EVERWIN VIDHYASHRAM

STD: VIII **MATHEMATICS** **TERM – II**

PLAYING WITH NUMBERS

Ex - 16.1

1. 3 A
+2 5
B 2

Find the values of letters and give the reasons for the steps involved.

Ans: 3 7
+2 5
6 2 B=6

2. Find the values of letters and give the reasons:

4 A
+9 8
C B 3

Ans: 4 5
+9 8
14 3 B=4, C=1

3. Find the values of numbers

1 A
× A
9 A

Ans: 1 6
× 6
9 6 A=6

4. Find the values of letters in the following and give reasons for th setups involved.

A B
+3 7
6 A

Ans: 2 5
+ 3 7
6 2

5. Find the values of letters in the followed and give reasons.

A B
× 3
C A B

Ans: 5 0
× 3
1 5 0

A = 5, B=0, C=1.

6. Find the values of the letters in the following and giv reasons.

A B
× 5
C A B

Ans: 5 0
× 5
2 5 0

7. Find the values of letters in the following and give reasons.

A B
× 6
B BB

Ans: 7 4
× 6
4 4 4

A=7, B=4

8. Find the values of letters and give reasons.

A 1
+ 1 B
B 0

Ans: 7 1
+ 1 9
9 0

9. Find the values at the letters in +ve following and give reasons.

2 A B
+ A B 1
B 1 8

Ans: 2 4 7
+ 4 7 1
7 1 8

10. Find the values of letters in the following and give reasons.

$$\begin{array}{r} 1\ 2\ A \\ +\ 6\ A\ B \\ \hline A\ 0\ 9 \end{array}$$

Ans:

$$\begin{array}{r} 1\ 2\ 8 \\ +\ 6\ 8\ 1 \\ \hline 8\ 0\ 9 \end{array}$$

A=8, B=1

Ex - 16.2

1. If a number is a multiple of 9. Then the sum of its digits will be divisible by 9.
∴Sum of digits of 21y5 = 2+1+y+5 = 8+y
Hence, .8+y should be a multiple of a. This is possible when 8+y is any one of these numbers 0, 9, 18, 27 and so an ……
However, since y is a single digit number, this sum can be 9 only.
Therefore, y should be 1 only.
2. Ans: If a number is a multiple of 9, then the sum of its digits will be divisible by 9.
Sum of digits of 3125 = 3+1+2+5 = 9+z
Hence 9+Z should be a multiple of 9. This is possible when 9+z is only one of these numbers 0, 9, 18, 27, and so on…..
However, since z is a single digit number, this sum can be either 9 or 8. Therefore, z should be either 0 or 9.
3. Ans: Since 2nx is a multiple of 3, the sum of digits is a multiple of 3. Sum of digits of 24x=2+4+x = 6+x.
⟹ Hence, 6+x is a multiple of 3. This is possible when 6+x is any one of these numbers 0, 3, 6, 9 and so on…..
⟹Since X is a single digit number, the sum of the digits can be 6 or 9 or 12 or 15 and thus, the values of x comes to 0 or 3 or 6 or 9 respectively
∴Thus, X can have its value as any of the four different values 0, 3, 6 or 9.
4. Ans: ⟹ Since 3125 is a multiple of 3, the sum of its digits will be a multiple of 3.
⟹That is, 3+1+2+5 = 9+z is a multiple of 3
This is possible when 9+z is any one of 0, 3, 6, 9, 12, 15, 18 and so on…..
⟹Since Z is a single digit number the value of 9+z can only be 9 or 12 or 15 or 18 and thus the value of x comes to 0 (or) 3 (or)6 (or)9 respectively.
∴Thus, Z can have its values of any one of the four different values 0, 3, 6 or 9.

Data handling

Exercise: 5.1

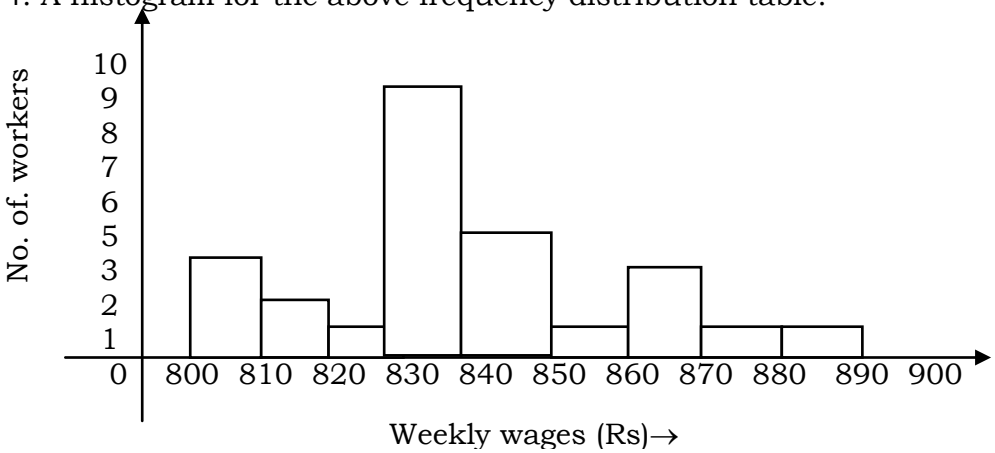
1. In case of the data given in alternative (b) and (d), we will use histogram as we can divide the given data in class intervals.
In case of alternatives (a) & (c)
We do not know about the number of letters of different areas and the number of cassettes. In that cases we will not use a histogram.
2. Frequency Distribution table.

