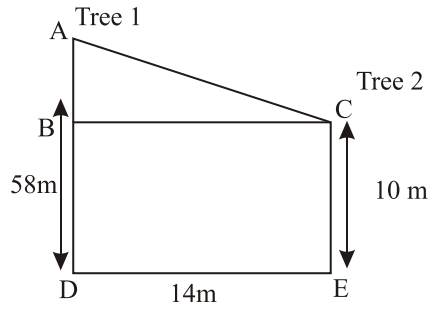
$= 42.25$ $6.5^2 = 2.5^2 + 6^2$

Yes they make right angle Δ

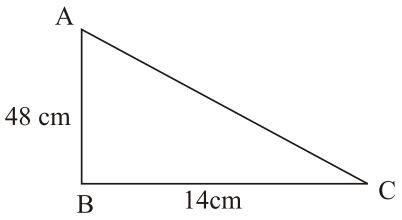
(i) 6, 8, 10 $10^2 = 100$ $8^2 + 6^2 = 64 + 36 = 100$

So $10^2 = 6^2 + 8^2$ Yes **Ans**

6.



For length of rope consider $A : ADC$

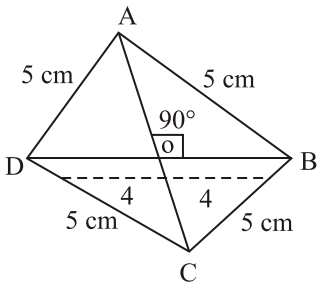


$AC^2 = 48^2 + 14^2 \quad AC^2 = 2304 + 14 \times 14$

$AC^2 = 2304 + 196 \quad AC^2 = 2500$

$AC = \sqrt{2500} = 50$ cm **Ans**

7.



Consider $ABCD$ is a rhombus in rhombus diagnol bisect each other at 90°

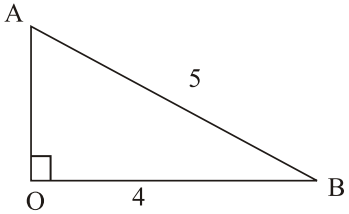
i.e. $AO = OC$

In $\Delta AOB \; 5^2 = 4^2 + AO^2$

$25 - 16 = AO^2$

$\sqrt{9} = AO \; 3 = AO$

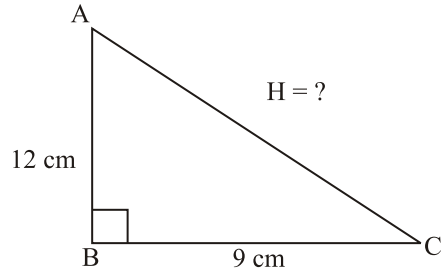
Second diagnol



$AC = AO + OC = AO + AO = 3$ cm $+ 3$ cm

$AC = 6$ cm **Ans**

8.



Let ABC is a right angle Δ Right angled at B

By Pythagoras theorem

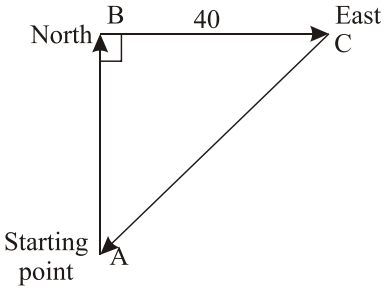
$AC^2 = 12^2 + 9^2$

$AC^2 = 144 + 81 \qquad AC^2 = 225$

$AC = \sqrt{225}$ Squ root on both side

$AC = \sqrt{15 \times 15} \; AC = 15$ cm **Ans**

9. East & North Directions are at 90° with each other for Distance i.e. AC



In ΔABC

$AC^2 = AB^2 + BC^2$

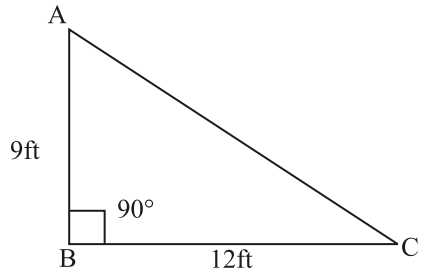
$AC^2 = 30^2 + 40^2$

$AC^2 = 900 + 1600$

$AC^2 = 2500$

$AC = \sqrt{2500} \; AC = 50$ km Distance $= 50$ km **Ans**

10.



Wall and floor are at 90° with each other let AB be the wall and AC be the ladder we need to find AC

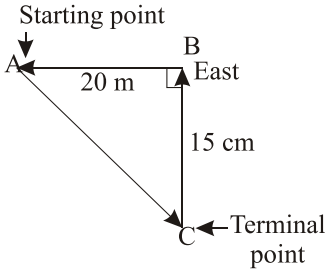
In $\Delta ABC \; AC^2 = AB^2 + BC^2$

$AC^2 = 12^2 + 9^2 \qquad AC^2 = 144 + 81$

$AC = \sqrt{225} \qquad AC = 15$ ft

length of ladder $= 15 + 1$ **Ans**

11. Let ABC the starting point and CB the terminal point



Now we need to find AC in order to get the distance

So In Right ΔABC

$AC^2 = AB^2 + BC^2 \; AC^2 = 20^2 + 15^2 \; AC^2 = 400 + 225$

$AC^2 = 625$ Sqr root on both sides $AC = \sqrt{625} = 25$ m

i.e. Distance $= 25$ m **Ans**

MCQ

1. Three i.e. from each vertin (c) **Ans**

2. (b) in isoscelles triangles **Ans**

3. Each median less in the interior of the triangle (d) **Ans**

4. (d) as $20^2 = 16^2 + 12^2 \quad 400 = 256 + 144 \quad 400 = 400$ (d) **Ans**

5. fig 11.43 is not in the book missing or misprint

12 Congruence of Trinalges

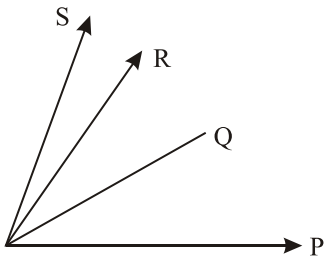
Exercise 12.1

1. (a) True
(b) False corresponding side should always be equal
(c) True (d) False (e) False

2. *abcd* are congruent **Ans** *e* and *f* are not congruence

3. If $\angle EFg \cong \angle RST$ (given)
and $\angle EFg = 87°$ then $\angle EFG = \angle RST$
{corresponding angles are equal}
So $\angle RST = 87°$ **Ans**

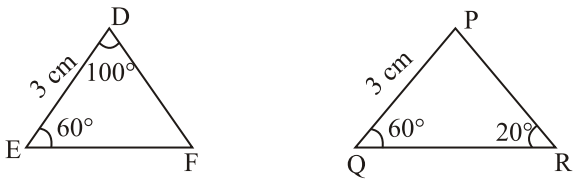
4. $\angle POQ$ No $\angle POQ$ is not similar to $\angle QOS$ as it couer approx the double angular are then $\angle POQ$ **Ans**



Exercise 12.2

1. (a) All the thur const.... sides are equal so both are congruent, Yes (SSS) **Ans**
(b) No all the corresponding angles are equal (AAA) but AAA is not a valid criteria
(c) No
(d) Yes By (SAS congruent criterion)

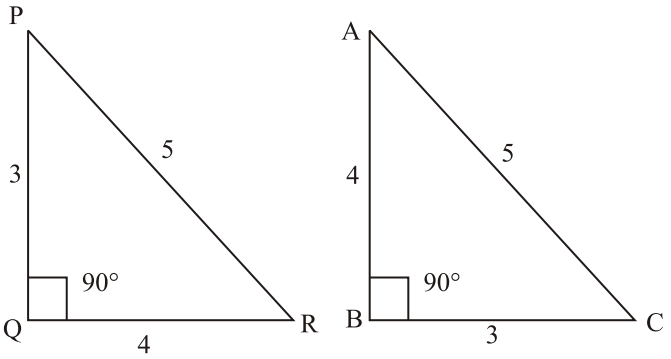
2.



In $\Delta DEF \ \angle E = \angle Q \ \angle F = 180 - 100 - 60 = 20°$ cm
In $\Delta PQR \ \angle P = 180 - 60 - 20 = 100$ cm
Now, In ΔDEF and ΔPQR
$\angle O = \angle P \ \angle E = \angle Q \ DE = PQ$
So By *ASA* congruent criterion $\Delta DEF \cong \Delta PQR$ **Ans**

3. If two angles are congruent then
(i) all the corresponding angles are equal
(ii) all the corresponding sides are equal **Ans**

4. *SAS* congruent criterion : Two triangles in which two corresponding sides equal can be sade congruent by *SAS* criterion
In *PQR* and *ABC*



$\angle Q = \angle B \qquad PQ = BC$
$QR = AB$
By *SAS* $\Delta PQR \cong \Delta ABC$ **Ans**

5. No, In circles corresponding radins should be equal for showing both circle as congruent

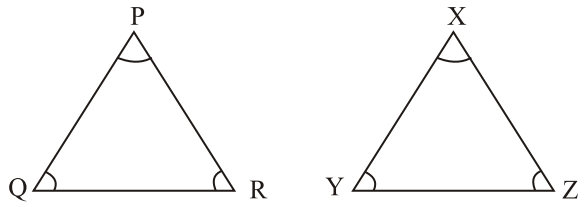
6. No *AAA* is not a valid criteria to make a triangles valid it can be only valid to make triangles are similar.

7. In fig. 12.23
(a) as $PQ \cong RS$ so $\overline{P}Q = R\overline{S}$
Now adding *QR* on both sides
So $PQ + QR = RS + QR$ i.e. $\overline{PQ} + \overline{QR} \cong RS + QR$ **Ans**
(b) In fig 12.24
$\overline{A}B = \overline{BC} = \overline{C}D$ {given}
Now $BPC - \overline{A}B = BPC - \overline{CD}$ as $\overline{A}B = CD$
$BPC - \overline{C}D = BPC - \overline{CD}$ So $BPC = BPC$
i.e. Yes $BPC - \overline{A}B = BPC - \overline{C}D$ **Ans**

8. In fig 12.25
In ΔDAY and $\Delta BXC \ \angle A = \angle B$ {each 90°}
$DA = CB$ {given}
$AX = BY$ {given}
adding *XY* on both sides
$AX + XY = BY + XY \ AY = BX \ AY = BX$
So By *SAS* congruent criterion $\Delta DAY \cong \Delta CBX$ **Ans**

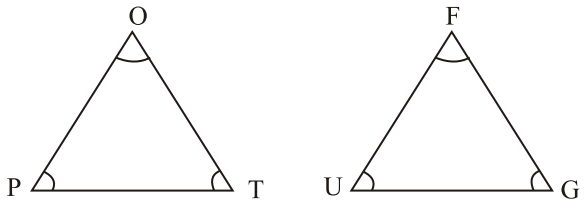
9. In fig. 12.26
O is the mid point of *PQ*
So $OP = OQ$ ...(1)
$\angle A = \angle B$ ....(2) {given}
Now In ΔAOB and $\Delta BOQ \ \angle A = \angle B \ OP = OQ$ {given}
and $\angle POA = \angle BOQ$
{vertically opposite By *ASA* criterion angles}
So $\Delta POA \cong \Delta BOA$ **Ans**

10. (a) $\Delta PQR \cong \Delta XYZ$



So $PQ = XY$ $\angle P = \angle X$
$PR = XZ$ $\angle Q = \angle Y$
$QR = YZ$ $\angle R = \angle Z$ **Ans**

(b) $\Delta OPT \cong \Delta FUG$



Correspondence part are
$\angle O = \angle P$ $OP = FU$
$\angle P = \angle U$ $OT = FG$
$\angle T = \angle G$ $PT = UG$ **Ans**

11. In fig 12.27

(a) In ΔABC and ΔDEF $BA = DE = 5.3$ cm
$\angle B = \angle E$ {each 50°}
$\angle A = \angle D$ {each 80°}
So by *ASA* criterion $\Delta ABC \cong \Delta DEF$ **Ans**

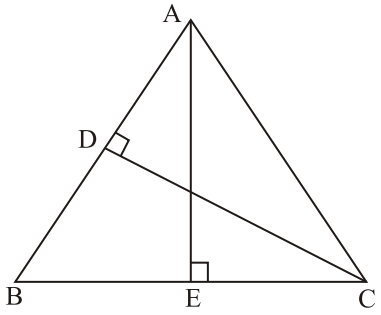
(b) In ΔADC and ΔABC $\angle BCA = \angle DCA$ {each 45°}
$\angle BCA = \angle DCA$ {each 30°}
$AC = AC$ {common side}
So By *ASA* congruent criterion
Yes $\Delta ADC \cong \Delta ABC$ **Ans**

(c) In ΔCAB and ΔPQR $\angle C = \angle Q = 30°$
$\angle B = \angle R = 70°$
$PR = AB = 2.3$ cm So By *ASA* $\Delta BAC \cong \Delta PQR$ **Ans**

(d) In ΔABC and ΔABD $\angle CAB = \angle DBA = 135°$
$\angle CBA = \angle DAB = 35°$
$AB = BA$ {common sides}
So By *ASA* congruent criterion $\Delta ABC \cong \Delta ABD$ **Ans**

12. $\Delta PQR \cong \Delta TSI$ {given} So $PQ = TS$ $PR = IS$ ...(1)
$RQ = IT$ $\angle P = \angle S$ ...(3)
Now In ΔPAR and ΔSBI $PR = IS$ also $PQ = TS$
$\frac{1}{2}PQ = \frac{1}{2}TS$ $AP = BS$ and by 3rd $\angle P = \angle S$ So by *SAS*
$\Delta PAR \cong \Delta SBI$ i.e. $RA = IB$ {By C.P.C.T.} **Ans**

13. Let ABC is an equilateral
Let CD and AE are two altitudes To Prove : $CD = AE$
Now In ΔABC and ΔBCD
$\angle A = \angle B$ {each 60°}
$\angle CDB = \angle ADC$ {each 90°}
In ΔABC $BC = AB$
$\frac{1}{2}BC = \frac{1}{2}AB$ {altitude is also the median in an equilateral}
$EB = AB$ and similarly in
$AB = \frac{1}{2}AD + \frac{1}{2}DB$
(CD is the median) $AD = DB$



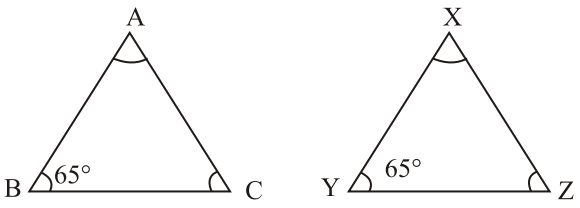
...(3)
So $\Delta ADC \cong \Delta BDC$ $AE = CD$
{By (PCT} Hence proved **Ans**

14. In fig. 12.29 $\Delta ABC \cong \Delta EDF$ given six elements are
(1) $\angle C = CD$ {each 60°} (2) $\angle B = \angle F = 80°$
(3) $\angle A = \angle E = 40°$ (4) $AC = ED$
(5) $DF = BC$ (6) $AB = FE$
By corresponding part of the congruent triangles **Ans**

15. In fig. 12.30 E is the mid point of AC and BD {given}
So $ED = BE$ ...(1) $AE = EF$ ...(2) $BD \neq AC$
In ΔAEB and ΔDEC $DE = EB$ $AE = EC$
{as E is the mid point}
$\angle AEB = \angle DEC$ {vertically opposite angles}
So $\Delta AEB \cong \Delta DEC$
(a) $\angle CDB = \angle DBA$ Yes {by C.P.C.T.}
(b) $\angle CDB \neq \angle CAB$ No
(c) Yes DC is AB as both the Δs are similar in of same
(d) $DC = AB$ Yes {by C.P.C.T.} opposite symmetry **Ans**

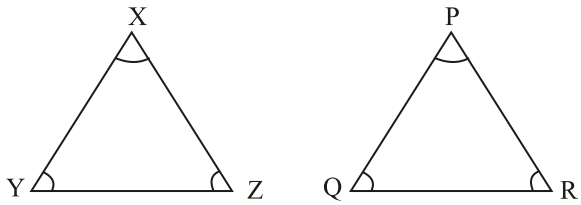
MCQ

1.



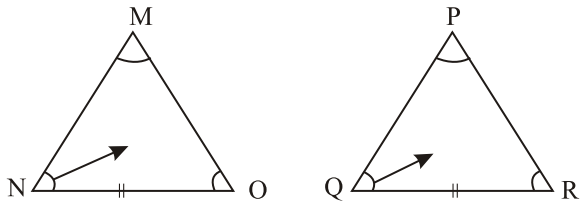
$\angle ABC = \angle XYZ$ (by C.P.C.T.) (a) **Ans**

2.



all other options are correct
(b) $\angle Y \neq \angle R$ **Ans**

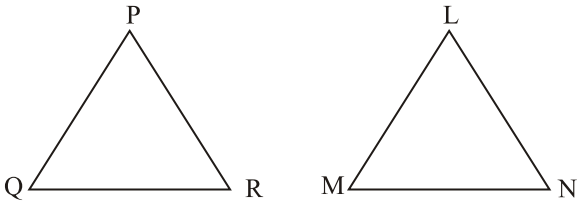
3.



$NO = QR$ So (a) **Ans**

4. By fig. 12.31 (c) **Ans** as $BC \neq EF$

5.



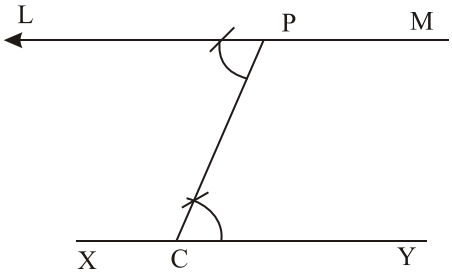
(a) is the only correct option **Ans**

6. (a) congruent by *ASA* **Ans**

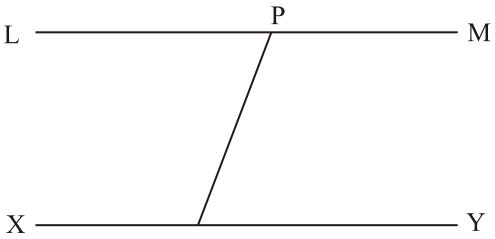
13 Construction

1. By compass

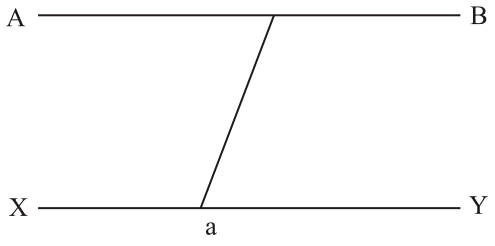
1. Draw a line XY 2. Mark P about XY Take point C on XY From P draw a line segment PC At P draw $\angle LPC = \angle PCY$ $P \angle P$ to M



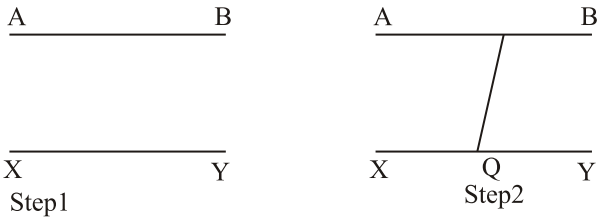
(b) By ruler



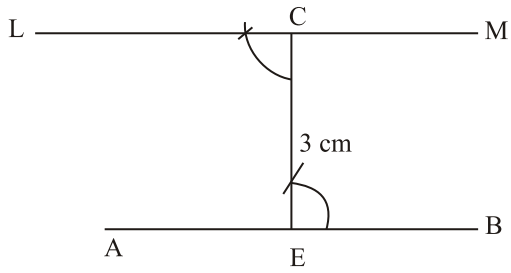
2. By compass



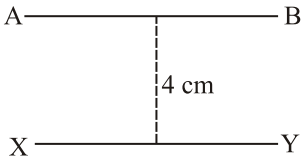
By ruler



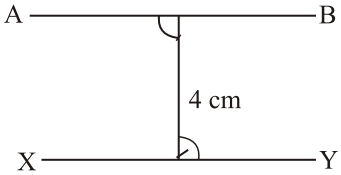
3. **Step 1** Draw AB **Step 2** Make C km above AB **Step 3** From C draw CE (by taking E point on AB) from CE make C similar angles i.e. $BCE = \angle CEB$ **Ans**