Shopper	Tally marks	Number
W	𝍸 𝍸 𝍸 𝍸 III	28
M	𝍸 𝍸 𝍸	15
B	𝍸	5
G	𝍸 𝍸 II	12
		60

3. A frequency distribution table by using tally marks for the above data is as follows.

Interval	Tally marks	Frequency
800 - 810	III	3
810 - 820	II	2
820 - 830	I	1
830 - 840	$\cancel{\text{III}}$ $\cancel{\text{IIII}}$	9
840 - 850	$\cancel{\text{III}}$	5
850 - 860	I	1
860 - 870	III	3
870 - 880	I	1
880 - 890	I	1

4. A histogram for the above frequency distribution table.



(i). 830 - 840 is the group which has the maximum number of workers.

(ii) The workers who can earn more than ₹850 are the number of workers who fall in the group of 850 - 860 or 860 - 870 or 870 - 880 earning more than 850 will be the sum of the numbers of all these workers. (i. e) 1+3+1+1+y=10

(iii) The number of workers who earn less than ₹850 are 3+2+1+9+5 = 20

5. (i) From the graph, it can be observed that the maximum number of students (i.e. 32) Watch TV for 4 - hrs

(ii) The students who watched TV for less than 4 hrs are the students who watch TV for 1 - 2 hrs or 2-3 hrs or 3-4 hrs. Hence, total number of students = 4+8+22=34

(iii) The students who watch TV for more than 5 hours are the students who watched TV for 5-6 hours or 6-7 hours. Hence, total number of students = 8+6=14.

Exercise: 5.2

1. (i) Number of people who like classical music = 10%

This 10% represents 20 people

100% represents = $\frac{20\times100}{10}$ = 200 people

(ii) From the pie chart, it can be easily observed that the light music is represented by the maximum part of pie chart (i.e. 40 %). Hence, most of the people like light music.

(iii) No. of CD's of classic music = 10% of 1000

$=\frac{10}{100}\times1000 = 100$

No. of CD's of semi - classical music = 20% of 1000

$=\frac{20}{100}\times1000 = 200$

No of CD's of folk music = 30% *of* 1000

$=\frac{30}{100}\times1000 = 300$

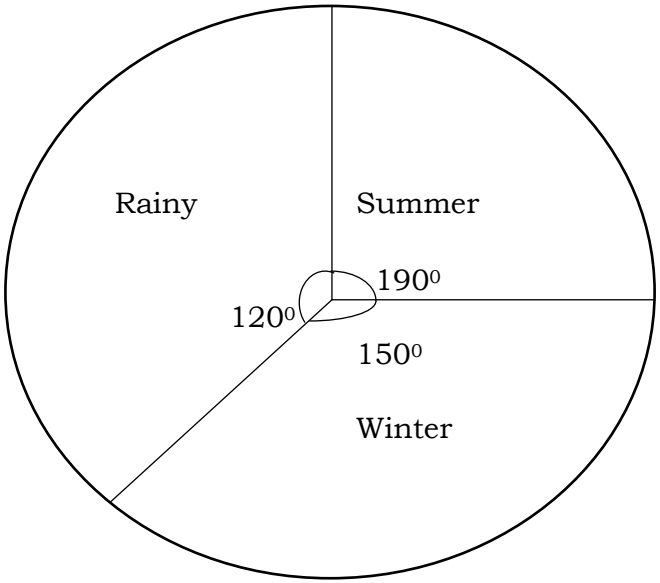
No. of cassettes of light music = 40% of 1000

$=\frac{40}{100}\times1000 = 400$

2. (i) Winter

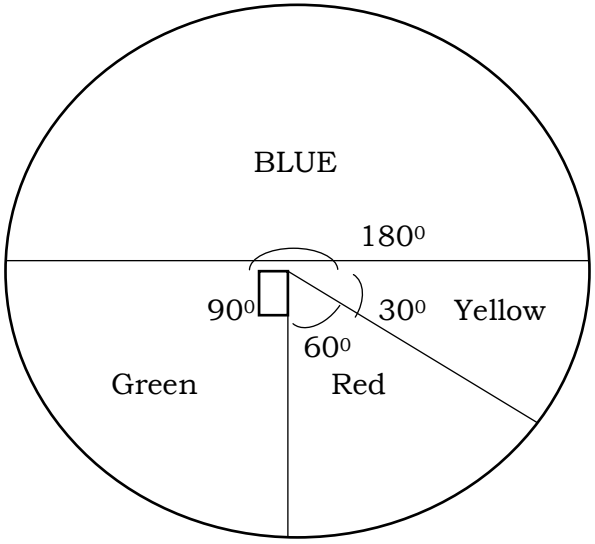
(ii) Total number of votes=90+120+150=360

Season	No. of. Votes	In fraction	Central angle
Summer	90	$\frac{90}{360}$	$\frac{90}{360}\times360^0=90^0$
Rainy	120	$\frac{120}{360}$	$\frac{120}{360}\times360^0=120^0$
Winter	150	$\frac{150}{360}$	$\frac{150}{360}\times360^0=150^0$



3.

Colours	No. of. people	In fraction	Central angle
Blue	18	$\frac{18}{36}$	$\frac{18}{36}\times360^0 = 180^0$
Green	9	$\frac{9}{36}$	$\frac{9}{36}\times360^0 = 90^0$
Red	6	$\frac{6}{36}$	$\frac{6}{36}\times360^0=60^0$
Yellow	3	$\frac{3}{36}$	$\frac{3}{36}\times360^0=30^0$



4. Total marks obtained by students are, 540 hence, marks represent 360^0. The central angle for 105 marks has to be calculated.