4. Using ruler Step 1 place a set square with one arm of it on right angle draw a line

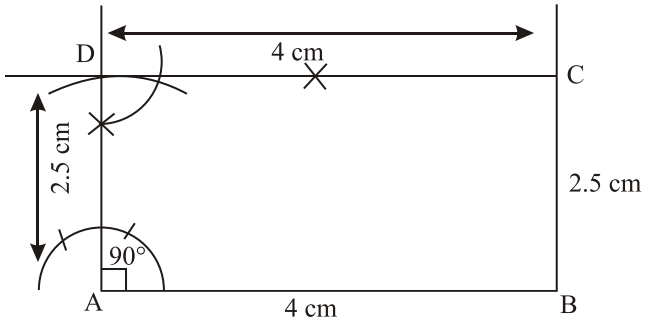


Step 2 Now below 4 cm from this line mark another line without making the scale



Using compass $AB \parallel XY$ AB is 4 cm apart from XY

5. $ABCD$ is a rectangle as $AB = CD = 4$ cm $AD = CB = 2.5$ cm **Ans**



Exercise 13.2

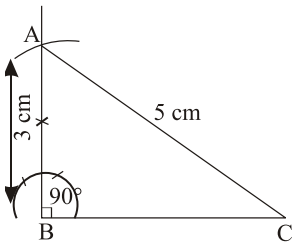
1. $AC^2 = AB^2 + BC^2$

$AC^2 = 3^2 + 4^2$

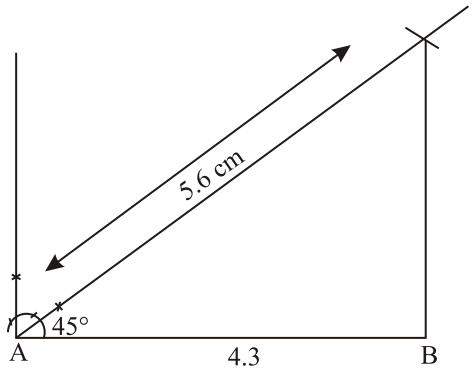
$= 9 + 16 = 25$

$AC = \sqrt{25}$

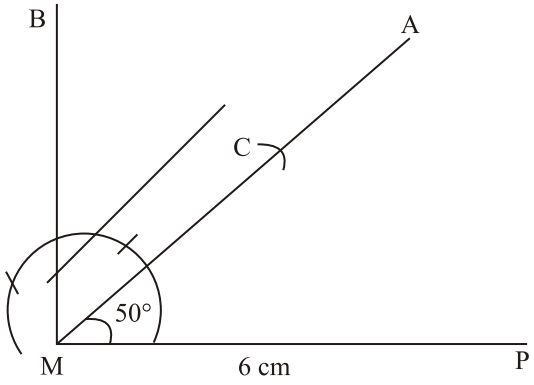
$AC = 5$ cm **Ans**



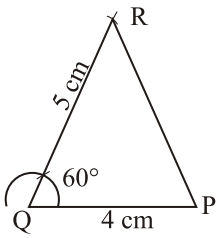
2.



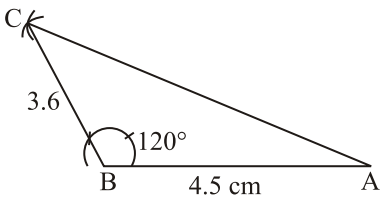
3. $MB \perp MN$ cannot pass from C



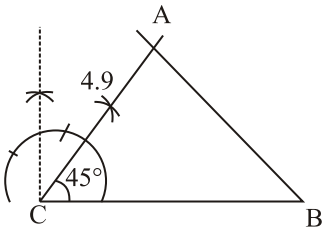
4.



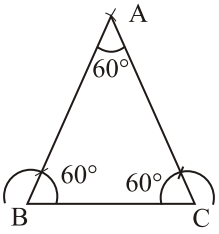
5. **(a)**



(b)



6. as $AB = AC = BC$ So all angles will be 60° and it is a equilateral Δ



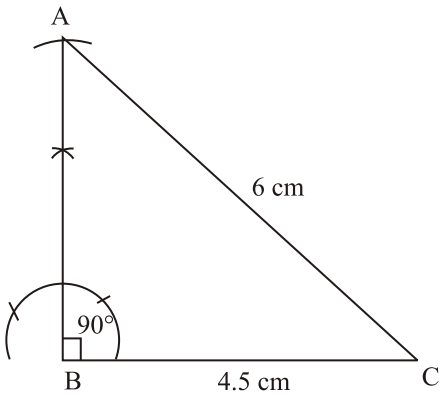
7. base $= 4.5$ cm hypotaneuse $= 6$ cm By Pythagoras theorem

$H^2 = P^2 + B^2$ $\qquad 6^2 = (4.5)^2 + B^2$

$36 = 20.25 + B^2$ $\qquad 15.75 = B^2$

$\sqrt{\frac{3 \times 3 \times 25 \times 7}{100}} = B^2$ $\qquad 5 \times \frac{7}{10}\sqrt{7} = B^2$

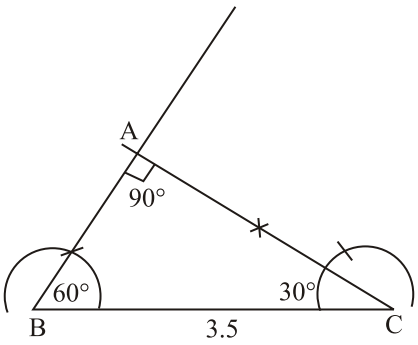
$= \frac{15}{10} \times 2.677 = 3.96 \approx 4$



8. $BC = 3.5$ cm $\angle B = 60°$,

$\angle A = 90°$ $\angle A + \angle B + \angle C = 180°$

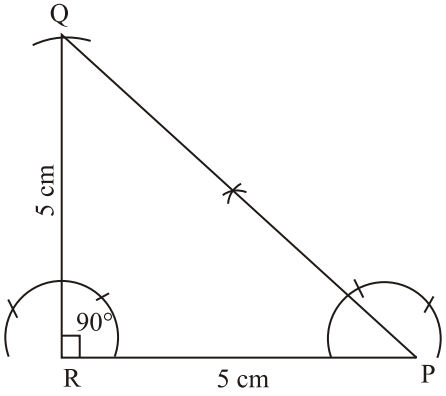
$\angle C = 180 - 90 + 60°$ $\angle C = 30°$



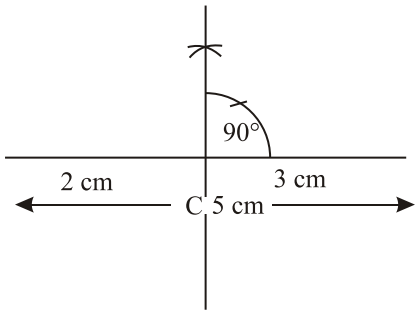
9. $PR = QR = 5$

$\angle R = 90°$ other $\quad 90° + x + x = 180°$

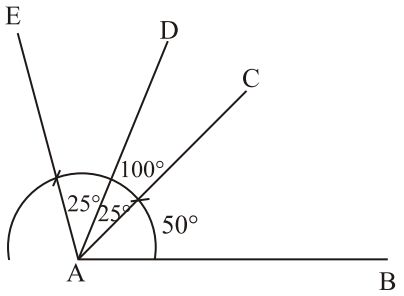
two $2x = 90°$ angles $x = 45°$ here $45°$



10.

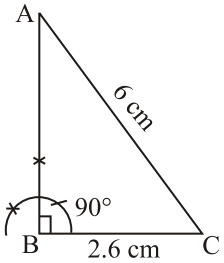


11.

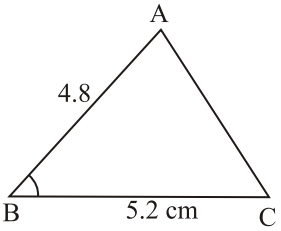


$\angle CAB = 50° \; \angle DAB = 75° \; \angle CAB = 100°$ **Ans**

12.

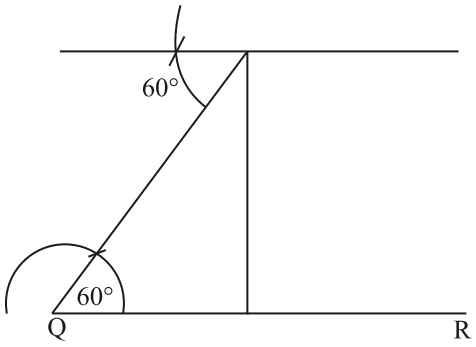


13.



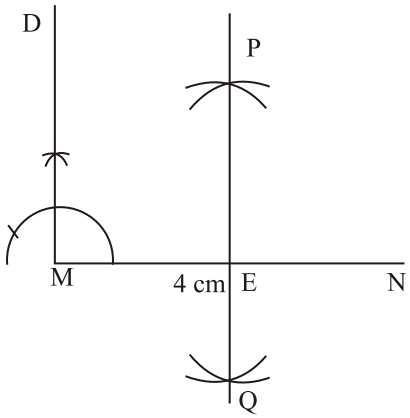
Only one Δ possible **Ans**

14.



Perpendicular Distance = 3.6

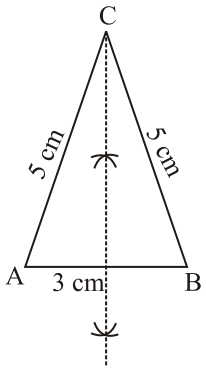
15.



Yes PQ is 11 to OM as $\quad 8\angle PEM + \angle OME = 180°$

$\angle PNE = \angle OME$ and MN is the dnansursal **Ans**

16.

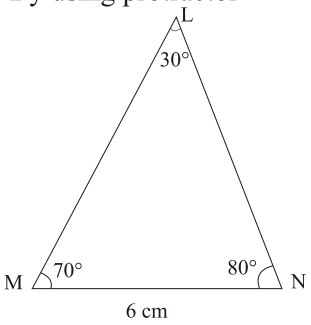


Here $BC = AC$ and $AB = 3$ cm

17. $\angle M + \angle N + \angle L = 180°$

$80° + 70° + \Delta = 180° \qquad \angle L = 180° - 150° = 30°$

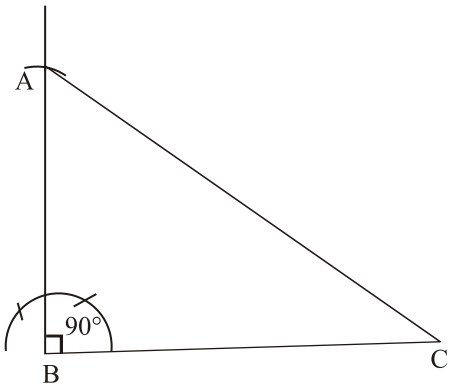
Hint : Made By using protractor



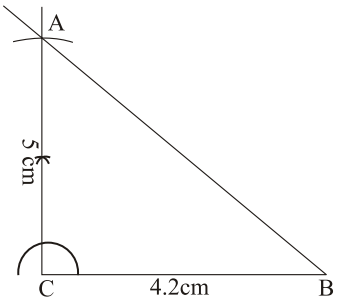
18. $AC^2 = AB^2 + BC^2$

$5^2 = AB^2 4^2$ $\quad 25 - 16 = AB^2$

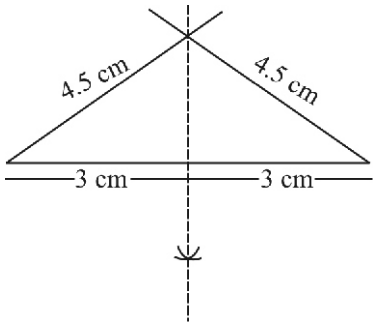
$9\text{ cm} = AB^2$ $\quad 3\text{ cm} = AB$



19.



20.



Brain Teasers

Fill up

1. Parallel lines
2. 180°
3. angles
4. two sides
5. a cute angle triangle
6. fig. 13.15 is not in the book

14 Visualising Solid Shapes

Exercise 14.1

1. (a) 3*D* **Ans** as cube is having *l*, *b* and *h*
(b) 2*D* **Ans** as rictangle only hence *l* and *b*.
(c) 2*D* **Ans**
(d) 3*D* having *l*, *b* and *h* (e) 3*D*
(f) 3*D* (g) 3*D* (h) 2*D*

2. (a) book → Cuboid **Ans**
(b) Carrot → Cone **Ans**
(c) bangle → Circle **Ans**
(d) Dice → Cube **Ans**
(e) Unsharponed Pencil → Cylinder **Ans**
(f) Tennis ball → Sphere **Ans**
(g) TV → Cuboid
(h) Joker's cap → Cone **Ans**

3. Complete the table

Solid	Faces	Vertices	Edyes
Cube	6	8	12
Crboid	6	8	12
Cylinder	3	0	2
Cone	2	1	1
Sphere	1	-	-
Triangular	5	6	9
Square Pyramid	5	5	8

4. (a) Cone (b) Sphere (c) Square Pyramid
(d) Triangular prism

5. (a) True (b) False (c) False (d) False (e) True (f) True
(g) True (h) True (i) True (j) True

Q 6, 7. Do, it yourself

Exercise 14.2

1. (a) 6 (b) 10

2. Do it yourself

MCQ

1. (c) 6 edges **Ans**
2. (b) cone has only one verta **Ans**
3. (d) Sphere do not have any edges **Ans**
4. (c) 3 **Ans** **5.** (a) Square Pyramid **Ans**
6. (c) Prism **Ans** **7.** (b) Cone **Ans**

15 Perimeter and Area

Exercise 15.1

1. (a) Perimeter = sum of all sides
$= 100 + 80 + 60 + 45 + 90 + 120 = 495$ cm **Ans**

(b) Perimeter of Star $= (2+2+2+2+2)\times 2$
$= 20$ cm **Ans**

(c) Perimeter of $= 3\times 8 + 1\times 4 = 24 + 4 = 28$ cm **Ans**

2. (a) Perimeter of Square $= 4\times$ side $= 4\times 3\frac{1}{4}$

$= 4\times\frac{13}{4}$ $P = 13$ cm **Ans**

(b) Perimeter of rectangle $= 2(l+b)$ here
$l = 22.5$ $b = 11.7 = 2(22.5 + 11.7)$
$= 34.2\times 2 = 68.4$ cm **Ans**

(c) Perimeter of $\Delta = a + b + c = 11.5 + 14.7 + 18.3$
$= 44.5$ cm **Ans**

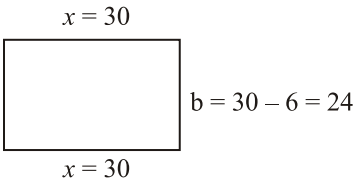
3. (a) Perimeter $= 4\times$ side $= 4\times 9.3 = 37.2$ **Ans**

(b) Perimeter of rectangle $= 2(l+b)$
$= 2\left(60 + 35\frac{1}{2}\right)$ m $= 2\left(60 + \frac{71}{2}\right)$ m

$= 2\left(\frac{191}{2}\right)$ m $= 191$ m **Ans**

(c) As Perimeter of triangle
$= AB + BC + AC = 9.2 + 4.5 + 7.3$
$= 21.0 = 21$ cm **Ans**

4. Length of square field $= 35$ m Perimeter of square field
$= 4\times 35 = 140$ m



for its 3 revolution Distance conered
$= 140\times 3 = 420$ m **Ans**

5. Let the length be x then breadth $= (x-6)$ m So breadth
$= 24$ m
Perimeter $= 2(l+b) = 2(30+24) = 2\times 54 = 108$ m

6. Perimeter of rectangular bed-sheet $= 2(l+b)$
$= 2(2.25 + 1.75) = 2\times 4 = 8$ m
Cost of 8m lace $= 14\times 50\times 8 = 116.00 = 116$ ₹ **Ans**

7. For fencing perimeter of triangle riquired
$= 60 + 40 + 20 = 120$ m
Cost to fence 1 meter $= 25$ ₹ Cost for flning 120 meter
$= 25\times 120 = 3000$ ₹
So 120, 3000 ₹ **Ans**

Exercise 15.2

1. (a) Area of parallel Q gram = base × height
$= (3\times 5)\text{ cm}^2 = 15\text{ cm}^2$ **Ans**

(b) Area $= (8\times 4)\text{ cm}^2 = 32\text{ cm}^2$

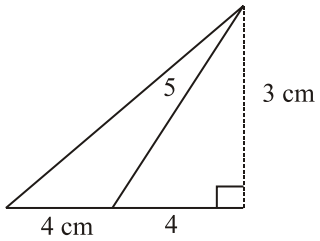
(c) Area of 11 gm $= (4\times 4)\text{ cm}^2 = 16\text{ cm}^2$ **Ans**

2. Area of triangle $= \frac{1}{2}$ base × height

(a) area $= \left(\frac{1}{2}\times 4\times 12\right)\text{cm}^2 = 24\text{ cm}^2$

(b) Area of $\Delta = \frac{1}{2}\times 3\times 3 = 4.5\text{ cm}^2$ **Ans**

(c)



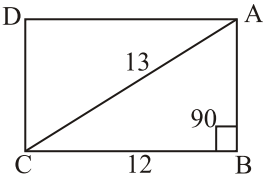
applying 3, 4, 5 as triplet for the second triangle now, base $= 8$ height $= 3$

So area $= \frac{1}{2}\times 3\times 8 = 12\text{ cm}^2$ **Ans**

3. area of rectangle = length × breadth
(a) $l = 15.5$ $b = 5$ m area of rectangle
$= 15:5\times 5 = 77.5\text{ m}^2$ **Ans**

(b) $l = 10$ m Perimeter $= 30$ m Perimeter of rectangle
$= 2(l+b)$
$30 = 2(10+b)$ $\quad 30 = 20 + 2b$
$30 - 20 = 2b$ $\quad 5\text{ m} = b$ So the area $= l\times b$
$= 10\times 5 = 50\text{ m}^2$ **Ans**

(c) length $= 12$ m Diagonal $= 13$ m ΔABC is a right angle Δ So by Pythagoras theorem



$AC^2 = AB^2 + BC^2$
$13^2 = 12^2 + AB^2$
$169 - 144 = AB^2$ $\quad 25 = AB^2$ $5\text{ m} = AB$

breadth $= 5$ m length $= 12$
area of rectangle $= l\times b = 12\times 5 = 60\text{ m}^2$ **Ans**

4. Area of square $= 100\text{ m}^2$ (given)

$(\text{size})^2 = 100 \quad \text{Size} = 10 \text{ m}$ **Ans**

5. Cost of fencing $= 595$

i.e. $2(l+b) \times 3.50 = 595 \quad 2(60+b) \times 3.50 = 595$

$(120+2b) = \frac{595}{35} \times 10 \quad 120+2b = \frac{595}{7} \times 2$

$120+2b = 85 \times 2 \quad 2b = 170-120$

$2b = 150 \quad b = 75$ m breadth $= 75$ m **Ans**

6. Let the height of Δ be x So the base will become $3x$

Cost of cultivating $= 495.72$ i.e. 1 hectare $= 1000 \text{ m}^2$

$$\left(\frac{1}{2} \times x \times 3x\right) \times \frac{36.72}{10000} = 495.72 ₹$$

$$\frac{3x^2}{2} = \frac{495.72}{36.72} \times 10000$$

$$x^2 = \frac{135 \times 2}{10 \times 3} \times 10000$$

$$x^2 = \frac{45}{5} \times 10000 \quad x^2 = 9 \times 10000$$

$x = 300$ m So height $= 300$ m

base $= 3x = 3 \times 300 = 900$ m **Ans**

i.e. height $= 300$ m base $= 900$ m **Ans**

7. Perimeter of rectangular field $= 0.6$ km Let the length be $2x$

So breadth $= x$ Now Perimeter $= 0.6$ km $2(l+b) = 0.6$ km

$2(2x+x) = 0.6 \text{ km} \quad 6x = 0.6 \text{ km} \quad x = \frac{1}{10}$ km

Now area $= l \times b = \frac{1}{10} \times \frac{2}{10} = \frac{2}{100} \text{ km}^2$

$1 \text{ km}^2 = 100$ hectare area in hectares

$$= \frac{2}{100} \times 100 = 2 \text{ hectares}$$ **Ans**

8. Area of parallelogram $= 335 \text{ m}^2 \quad h \times b = 338$ m Let the base be x

So the height is $2x \quad 2x \times x = 338 \quad x^2 = \frac{338}{2}$

$$x^2 = 169 \quad x = 13$$

Height $= 2x = 2 \times 13 = 26$ m base $= x = 13$ m **Ans**

9. Let the length be $4x$ Let the breadth be $3x$ Height $= 5.5$ metre (given)

Total cost of decerting $= 5082$ ₹ (C.S.A.) $\times 6.60 = 5082$

Cursed surface area $= \frac{5082}{660} \times 10$ C.S.A.