Central angle for 105 marks = $\frac{105}{540}\times360^0 = 70^0$

∴The students scored 105 marks in Hindi.

ii) Difference b/w the central angles of Maths and Hindi
$= 90^0-70^0=20^0$

Marks for 200 Central angle = $\frac{20^0}{360^0}\times540 = 30$

Obtained in Mathematics than Hindi

iii) Sum of central angles of Social & Maths = $90^0+65^0=155^0$

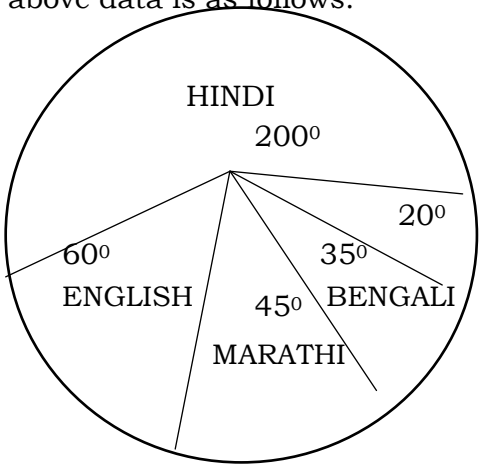
Sum of Central angles of Social & Hindi = $80^0+70^0 = 150^0$

$155^0>150^0$

The students score more in Social & Maths than in Science and Hindi.

Language	No. of students	In fraction	Central angle
Hindi	40	$\frac{40}{72}$	$\frac{40}{72}\times360^0 = 200^0$
English	12	$\frac{12}{72}$	$\frac{12}{72}\times360^0 = 60^0$
Marathi	9	$\frac{9}{72}$	$\frac{9}{72}\times360^0 = 45^0$
Tamil	7	$\frac{7}{72}$	$\frac{7}{72}\times360^0 = 35^0$
Bengali	4	$\frac{4}{72}$	$\frac{4}{72}\times360^0 = 20^0$

Pie Chart of the above data is as follows:



Exercise: 5.3

1. a) On spinning the given wheel, the possible outcomes are A, B, C, D.

b) By tossing two coins together, the possible outcomes are {HH, HT, TH, TT}

2. (i) When a dice is thrown the possible outcomes are {1, 2, 3, 4, 5, 6}

a) Out of these outcomes 2, 3 and 5 are prime numbers.
Hence these are the outcomes of an event of getting a prime umber.

b) Out of these outcomes 1, 4 and 6 are not prime numbers. Hence these are the outcomes of an event of not getting a prime number.

ii) a) Out of these outcome, a number greater than 5 is possible when 6 comes on the face of the dice.

b) Out of these outcomes, a number not greater than 5 is possible when the number on the face of the dice is any one of the outcomes 1, 2, 3, 4 and 5.

a) The pointer can stop at one of the following regions A, B, C, D
Out of these 5 cases it is possible only in on case that the pointer will stop at the region D = $\frac{1}{5}$

∴Probability that the pointer will stop at region D = $\frac{1}{5}$

b) There are 52 cards in a deck of cards and there are four ace cards in one deck of cards.

Probability of getting ace cards = $\frac{4}{52}=\frac{1}{13}$

c) There are total of 7 apples.
Out of which 4 are red and 3 are green

P(Red apples) = $\frac{4}{7}$

4. i) There are 10 slips in the box
However 6 is written only one slip.

p(getting a number 6) = $\frac{1}{10}$

ii) P (getting a number < 6) = $\frac{5}{10}=\frac{1}{2}$

iii) P (getting a number >6) = $\frac{4}{10}=\frac{2}{5}$

iv) P (getting a 1 digit number) = $\frac{9}{10}$

5. Total sectors = 3+1+1 = 5

P(green sector) = $\frac{3}{5}$

P (non - Blue Sector) = $\frac{4}{5}$

6. (i) a. Out of 6 possible outcomes a prime number can be obtained in 3 cases

A probability of getting a prim number = $\frac{3}{6}=\frac{1}{2}$

b) Out of 6 possible outcomes a prime number may not be obtained in 3 cases.

∴P (getting a not prime number) = $\frac{3}{6}=\frac{1}{2}$

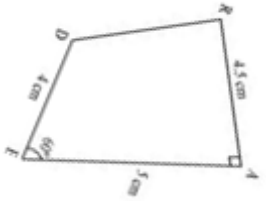
ii) a)P (getting a number of > 5) = $\frac{1}{6}$

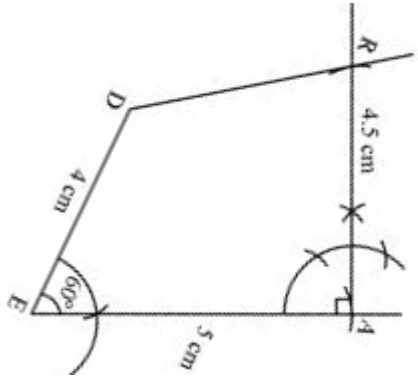
b) P (getting a number not greater than 5) = $\frac{5}{6}$

Exercise : 4.4

i) Quadrilateral DEAR

DE = 4 cm, EA = 5 cm, AR = 4.5 cm ∠E = 60^0, ∠A = 90^0



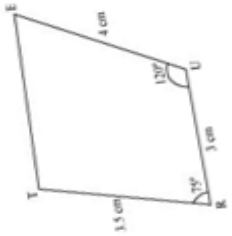


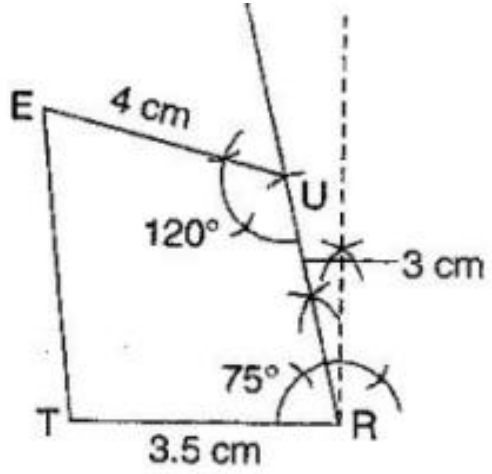
Construction steps:

1. Draw a ine segment EA = 5 cm
2. Mark ∠AEY = 60.0, draw a ray y
3. Mark ∠EAR = 900, draw a ray X
4. Take A as centre with radius 4.5 cm draw an arc.
5. Take E as centre with radius 4 cm draw an another arc.