$$= \frac{4620}{6} \text{ C.S.A.} = 770$$

$$2bh + 2lh = 770 \quad 2h(l+b) = 770$$

$$2 \times 5.5 \times (l+b) = 770 \quad l+b = \frac{770}{11}$$

$$4x + 3x = 70 \qquad x = 10$$

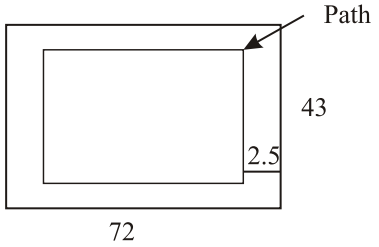
So length $= 4x = 4 \times 10 = 40$ metre

breadth $= 3x = 3 \times 10 = 30$ metre **Ans**

Exercise 15.3

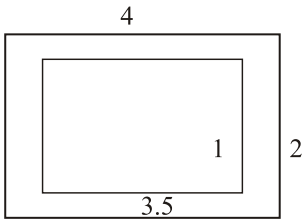
1. length of inner rectangle $= 72 - 2.5 - 2.5 = 72 - 5 = 67$ m

breadth of inner rectangle $= 43 - 5 = 38$ m Area of path = bigger rectangle $-$ smaller rectangle



$= 43 \times 72 - 67 \times 38 = 550 \text{ m}^2$ Cost of fencing $= 550 \times 1.25$ ₹ $= 687.5$ ₹ **Ans**

2. Area of table couer $= (4 \times 2) \text{ m}^2 = 8 \text{ m}^2$ area of cover couria table top $= 3.5 \times 1.5 = 5.25 \text{ m}^2$

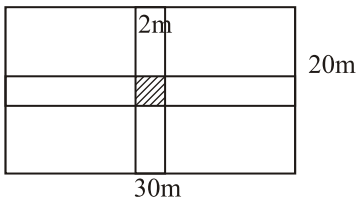


Cost of polishing $=$ ₹ 6.25 1m^2 So cost of polishing 5.25 $\text{m}^2 = 6.25 \times 5.25 = 32.81$ ₹ **Ans**

area $= 5.25 \text{ m}^2$ cost $= 32.8$ ₹ **Ans**

3. Area of 1st road $= 30 \times 2 = 60 \text{ m}^2$ Area of second road

$$= 20 \times 2 = 40 \text{ m}^2$$

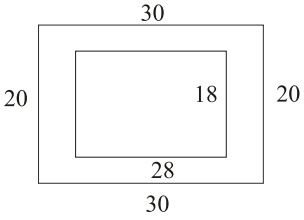


Area of intersection $= 2 \times 2 = 4 \text{ m}^2$

Total area of roads $= (60+40) - 4$

$$= 100 - 4 = 96 \text{ m}^2$$ **Ans**

4. Area of grassy plot $= (28 \times 18) \text{ m}^2 = 504 \text{ m}^2$



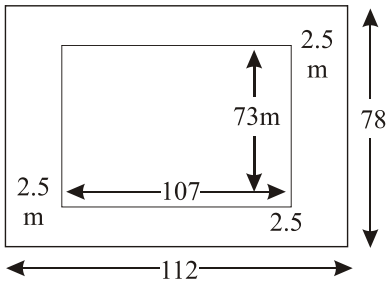
Area of rectangular lawn $= 30 \times 20 = 600 \text{ m}^2$

Area of foot path round plot $= 600 - 50 = 96\ m^2$

Number of titles required

$$= \frac{96 \times 100 \times 100}{40 \times 40} = \frac{9600}{16} = 600 \textbf{ Ans}$$

5.



Area of the path $= 112 \times 78 - 107 \times 73$

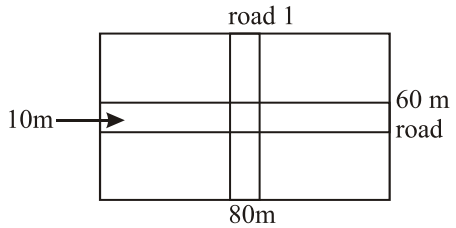
$$= 8736 - 7811 = 925\ m^2$$

Cost of construction for $1\ m^2 = ₹\ 3.40$

Cost of construction for $925\ m^2 = 925 \times 3.40$

$$= \frac{925 \times 340}{100} = 3145\ ₹ \textbf{ Ans}$$

6.



Area of Ist road $= 60 \times 10\ m^2$

area of IInd road $= 80 \times 10\ m^2$

area of intesect $= 10 \times 10\ m^2$

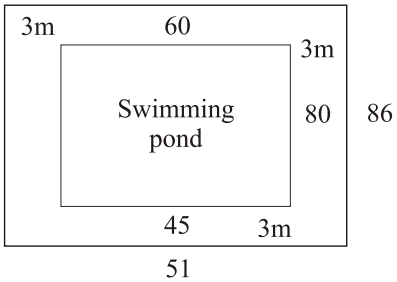
Total area of road $= 800 + 600 - 100$

$$= 800 + 500 = 1300\ m^2$$

Cost of labelling it be ₹ $1.20\ m^2 = \frac{1300 \times 120}{100}$

$$= 190 \times 12 = 1560\ ₹ \textbf{ Ans}$$

7.



Area of the borders

$= 86 \times 51.80 \times 45 = 4386 - 3600 = 786\ m^2$ **Ans**

8. Area of the shaded region = area of rectangle – area of 45 square

$= 25 \times 42 - 4(9 \times 9) = 1050 - 324$

$= 726\ m^2$ **Ans**

Exercise 15.4

Circumferience of circle $= 2\pi r$ $D = 14$ $r = \frac{14}{2} = 7$ cm

1. (a) Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 7 = 47$ cm **Ans**

$D = 6.6$

(b) Circumference $= 2\pi r = 2 \times \frac{22}{7} \times \frac{5.6}{2}$

$$= 2 \times \frac{22}{7} \times 2.8 = 2 \times 22 \times \frac{4}{10}$$

$$= \frac{176}{10} = 17.6\ \text{cm}$$ **Ans** $D = 56$ m

(c) Circumference $= 2\pi \frac{D}{2} = 2 \times \frac{22}{7} \times \frac{56}{2}$

$= 2 \times 11 \times 8 = 16 \times 11 = 176$ cm **Ans**

2. (a) $r = 28$ cm Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 28$

$= 176$cm **Ans** $r = 14$ m

(b) Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 14 = 2 \times 22 \times 2$

$= 8 \times 11 = 88$ m **Ans**

(c) $r = 24.5$ cm Circumference $= 2\pi r = 2 \times \frac{22}{7} \times \frac{245}{10}$

$$= \frac{22}{7} \times 49 = 22 \times 7 = 154\ \text{cm}$$ **Ans**

3. (a) Circumference $= 308$ m $2 \times \frac{22}{7} \times r = 308$

$$r = \frac{308 \times 7}{22 \times 2} = \frac{14 \times 7}{2} = 49\ \text{m}$$ **Ans**

(b) Circumference $= 880$ cm

$$2\pi r = 880\ \text{cm} = 2 \times \frac{22}{7} \times r = 880\ \text{cm}$$

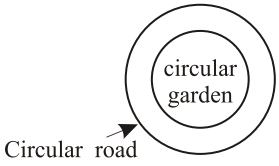
$$r = \frac{880 \times 7}{47} = 20 \times 7 = 140\ \text{cm}$$ **Ans**

(c) Circumference $= 132$ cm

$$2\pi r = 132\ \text{cm}\ 2 \times \frac{22}{7} \times r = 132\ \text{cm}$$

$$r = \frac{132 \times 7}{47} = 3 \times 7 = 21\ \text{cm}$$ **Ans**

4.



Circumference $= 110$ Circumference Inner $= 88$

$2\pi r_2 - 2\pi r_1 = 110 - 88$

$2 \times \frac{22}{7}(r_2 - r_1) = 22 \quad r_2 - r_1 = \frac{7}{2}$

$r_2 - r_1 = 3.5$ m width $= 3.5$ m **Ans**

5. Distance covered in one reuoention $= 2\pi r$

Distance couired in 8000 reuolit

$= 2\pi r \times 8000 = 2 \times \frac{22}{7} \times \frac{21}{10} \times 8000$

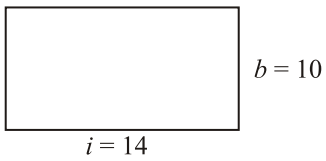
$= 2 \times 22 \times 3 \times 800 = 11 \times 12 \times 800$

$= 11 \times 100 \times 96 = 105600$ m or 105.6 km **Ans**

6. radius $= 5$m outer edge of the wet grass $=$ circumference

$= 2 \times \frac{22}{7} \times 5 = \frac{20 \times 11}{7} = \frac{220}{7} = 31.4$ m **Ans**

7.