6. Join RD
7. DEAR is required quadrilateral.

2. Quadrilateral True TR = 3.5 m, RU = 3 cm, UE = 4 cm ∠R = 75⁰∠U = 120⁰



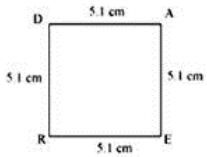


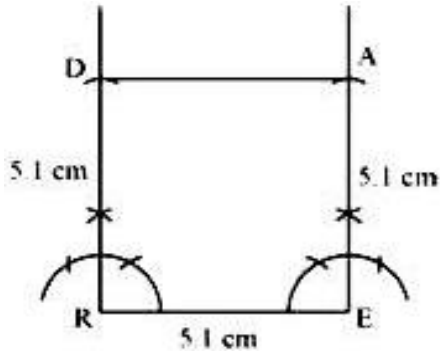
Construction steps:

1. Draw a line segment TR = 3.5 cm
2. Mark ∠TRU = 758, draw a ray and name it as X
3. Take R as centre with radius 3 cm draw an arc.
4. Take U as centre with radius 4 cm. Draw an another arc.
5. Join EU and TE.

Exercise : 4.5

1. The square READ with RE = 5.1 cm



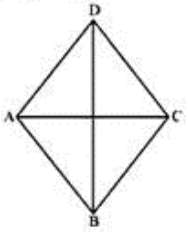


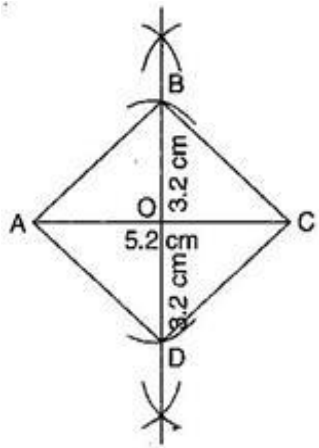
Construction steps:

1. Draw a line segment RE = 5.1 cm
2. Mark ∠DRE = 90⁰, draw a ray X.
3. Mark ∠REA = 90⁰, draw a ray Y.
4. Take R and E as centre with radius 5.1 draw two arcs and name it as A and D.
5. Join AD.
6. READ is required square.

2. Diagonals are 5.2 and 6.4 cm

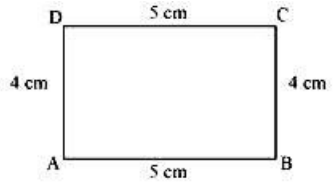
Rhombs

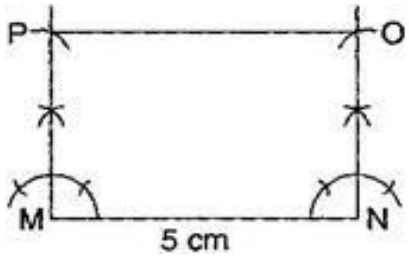




Construction steps:

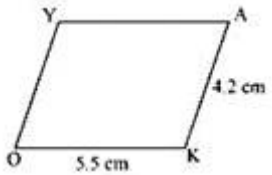
1. Draw a line segment AC = 5.2 cm
2. Draw perpendicular bisectors ofAC
3. Take 3.2 cm as radius draw an arc above and below.
4. Now join ABCD.
3. Rectangle AB = 5 cm, BC = 4 cm.

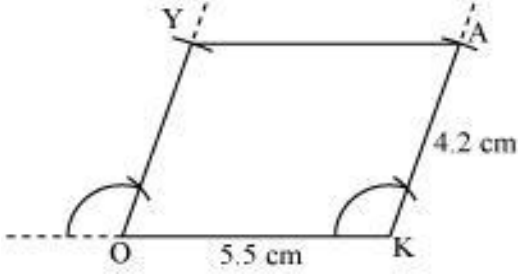




Construction steps:

1. Draw a line segment AB = 5 cm.
2. Mark ∠BAD = ∠ABC = 90⁰ draw two rays x and y.
3. Take A and B as centre with radius 4 cm draw an arc and name it as C and D.
4. Join CD
5. ABCD is required rectangle.
4. Parallelogram OKAY where OK = 5.5 and KA = 4.2 cm





Construction steps:

1. Draw a line segment OK = 5.5 cm.
2. In ||gm we know that sum of two adjacent angles is 180⁰.
3. According to our convenience, Mark an angle ∠OKA = 120⁰ and ∠KOY = 60⁰, draw a rays X and Y
3. Take O and K as centre with radius 4.2 cm draw an arc and name it as Y and A.
4. Join AY.
5. OKAY is required ||gm.