Perimeter of the rectangular = Circumference of the circle

$2 \times 18 + 2 \times 15 = 2\pi r \quad 36 + 30 = 2 \times \frac{22}{7} \times r$

$\frac{66 \times 7}{44} = r \qquad \frac{3 \times 7}{2} = r \frac{21}{2} = r \quad r = 10.5$ cm **Ans**

8. Circumference of carriage whole in metres

$= \frac{\text{Distance covered}}{\text{No. of revolutions}}$

Circumference $= \frac{4.5 \times 1000}{1500}$

$2\pi r = \frac{4500}{1500} \frac{2 \times 314}{100} \times r = 3 \quad r = \frac{3 \times 100}{2 \times 314}$

radius (m) $= \frac{300 \times 100}{2 \times 314} = \frac{15000}{314}$

$= 547.77$ cm or $= 47.8$ cm **Ans**

9. radius $= 56$ cm

Circumfernece of curve = Perameter of square

$2\pi r = 4 \times$ size

$2 \times \frac{22}{7} \times 56 = 4 \times$ size

$\frac{16 \times 22}{4} =$ size $4 \times 22 =$ size 88 cm $=$ side **Ans**

10. Diameter of circle $= 3.5$ m

Circumference = lace required to covers the edge

$= 2 \times \pi \times \frac{D}{2} = 2 \times \frac{22}{7} \times \frac{35}{10 \times 2}$

$= 2 \times 22 \times \frac{5}{20} = \frac{22}{2} = 11$ m **Ans**

Cost of 1 metre lace $= 30$ ₹

Cost of 11 metre lace $= 30 \times 11 = 330$ ₹ **Ans**

Cost $= 330$ ₹ length $= 11$ m **Ans**

11. (a) Perimeter of quardent $= \frac{\text{Circuference}}{4} + 2 \times 21$

$= 2 \times \frac{22}{7} \times \frac{21}{4} + 2 \times 21$

$= 42 + 11 \times 3 = 33 + 42 = 75$ m **Ans**

(b) Perimeter $= \frac{3}{4} \times$ Circumference $+ 2 \times 0.7, \quad r = 0.7$

$= \frac{3}{4} \times 2 \times \frac{22}{7} \times \frac{7}{10} + 1.4$

$= 3 \times \frac{11}{10} + 1.4 = 3.3 + 1.4 = 4.7$ m **Ans**

(c) $r = 10.5$ m Perimeter $= \frac{\text{Circumference}}{2} + 2 \times 7$

$= \frac{2}{2} \times \frac{22}{7} \times \frac{10.5}{10} + 14$ m

$= \frac{2 \times 11}{10} \times 15 + 14$ m

$= 11 \times 3 + 14 = 33 + 14$

$= 47$ m **Ans**

Exercise 15.5

1. Area of circle $= \pi r^2$

(a) $r = 21$ m area $= \frac{22}{7} \times 21 \times 21$

$= 22 \times 3 \times 21 = 22 \times 63 = 11 \times 126 = 1386$ m^2 **Ans**

(b) $D = 42$ m $r = \frac{D}{2} = 21$ m

area $= \frac{22}{7} \times 21 \times 21 = 22 \times 3 \times 21 = 1386$ m^2 **Ans**

(c) $r = 14$

area $= \frac{22}{7} \times 14 \times 14 = 22 \times 28 = 11 \times 56 = 616$ cm^2 **Ans**

2. $D = 2.2$ m radius $= 1.1$ m area of circle $= \pi r^2$

$= \frac{22}{7} \times \frac{11}{10} \times \frac{11}{10}$

$= \frac{314}{100} \times \frac{11 \times 11}{100} = 3.7994$ m^2

cost of 1 m^2 $= 220 \approx 3.8$ m^2

Cost of 3.8 m^2 $= \frac{38}{10} \times 20 = 76$ ₹ **Ans**

3. Circumference $= 176$ m $2 \times \frac{22}{7} \times r = 176$

$r = \frac{176 \times 7}{22 \times 2} \quad r = 4 \times 7 \quad r = 28$ m

area of the shut $= \pi r^2$

$$= \frac{22}{7} \times 28 \times 28 = 22 \times 4 \times 28$$

$$= 11 \times 8 \times 28 = 11 \times 224 = 2464 \text{ m}^2 \textbf{ Ans}$$

4. Let the diameter be $3x$ and $2x$

$$\frac{\text{area of first circle}}{\text{area of second circle}} = \frac{\pi}{\pi} \times \frac{3x}{2} \times \frac{3x}{2} \times \frac{2 \times 3}{2x \times 2x}$$

$$= \frac{3x \times 3x \times 4}{4 \times 4x} = \frac{9x}{4x} = \frac{9}{4}$$

(ii) Circumference $= 77$ ratio $= 9:4$ $2 \times \frac{22}{7} \times r = 77$

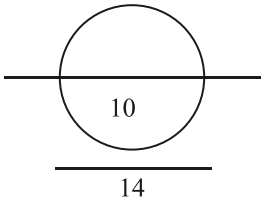
$$r = \frac{77 \times 7}{44} = \frac{7 \times 7}{4} = \frac{49}{4}$$

$$\text{area} = \frac{22}{7} \times \frac{49}{4} \times \frac{49}{4} = \frac{22 \times 7 \times 49}{4 \times 4} = \frac{11 \times 7 \times 49}{8}$$

$$= \frac{11 \times 343}{8} = \frac{3773}{8} \text{ cm}^2 \textbf{ Ans}$$

5. $D = 10$ cm $r = 5$ cm area of Disc

= area of outer circle − area of inner circle



$$= \pi(r_0)^2 - \pi(r_1)^2 = \pi\left[\left(\frac{14}{2}\right)^2 - \left(\frac{10}{2}\right)^2\right]$$

$$= \frac{314}{102}[49 - 25] = \frac{314}{100} \times 24 = 75.36 \text{ cm}^2 \textbf{ Ans}$$

6. $D = 29$ m radius $= \frac{29}{2}$

$$\text{Circumference of the garden} = 2 \times \pi \times \frac{D}{2}$$

$$= 2 \times \frac{22}{7} \times \frac{29}{2} = \frac{22}{7} \times 29$$

for 6 road wire required $= \frac{22}{7} \times 29 \times 6 \text{ m} = 546.8$ m **Ans**

Now cost of 1 m line $= 11$ ₹

Total cost of 546.8 m wire $= 546.8 \times 11 = 6014.8$ ₹ **Ans**

7. $\frac{\text{Circumference of first circle}}{\text{Circumference of second circle}} = \frac{2\pi r_1}{2\pi r_2}$ i.e.

$$\frac{2\pi r_1}{2\pi r_2} = \frac{4}{1} \quad \frac{r_1}{r_2} = \frac{4}{1}$$

$$\text{ratio of area} = \frac{\pi(r_1)^2}{\pi(r_2)^2} = \left(\frac{r_1}{r_2}\right)^2 = \left(\frac{4}{1}\right)^2 = \frac{16}{1} = 16:1 \textbf{ Ans}$$

8. Circumference $= 10\pi$ $2 \times \pi \times x = 10\pi$ $2r = 10$ $r = 5$ **Ans**

area $= \pi r^2 = \frac{314}{100} \times 5 \times 5 = \frac{314}{4} = 78.5$ unit

$r = 5$ unit area $= 78.5$ unit^2 **Ans**

9. area of shaded rigion = area of rectangle − area of semicircle of radius $\frac{7}{2}$

$$= 12 \times 7 - \frac{\pi}{2} \times \frac{7}{2} \times \frac{7}{2} = 84 - \frac{22}{7} \times \frac{7 \times 7}{2 \times 4}$$

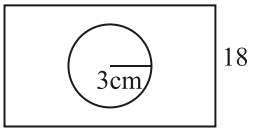
$$= 84 - \frac{77}{4} = 84 - 19.25 = 64.75 \text{ cm}^2 \textbf{ Ans}$$

10. $r = 3$ cm

area of left paper = area of rectangle − area of circle or radius 3 cm

$$= 11 \times 10 - \frac{22}{7} \times 3 \times 3$$

$$= 110 - \frac{198}{7}$$



$$= 110 - 28.28 = 81.71 \text{ cm}^2 \textbf{ Ans}$$

11. (a) In Right ΔABC $17^2 = 8^2 + AB^2$

$$289 - 64 = AB^2 \quad 225 = AB^2$$

$$\sqrt{225} = AB \quad 15 = AB$$

area of shaded region = area of rectangle − area of O

$$= l \times b - \frac{1}{2} \times \text{base} \times \text{height}$$

$$= 16 \times 10 - \frac{1}{2} \times 8 \times 15$$

$$= 160 - 60 = 100 \text{ cm}^2 \textbf{ Ans}$$

(b) area of shaded region = area of square − area of circle or radius $\frac{14}{2}$ cm

$$= (\text{Side})^2 - \pi r^2 = (14)^2 - \frac{22}{7} \times \frac{14}{2} \times \frac{14}{2}$$

$$= 196 - 21 \times 24 = 196 - 154 = 42 \text{ cm}^2 \textbf{ Ans}$$

(c) area of shaded portion = area of square − area of Δ (base $= 10$, height $= 20$) − area of Δ (base $= 10$, height $= 10$) − area of Δ (base 10, height $= 20$)

$$= (20)^2 - \frac{1}{2} \times 10 \times 20 - \frac{1}{2} \times 10 \times 10 - \frac{1}{2} \times 10 \times 20$$

$$= 400 - 100 - 50 - 100$$

$$= 400 - 250 = 150 \text{ cm}^2 \textbf{ Ans}$$

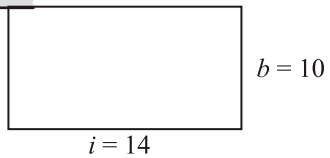
MCQ

1. Length of fince

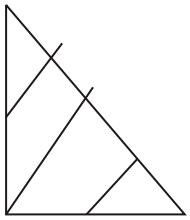
= perimeter of rectangle

$= 2(l + b) = 2(14 + 10)$

$= 2 \times 24 = 48$ m (c) **Ans**



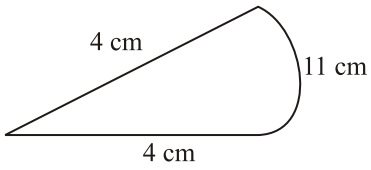
2.



area of rectangle of modification $= \frac{1}{2} \times \frac{b}{2} \times 2h = \frac{1}{2} bh$ (d)

remains same

3.