CUBE AND CUBE ROOT

Exercise: 7.1

1) i) 216

2	216
2	108
2	54
3	27
3	9
	3

2×2×2×3×3×3

2×3 = 6 = $\sqrt[3]{216}$ = 6

216 is a perfect square.

ii) 128

2	128
2	64
2	32
2	16
2	8
2	4
	2

2×2×2×2×2×2×2

Here, 2 is not having triplet 128 is not perfect cube.

iii) 1000

2	1000
2	500
2	250
5	125
5	25
	5

2×2×2×5×5×5 = 2×5 = 10

$\sqrt[3]{1000}$ = 10

Hence 1000 is a perfect cube.

iv) 100

2	100
2	50
5	25
	5

2×2×5×5

Here 2, 5 is not having triplets.

Hence 100 is not a perfect cube.

v) 46656

2	46656
2	23328
2	11664
2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
	3

= 2×2×2×2×2×2×3×3×3×3×3×3

=2×2×3×3

= 36

∴ 46656 is a perfect cube.

2. 243

3	243
3	81
3	27
3	9
	3

3×3×3×3×3

Here 3 has no triplet

We need one more 3 to make a perfect cube.

∴243×3=729.

ii) 256

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

∴2×2×2×2×2×2×2×2

Here 2 has no triplet

We need one more '2' to make a perfect cube

∴256×2=512

iii) 72

2	72
2	36
2	18
3	9
	3

∴2×2×2×3×3

Here '3' has no triplet

We need one more 3 to make a perfect cube.

∴72×3=216.

iv) 675

5	675
5	135
3	27
3	9
3	3
	1

∴ 5×5×3×3×3.

Here '5' has no triplet we need one more 5 to make a perfect cube.

675×5=3275

v) 100

2	100
2	50
5	25
	5

$2\times2\times5\times5$

Here 2 and 5 has no triplet.

We need one more 2 & 5 to make perfect cube.

$\therefore 100\times2\times5 = 100\times10 = 1000.$

3) i) 81

3	81
3	27
3	9
3	3
	1

$3\times3\times3\times3$

Here '3' has no triplet.

So 3 has to be divided to get perfect cube.

$81\div3=27$

ii) 128

2	128
2	64
2	32
2	16
2	8
2	4
	2

$2\times2\times2\times2\times2\times2\times2$

Here '2' has no triplet. So 2 has to be divided to get perfect cube.

$\therefore 128\div2=64$

iii) 135

5	135
3	27
3	9
3	3
	1

$5\times3\times3\times3$

Here '5' has no triplet, So, 5 has to be divided to get perfect cube.

$\therefore 135\div5=27$

iv) 192

2	192
2	96
2	48
2	24
2	12
2	6
	3

$2\times2\times2\times2\times2\times2\times3$

Here '3' has no triplet. So, 3 has to be divided to get perfect cube

$\therefore 192\div3 = 64$

v) 704

2	704
2	352
2	176
2	88
2	44
2	22
	11

$\therefore 2\times2\times2\times2\times2\times2\times11$

$\therefore$ Here 11 has no triplet. So, 11 has to be divided to get perfect cube

$\therefore 704\div11=64.$

4. Volume of the cuboid of sides 5 cm, 2 cm and 5 cm

$= (5\times2\times5)\ cm^3$

Here, two 5's and one 2 left which are not triplet.

If we multiply this expression by $2\times2\times5=20$, then it will become a perfect cube.

Thus $5\times5\times2\times2\times2\times5 = 5\times5\times5\times2\times2\times2$

$=1000$ is a perfect cube.

Hence 20 cuboids of 5 cm, 200 m, 5 cm are required to form a cube.

Exercise: 7.2

i) 64

2	64
2	32
2	16
2	8
2	4
2	2
	1

$= 2\times2\times2\times2\times2\times2$

$=2\times2 = 4$

$\therefore \sqrt[3]{64} = 4$

ii) 512

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	2

$= 2\times2\times2\times2\times2\times2\times2\times2\times2$

$=2\times2\times2 = 8$

Hence $\sqrt[3]{512} = 8$

iii) 10648

2	10648
2	5324
2	2662
11	1331
11	121
	11

$= 2\times2\times2\times11\times11\times11 = 2\times11 = 22$

$\sqrt[3]{10648} = 22$

iv) 27000

3	27000
3	9000
3	3000
10	1000
10	100
10	10
	1

$=3\times3\times3\times10\times10\times10$

$=3\times10$

$=30.\ \sqrt[3]{27000} = 30$

v) 15625

5	15625
5	3125
5	625
5	125
5	25
	5

$=5\times5\times5\times5\times5\times5$

$=5\times5$

$= 25$

$= \sqrt[3]{15625} = 25$

vi) 13824

3	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$=2\times2\times2\times2\times2\times2\times2\times2\times2\times3\times3\times3$

=2×2×2×3

=8×3 = 24

$\therefore \sqrt[3]{13824} = 24$

vii) 110592

2	110592
2	55296
2	27648
2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

=2×2×2×2×2×2×3×3×3×3×3×3

=2×2×2×3×3

=36

ix) 175616

2	175616
2	87808
2	43904
2	21952
2	10976
2	5488
2	2744
2	1372
2	686
7	343
7	49
7	7
	1

$\therefore 2\times2\times2\times2\times2\times2\times2\times2\times2\times7\times7\times7$

=2×2×7

=28

$\sqrt[3]{175616} = 28$

x) 91125

5	91125
5	18225
5	3645
3	729
3	243
3	81
3	27
3	9
3	3
	1

=5×5×5×3×3×3×3×3×3 = 5×3×3

=15×3 = 45.