Perimeter $= 4 + 4 + 11 = 19$ cm **Ans**

4. Area of remaining part = area of rectangle − area of semicince

$$= l \times b - \frac{\pi}{2} r^2$$

$$= 21 \times 15 - \frac{21}{7} \times \frac{21}{2} \times \frac{21}{2} \times \frac{5}{2}$$

$$= 315 - 22 \times \frac{3}{2} \times \frac{21}{2} \times \frac{1}{2}$$

$$= 315 - 11 \times 3 \times \frac{21}{2} \times \frac{1}{2}$$

$$= 315 - \frac{693}{4} = 315.00 - 173.25$$

$$= 141.75 \text{ (d) } \textbf{Ans}$$

5. Area of shaded region = area of rectangle − area of two saminircle or radius $\frac{14}{2}$

$$= 20 \times 14 - \frac{22}{7} \times 7 \times 7$$

$$= 280 - 154 = 126 \text{ cm (None of these) } \textbf{Ans}$$

6. Area of first strip $= 50 \times 10$ area of second strip $= 50 \times 10$

area of intersiction $= 10 \times 10$

Total area $= 500 + 500 - 100 = 900 \text{ cm}^2$ (a) **Ans**

7. 1 are $= 100 \text{ m}^2$ 4 equal area $= 4$ equal are $= \frac{100}{4} \text{ m}^2$

$= 25 \text{ m}^2$ (b) **Ans**

8. Area of ring = area of outer ring − area of inner ring

$$= \pi r^2 - \pi r_1^2 m_2 = \pi(5^2 - 4^2) m^2$$

$$= \pi(25 - 16) = 9\pi m^2 \text{ (d) } \textbf{Ans}$$

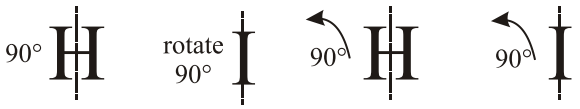
16 Symmetry

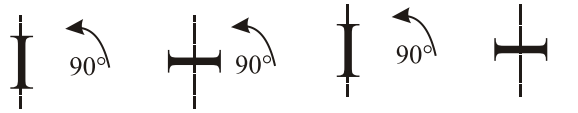
Exercise 16.1

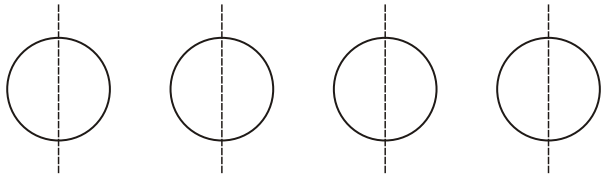
Do it by yourself

Exercise 16.2

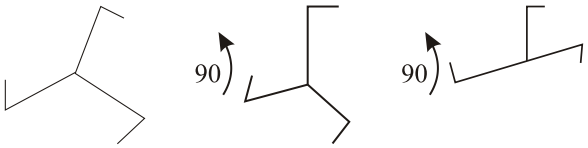
1. H, I, O

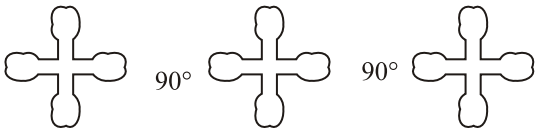




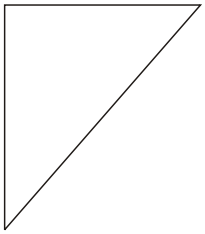


2. ***a, c, d***



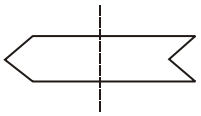


3. (a)

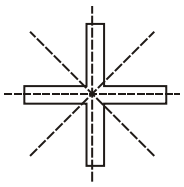


No line symmetry possible order of symmetry $= 1$ **Ans**

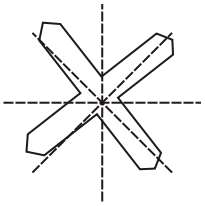
(b) 360 order of after 360° same symmetry 1 line of symmetry $= 1$ **Ans**



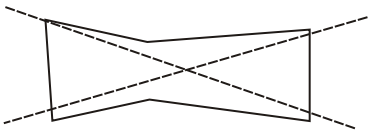
(c) line of symmetry = 4 90 order of symmetry = 4 after 90° same **Ans**



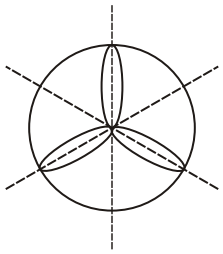
(d) line of symmetry = 4 90 order of symmetry = 4 after (90° .....) same **Ans**



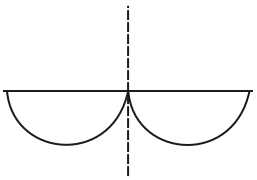
(e) line of symmetry = 2 180 order of symmetry = 2 after (180° .....) same **Ans**



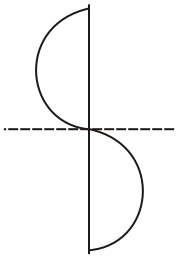
(f) line of symmetry = 3 120 order of symmetry after (120° ....) same = 3 **Ans**



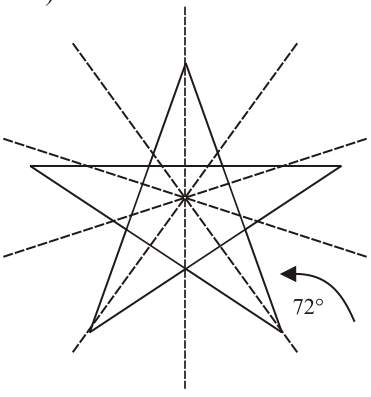
(g) line of symmetry only = 1 360 order of symmetry = 1 after 360° same **Ans**



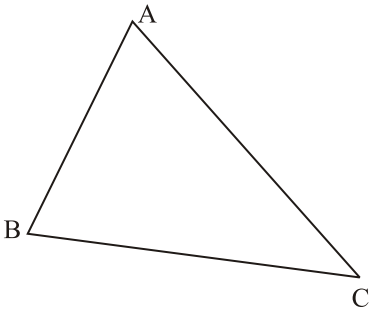
(h) line of symmetry = 1 180 order of symmetry = 2 after easy 180° **Ans**



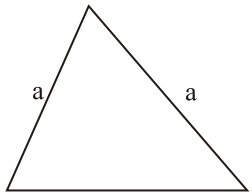
(i) Line of symmetry = 5 72 order of symmetry = 5 (at cury 72°) **Ans**

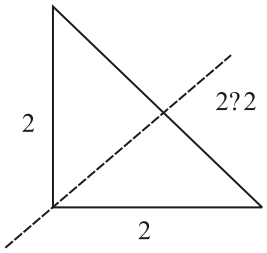


4. (a) No line of symmetry 360 order of symmetry = 1 at cury 360° **Ans**

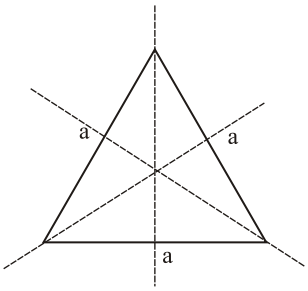


(b) Isosceles Δ it can be a right angle Δ 360 line of symmetry = 1 order of symmetry = 1 at cury 360°





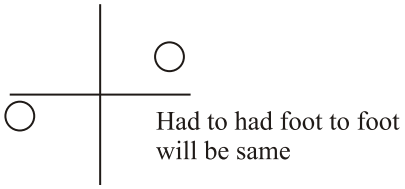
(c) eqrilateral Δ order of symmetry = 3 line of symmetry = 3 **Ans**



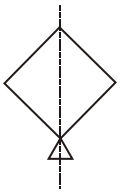
(d) Regular Pentagon In any regular polygon line of symmetry = order of symmetry = Number of sides So line of symmetry = 5 order of symmetry = 5 **Ans**

MCQ

1. (a) 66 **Ans**
   (b) (c) 0 head to head foot to foot will be same



3. (c) Kite



4. (c) Wow does not have point symmetry

5. (c) triangle in isosceles triangle
6. (a) in circle there can be infinite lines of symmetry
7. (a) Kite has only one line of symmetry
8. (b) Isosceles triangle has one line of symmetry

17 Data Handling

Exercise 17.1

1. (a) $\text{Mean} = \dfrac{\text{Sum of all observation}}{\text{No of observation}}$

$$= \frac{15+19+15+14+15+16+14+21+15}{9}$$

$$= \frac{144}{9} = 16$$

Mode = 15 14, 14, 15, 15, 15, 15, 16, 19, 21

$$\text{Median} = \frac{9+1}{2} = 5$$

Median = 15 Mode = 15 Mean = 16 **Ans**

(b) 10, 10, 10, 10, 11, 11, 13, 14, 15, 16

$$\text{Mean} = \frac{40+22+58}{10} = \frac{120}{10} = 12$$

$$\text{Mode} = 10 \text{ Median} = \frac{11+11}{2} = 11 \textbf{ Ans}$$

Mean = 12 Median = 11 Mode = 10 **Ans**

(c) 2, 3, 5, 7, 8, 9 Mean $\dfrac{34}{6} = 566$ **Ans**

$$\text{Median} = \frac{5+7}{2} = 6 \textbf{ Ans}$$

Mode = no mode

Mean = 5.66 Median = 6 Mode = no mode **Ans**

(d) $\text{Mean} = \dfrac{11+21+27+21}{10} = \dfrac{81}{10} = 8.1$

$$\text{Median} = \frac{9+9}{2} = \frac{18}{2} = 9 \text{ Mode} = 9, 7$$

Mean = 8.1 Median = 9 Mode = 9

2. For the average score in 5 subject sum $= 5 \times 85 = 425$

last subject marks ..... $= 420 - 87 - 76 - 95 - 33$

$= 425 - 346 = 79$ marks **Ans**

3. Mean = Mode Mode

$$= 6\ \frac{37+x}{8} = 6$$

$$x = 8 \times 6 - 37 = 48 - 37\ x = 11 \textbf{ Ans}$$

4. Results in ascending order 39, 40, 40, 40, 41, 41, 41, 42, 42, 42, 42, 44, 45, 45, 46

$$\text{Mean} = \frac{39+120+123+168+44+90+46}{15} = \frac{630}{15} = 42$$

$$\text{Median} = \left(\frac{15+1}{2}\right) \text{observation} = 8\text{th observation} = 42$$

Mode = 42 Mean = 42 Median = 42 Mode = 42 **Ans**

5. 148, 149, 152, 152, 152, 153, 154, 155, 155, 156, 160, 162

$$\text{Mean} = \frac{148+149+152+3+153+154+155\times 2+156+160+162}{12}$$

$$= \frac{1848}{12} = 154$$

$$\text{Median} = \frac{6\text{th} + 7\text{th observation}}{2}$$

$$= \frac{153+154}{2} = 153 - 5$$

Mode = 152 Mean = 154 Median

= 153.5 Mode = 152 **Ans**

6. Marks Student 69 5 66 6 82 $\dfrac{4}{15}$

$$\text{Mean} = \frac{69\times 5 + 66\times 6 + 81\times 4}{15}$$

$$= \frac{345+396+324}{15} = \frac{1065}{15} = 71$$

marks Mean marks = 71 **Ans**

7. Median of 9 obsurvation $= 20\left(\dfrac{10\text{th}}{2}\right)$ observation $= 20$

So the x is nothing but the median $x = 20$ **Ans**

8. as in this questions both 33 and 37 are given 3 times and mode = 33 given in question so the remaining value of x will be 33 i.e. mode = 33 $x = 33$ **Ans**