2. i) False

ii) True

iii) False

iv) False

v) False

vi) False

vii) False

viii) True

3. 1, 331

$1=1^3$ or 2^3

$\therefore \sqrt[3]{1331} = 11^3$

$1^3=1\times1\times1 = 1$

b) 4913

$4 = 1^3$ or 2^3

$\sqrt[3]{4913} = 17$

$7^3 = 7\times7\times7$

=343

c) 12167

$12 = 2^3$ or 3^3

Hence $\sqrt[3]{12167} = 23$

$=3\times3\times3 = 27$

d) 32768

$32 = 3^3$ or 4^3

Hence $\sqrt[3]{32768} = 32$

Ch - 8: Comparing quantities

Exercise - 8.1

1. a) Speed of a cycle 15 km/ hr:

Speed of scooter 30 km/hr:

=5km/hr: 10 km/hr

=1:2

b) 5m: 10 km

5m: 10000m [∴1km = 100 mts]

1: 2000

c) 50P :₹5

=50p: 500p [∴₹1=100p]

1:10

2. a) 3:4

$= \frac{3}{4}\times100 = 75\%$

b) 2:3

$=\frac{2}{3}\times100=\frac{200}{3}=66\frac{2}{3}\%$

3. Given total number of students are 25

No. of students are good in Maths =72% of 25

$=\frac{72}{100}\times25 = 18$

No of students are not good in Maths = 25-18=7

4. Let the total number of matches be 'x'

Given that 40% of x = 10

$\frac{40}{100}\times x=10$

$x=\frac{10\times10}{4}$

x=25 matches

Hence the total number of matches is 25.

5. Let us take total money that Chemali had in the beginning be 'x'.

% of money by Chemali = 100% - 75% = 25%

=25% of x = 600

$\Rightarrow\frac{25}{100}\times x = 600$

$x=\frac{600\times100}{25}$

x=2400

Total amount is ₹2400.

6. Given that number of people are 50, 00,000

% of the people like other games = 100% - 90% = 10 %

Number of people like cricket $=\frac{60}{100}\times50,00,000 = 30,00,00$

Number of people like football.

$=\frac{30}{100}\times50,00,000 = 15,00,000$

Number of people like other games = $\frac{10}{100}\times50,00,000$

=5,00,000

Exercise: 8.2

1. A man got 10 % increases in his salary.

=100% +10% = 110%

Let original salary be 'x'

110% of x = 1,54,000

$\frac{110}{100}\times x = 1, 54, 000$

$x=\frac{1,54,000\times10}{11}$

x=1, 40, 000/-

Hence A man's original salary is ₹1,40,000.

2. No. of people went to the zoo on Sunday = 845

No. of people went to the zoo on Monday = 169

Difference = 676 people

% of people decrease visiting zoo on Monday = $\frac{676\times100}{845}$

=80%

3. It is given that the shopkeeper buys 80 articles for Rs 2,400

Cost of one article = $\frac{2400}{80}$ = ₹30.

Profit % = 16%

$16 = \frac{profit}{CP}\times100$

Profit = $\frac{16\times30}{100}$

Profit = ₹4.80

Selling price of one article = C.P + profit

=Rs (30+4.80)
=Rs 34.80
4. Total cost of an article = cost + overhead expenses
=Rs 15500+Rs 450
=Rs 15950
Profit% = $\frac{profit}{CP}$×100
15 = $\frac{Profit}{Rs\ 15950}$ ×100
$\frac{15\times1595}{10}$=profit
Rs 2392.50
∴SP of the article = C.P + profit
=Rs (15950+2392.50)
=Rs 18342.50
5. CP of a VCR = RS 8000
The shopkeeper made a loss of 4% on VCR.
Then SP = $\frac{(100-loss\%)\times CP}{100}$
=$\frac{(100-5)\times8000}{100}$
=95×80=7600
CP of TV = RS 8000
Profit =8%
∴SP= $\frac{(100+profit\ \%)CP}{100}$
=$\frac{(100+8)\times8000}{100}$ = Rs 8640
Total SP = ₹7680+₹8640= ₹16320
Total CP = Rs 800+Rs 8000 = ₹16000
Since total S.P > total C.P
∴Profit = Rs 16320-Rs 16,000 = ₹320
Profit % = $\frac{Profit}{CP}$×100 = $\frac{320}{16000}$ ×100 = 2%
∴The shopkeeper had a gain of 2% on the whole transaction.
6. Total marked price = ₹ [1, 450+2×850]
=Rs [1, 450+1,700]
=Rs 3,150.
Given that discount % = 10 %
Also discount % = MP - Sale price
Rs 315 = Rs 3150-SP
∴SP= Rs (3150-315)
= Rs 2835
Thus, the customer will have to pay Rs 2,835
7. SP of each buffalo = Rs 20000
The milkman made a gain of 5% while selling one buffalo.
CP of one buffalo = (20000×$\frac{100}{105}$) = Rs 19,047.62
Also, the second buffalo was sold at 10 %
∴CP of other buffalo = $\left(20000\times\frac{100}{90}\right)$
=Rs 22222.22
Total CP = Rs 19047.62+Rs 2222.22
=Rs 41269.84
Total SP = Rs 20000+Rs 20000
=Rs 40,000
Loss = Rs 41269.84-40,000
=1269.84
Thus, the overall loss of milkman was Rs 1, 269.84
8. On Rs 100, the tax to be paid = Rs 12.
On Rs 13000, the tax to be paid will be = Rs $\left(\frac{12}{100}\times13000\right)$
=Rs 1560
Required amount = Cost+ sales tax
=₹13000+Rs1560
=₹14560
Thus Vinod will have to pay ₹14,560 for the TV.
9. Let the marked price be x
Discount % = $\frac{discount}{MP}$×100
20= $\frac{\text{Discount}}{\text{x}}$ x 100
Discount = $\frac{20\times x}{100}$
=$\frac{x}{5}$
Also, discount =MP - SP
$\frac{1}{5}$x = x-Rs 1600
x-$\frac{1}{5}x = Rs\ 1600$
$\frac{5x-x}{5}$ = 1600
4x=1600×5
x=$\frac{1600\times5}{4}$

x=2000
Thus, the marked price was ₹2000.
10. The price includes vat. Thus, 8% vat means that if the price without vat is Rs 100.
Then price including vat will be Rs. 108.
When price including vat is ₹5400.
∴Original price = $\frac{100}{108} \times 5400$ = Rs 5000
Thus, the price of the hair - deyer before the addition of vat was = ₹5,000.

Exercise: 8.3

1. Principal = Rs 10,800
Rate = 12½% = $\frac{25}{2}$%
n = 3 years
Amount = $P\left[1+\frac{R}{100}\right]^n$
$=10,800\left[1+\frac{\frac{25}{2}}{100}\right]^3$
$=10,800\left[\frac{225}{200}\right]^3$
$=10,800\times\frac{225}{200}\times\frac{225}{200}\times\frac{225}{200}$
= 15377.34 (approx)
CI = A-P = 15377.34 - 10800 = Rs 4,577.34.
b) Principal (p) = Rs 18,000
Rate = 10 % annual
Number of years = 2½ years
First we calculate the amount for two years.
$A = P\left[1+\frac{R}{100}\right]^n$
$=18000\times\left[1+\frac{1}{10}\right]^2$
$= 18000\left[\frac{11}{10}\right]\left[\frac{11}{10}\right]$
=₹21780.
By taking 21780 as principal, now we will calculate SI for the next ½ year will be calculated.
$SI = \frac{PNR}{100}$
$=\frac{21780\times\frac{1}{2}\times10}{100}$ =₹ 1089
∴Interest for the first 2 years = ₹21780-₹18000 = ₹3780
And interest for the next ½ year = ₹1089
Total CI = 18000+4869 = Rs 22,869.
C) Principal = 62,500
Rate = 8% per annum
Rate = 4% per half year
Number of years = 1½
There will be half years in 1½ years
$A = P\left(1+\frac{(R/2)}{100}\right)^{2n}$
$A = 62,500\left(1+\frac{4}{100}\right)^3$
$=62,500\left(\frac{100+4}{100}\right)^3$
$=62,500\left(\frac{104}{100}\right)^3$
$=62,500\times\frac{26}{25}\times\frac{26}{25}\times\frac{26}{25}$
=Rs 70304
CI = AP = Rs 70304 - Rs 62500
= Rs 7,804
d) Principal = Rs 8000
Rate of interest = 9% per annum
(or) $\frac{9}{2}$% per half year
No. of years = 1 year
There will be 2 half year in 1 year
$A = P\left(1+\frac{r}{200}\right)^{2(1)}$
$=8000\left(\frac{209}{200}\right)^2$
$=8000\times\frac{209}{200}\times\frac{209}{200}$
=Rs 8,736.20
CI = A-P = 8736.20-8000
=₹736.20
e) Principal = Rs 10,000
R = 8% per annum or 4% per half year
Number of years = 1 year
There are 2 half year in 1 year.
$A = P\left(1+\frac{(R/2)}{100}\right)^{2n}$

$=1000\left(1+\frac{4}{100}\right)^{2(1)}$

$=10000\left(\frac{25+1}{25}\right)^{2}$

$=10000\left(\frac{26}{25}\right)\left(\frac{26}{25}\right)$

=₹10,816.

CI = A - P =₹ 10816 - ₹10000 =₹ 816.

2. Principal = Rs 26,400

Rate = 15% per annum

Number of years = $2\frac{4}{12} year$

First calculating the amount for 2 years by using CI formula

$A = P\left(1+\frac{r}{100}\right)^{n}$

$=26400\left(1+\frac{15}{100}\right)^{2}$

$=26400\left(\frac{20+3}{20}\right)^{2}$

$=26400\left(\frac{23}{20}\right)^{2}$

=Rs 34,914

By taking Rs 34,914 as P.

The SI for the next $\frac{1}{3}$ years will be calculated.

$SI = \left[\frac{34914\times\frac{1}{3}\times15}{100}\right]$= Rs 1, 745.70.

Interest for the first two years = 34914 - 26400 =₹ 8,514.

Ans interest for the next $\frac{1}{3}$ year = Rs 1, 745.70

Total CI = 8514+1745.70 = 10,259.70

Amount = P+CI

=26400+10, 25970

=₹36,659.70

3. Interest paid by Fabina = $\frac{PRT}{100}$

$=\frac{12500\times12\times3}{100}$

= ₹4,500

Amount paid by Radha at the end of 3 years = $A = P\left(1+\frac{R}{100}\right)^{n}$

$A=12500\left(1+\frac{10}{100}\right)^{3}$

$=12500\left(\frac{10+1}{10}\right)^{3}$

$=12500\left(\frac{11}{10}\right)\left(\frac{11}{10}\right)\left(\frac{11}{10}\right)$

=₹16,637.50

CI = A - P = 16637.50-12500

=₹4, 137.50

The interest paid by Fabina is ₹4,500 and by Radha is ₹4,137.50.

Thus, Fabina pays more interest 4500-4137.50=₹362.50

Hence, Fabina will have to ₹362.50 more.

4. P = ₹12000

R = 6%

T = 2 years

$SI = \frac{PRT}{100}$ = Rs $\left(\frac{12000\times6\times2}{100}\right)$ = Rs 1,440.

To find the CI, the amount (A) has to be calculated

$A = P\left(1+\frac{R}{100}\right)^{n}$

$=12000\left(1+\frac{6}{100}\right)^{2}$

$=12000\left(\frac{50+3}{50}\right)^{2}$

$=12000\left(\frac{53}{50}\right)\left(\frac{53}{50}\right)$

=₹13, 483.20.