9. Mode = 6 and 7 {as both comes repeated 3 times}

10. Mean = 8 {given} $6 + 7 + 19 + x + 11 + 14 = 8 \times 8$

$$13 + 19 + x + 254 = 8 \times 8$$

$$57 + x = 8 \times 8$$

$$x = 64 - 57 = 7 \quad x = 7 \textbf{ Ans}$$

11. Mean = 51 {given}

Sum of 10 observation = Mean × 10

$$= 51 \times 10 = 510$$

Correct sum $= 510 - 10 = 500$

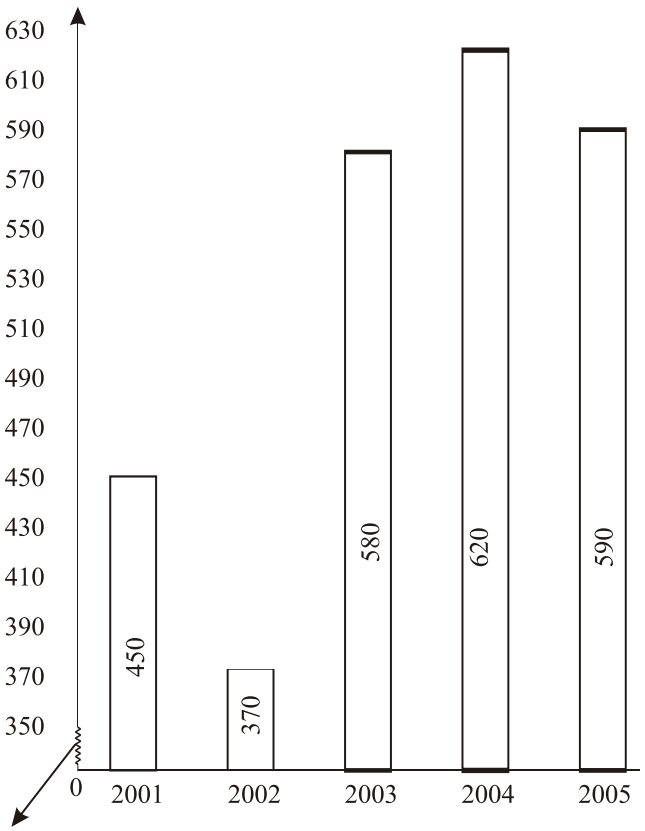
Correct mean $= \dfrac{500}{10}$ Mean = 50 **Ans**

12. (a) Pink {as it comes maximum times}

(b) Central tendency of data is the manimum number of qccurence of a given observation i.e. it the mode **Ans**

Exercise 17.2

1.



= Shifting 350
1 cm = 20 unit (Scale)

(a) average no of chair sold

$$= \frac{450+370+580+1620+590}{5}$$

$$= \frac{2610}{5} = 522 \text{ Chairs } \textbf{Ans}$$

(b) Increase in no of chair $= 620 - 370$
(from 2002 to 2004) $= 250$ chairs **Ans**

2. (a) Do it by yourself

(b) Do it by youself

(c) *D* gets maximum number of banners i.e. 620
Town D **Ans**

(d) $\frac{\text{Ratio of banners of town C}}{\text{Ratio of banners of town F}} = \frac{250}{450} = \frac{25}{45} = \frac{5}{9}$

Ratio $= 5:9$ **Ans**

(e) Total banners distributed

$$= 540+320+250+620+105+450 = 2285$$

Now $\frac{1}{5} \times$ total banners $= 2285 \times \frac{1}{5} = 457$

So Town A and Town D are getting chairs more than 457 540 > 457 620 > 457

Town A & Town D **Ans**

3. (a) number of visitors on Sunday

$$= x \times \text{No of visitors on .....}$$

$$1280 = x \times 300 \quad \frac{1280}{300} = x \quad x = 4 \text{ times } \textbf{Ans}$$

(b) Total number of visitors on wekend = No of visitors of saturday + No of visitors on Sunday

$$= 1050 + 1200 = 2250 \text{ visitors } \textbf{Ans}$$

(c) ratio $= \frac{\text{No of visitors on tuesday}}{\text{No of visitors on Sunday}}$

$$= \frac{600}{1200} = \frac{1}{2} = 1:2 \textbf{ Ans}$$

(d) Median $= \left(\frac{6}{2}\right)^{\text{th}}$ observation $= 3^{\text{rd}}$ observation

300, 450, 600, 600, 750, 1050, 1200 Median = 600 **Ans**
Mode = 600 **Ans**

4. (a) In January sales are the lowest i.e. 305 + 250 555 kg sales

So, January **Ans**

(b) Ratio $= \frac{\text{Sale of wheat (in March)}}{\text{Sale of rice (in March)}}$

$$= \frac{400}{500} = \frac{4}{5} = 4:5 \qquad \textbf{Ans}$$

(c) Sale Ratio of sales in February wheat to that of Rice

$$= \frac{345}{460} = \frac{69}{92} = \frac{23\times3}{23\times5} = \frac{3}{4} = 3:4 \textbf{ Ans}$$

So, February **Ans**

5. (a) Do it by yourself

(b) VII B **Ans**

Explanation : Harshe total march in language $= 91 + 87 = 178$ Marks

Suyash (jan VII B) Total marks in languages $= 97 + 89 = 186$ marks

186 > 178 (lass VII B pert of well) **Ans**

(c) Difference of marks obtained in mathematics $= 89 - 78 = 11$ marks **Ans**

(d) In Science & Social Science Harsh is better than Suyash **Ans**

(e) Mean marks of Harsh

$$= \frac{91+87+78+98+92}{5} = \frac{446}{5} = 89.2 \textbf{ Ans}$$

Mean marks of Suyash

$$= \frac{97+89+89+88+87}{5} = \frac{450}{5} = 90 \textbf{ Ans}$$

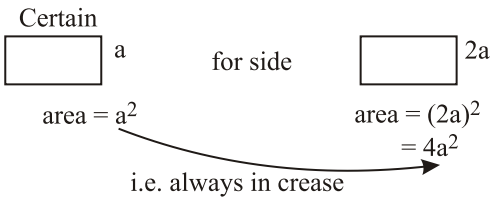
So Suyash perform better **Ans**

Exercise 17.3

1. (a) impossible **Ans**

Explanation : as possible outcome for lice are 2, 2, 3, 4, 5, 6

(b)



(c) Certain (always true) **Ans**

(d) likely **Ans** as it may get both nead or tail as output

(e) likely **Ans** as it may or may not rain tommorow is the possibility.

(f) Unlikely **Ans** height near increase at this rate

2. Possible outcome for dice $=\{1,2,3,4,5,6\}$

Number of total possible outcome $=6$

Probability (of getting 5)

$$=\frac{\text{No of outcome}}{\text{Total No of possible outcome}}=\frac{1}{6}\ \textbf{Ans}$$

(b) Possible earn number outcome $=\{2, 4, 6\}=3$

Total no of possible outcome $=\{1, 2, 3, 4, 5, 6\}=6$

Probability of getting even number $=\frac{3}{6}=\frac{1}{2}$ **Ans**

(c) Successful outcome for prime number $=2, 3, 5=3$

Total No of possible outcome $=6$

P (getting a prime number) $=\frac{3}{6}=\frac{1}{2}$ **Ans**

(d) 1 or 2 No of sucusful outcome $=2$

Total no of possible outcome $=6$

P (getting 1 or 2) $=\frac{2}{6}=\frac{1}{3}$ **Ans**

3. Total no of outcome $=12$

No of succesful outcome for black $=3$

(a) P (black) $=\frac{3}{12}=\frac{1}{4}$ **Ans**

(b) Successful outcome for white or black $=3+4=7$

Probability (W or B) $=\frac{7}{12}$ **Ans**

(c) Successful outcome for not red $=12-5=7$

Probability (Red ball) $=\frac{7}{12}$ **Ans**

(e) Successful outcome for not white balls $=12-4=8$

Probability (not white) $=\frac{8}{12}=\frac{2}{3}$ **Ans**

4. 'ESTJMATE' No of total outcome $=8$

(a) Successful outcome for getting $E=2$

P (getting E) $=\frac{2}{8}=\frac{1}{4}$ **Ans**

(b) as Successful outcome for getting $S=1$

Probability (of getting S) $=\frac{1}{8}$ **Ans**

(c) a T Successful outcome for getting $T=2$

Probability (getting T) $=\frac{2}{8}=\frac{1}{4}$ **Ans**

(d) A letter other than A Successful outcome for getting a letter other than $A=8-1=7$ Probability (getting number other than a) $=\frac{7}{8}$ **Ans**

5. P (rain tommorow) $=\frac{3}{7}$

P (not rain tommorow) $=1-$ P (rain tommorow)

$$=1-\frac{3}{7}=\frac{4}{7}\ \textbf{Ans}$$

MCQ

1. 5, 10, 15, 20, 25

$$\text{Median}=\left(\frac{5+1}{2}\right)^{\text{th}}\ \text{observation}=3^{\text{rd}}\ \text{observation}$$

Median $=15$ (b) **Ans**

2. First four prime numbers are $=2, 3, 5, 7$

$$\text{Mean}=\frac{2+3+5+7}{4}=\frac{17}{4}=4.25\ \text{(a)}\ \textbf{Ans}$$

3. First five odd natural number $=1, 3, 5, 7, 9$

$$\text{Mean}=\frac{1+3+5+7+9}{5}=\frac{25}{5}=5\ \text{(b)}\ \textbf{Ans}$$

4. First ten odd natural numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

$$\text{Mean}=\frac{1+3+5+7+9+11+13+15+17+19}{10}$$

$$=\frac{100}{10}=10\ \text{i.e. (a)}\ \textbf{Ans}$$

5. First eight even number $=2, 4, 6, 8, 10, 12, 14, 16$

$$\text{Mean}=\frac{2+4+6+8+10+12+14+16}{8}$$

$$=\frac{72}{8}=9\ \text{(c)}\ \textbf{Ans}$$

6. Mode of 0, 2, 2, 2, 3, 5, 6, 6 Clearly 2 θ (curs maximum times so Mode $=2$ (a) **Ans**