$\therefore$CI = A-P = 13483.20 - Rs 12000

=1,483.20

CI - SI = 1, 483.20 - 1,440 = 43.20

Thus, the extra amount to be paid is Rs 43.20

5. P = Rs 60,000

Rate = 12% per annum

=6% per half year

n = 6 months = 1 half year

$A = P\left(1+\frac{R}{100}\right)^{n}$

$=60000\left(1+\frac{6}{100}\right)^{1}$

$=60000\left(\frac{100+6}{100}\right)$

$=60000\left(\frac{106}{100}\right)$

= Rs 63,600

ii) There are 2 half years in 1 year
n=2

$A = [60000\left(1+\frac{6}{100}\right)^2]$

$=60000\times\left(\frac{106}{100}\right)^2$

$=60000\times\left(\frac{106}{100}\right)\times\left(\frac{106}{100}\right)$

=₹67,416.

6. i) P = ₹80,000
R = 10 %
n= 1½ years
Firstly, the amount for 1 year has to be calculated.

$A = P\left(1+\frac{r}{200}\right)^n$

$=80{,}000\left(1+\frac{10}{100}\right)^1$

$=80{,}000\left(\frac{11}{10}\right) = 88{,}000.$

By taking ₹88,000 as principal the SI for the next ½ year will be calculated.

$SI = \frac{PRT}{100} = \frac{88000\times10\times½}{100}$ = Rs 4,400

Interest for the first year = 88000 - 80,000 = Rs 8,000
and interest for the next ½ year = ₹4,400
Total CI = 8000 +4,400 = 1, 2400
A = P+CI
=80,000+12400=₹92,400

ii) The interest is compounded half yearly
Rate = 10 % per annum
=5% per half year
There will be three half years I 1½ years.

$A = Rs\ [80000\left(1+\frac{5}{100}\right)^3]$

$=80000\left(1+\frac{1}{20}\right)^3$

$=80000\left(\frac{21}{20}\right)\left(\frac{21}{20}\right)\left(\frac{21}{20}\right)$

=₹92,610
Difference b/w the amount = 92610 - 92,400 = ₹210
7. P= ₹8,000
R = 5% per annum
n= 2 years

$A = [80000\left(1+\frac{5}{100}\right)^2]$

$= [80000\left(1+\frac{1}{20}\right)^2]$

$=80000\left(\frac{21}{20}\right)\left(\frac{21}{20}\right)$

=₹8,820
ii) The interest for the next year.
I.e. the third year, has to be calculated by taking 8,820 as principal, the S.I for the next year will be calculated.

$SI = \frac{8820\times5\times1}{100}$ = 441/-

8. P = ₹10,000
R = 10% per annum
R = 5% per half year
n = 1½ years
There will be 3 half year m 1½ years

$A = P\left(1+\frac{R}{100}\right)^n$

$=10000\left(1+\frac{5}{100}\right)^3$

$=10{,}000\left(\frac{21}{20}\right)\left(\frac{21}{20}\right)\left(\frac{21}{20}\right)$

=₹11, 576.25
CI = A-P
= 11, 576.25-10,000 = 1, 576.25
The amount for 1 year and 6 months can be calculated by first calculating the amount for 1 year using the CI formula, and then calculating the SI for 6 months on the amount at the end of 1 year.

$A = \left[10000\left(1+\frac{10}{100}\right)\right]$

$=10000\left(\frac{11}{10}\right)$

=₹11,000
By 11,000 as the principle, the SI for the next ½ year will be calculated.

$SI = \left(\frac{11{,}000\times10\times½}{100}\right)$= ₹550

∴ Interest for the first year = ₹11000 - ₹10000 =₹ 1000
∴Total CI = 1000+550 = ₹1,550

∴The interest would be more when compounded half yearly than the interest when compounded annually

9. P = 4,096

R = 12½% per annum

R = $\frac{25}{4}$% per half year

n= 18 months

There will be 3 half year sin 18 months

∴A = P $\left(1+\frac{R}{100}\right)^n$

=4,096P $\left(1+\frac{25}{400}\right)^3$

=4096 $\left(1+\frac{1}{16}\right)^3$

=4096 $\left(\frac{17}{16}\right)\left(\frac{17}{16}\right)\left(\frac{17}{16}\right)$

= ₹ 4913.

Thus, the required amount = ₹4913.

10. It is given that, population in the year 2003 = 54,000

∴54000 = P $\left(1+\frac{5}{100}\right)^2$

Where P - population in 2001

P = 54000×$\frac{20}{21}$×$\frac{20}{21}$

=48979.59

∴Thus, the population in the year 2001 was 48979.59 approx.

ii) Population in 2005 = 54000 $\left[1+\frac{5}{100}\right]^2$

=54000 $\left[\frac{21}{20}\right]^2$

=54000 $\left[\frac{21}{20}\right]\left[\frac{21}{20}\right]$

=59,535

Thus, the population in the year 2005 would be 59,535.

11. The initial count of bacteria is given as 5,06,000.

Bacteria at the end of 2 hrs = 506000 $\left(1+\frac{2.5}{100}\right)^2$

=506000 $\left(1+\frac{1}{40}\right)^2$

=506000×$\frac{41}{40}$×$\frac{41}{40}$

=531616.25

=531616 (approx.)

Thus, the count of bacteria at the end of 2 hrs will be 5, 31, 616 (approx.)

12. P = ₹42,000

R = 8%

A = P $\left(1+\frac{R}{100}\right)^n$

=42000 P $\left(1+\frac{8}{100}\right)^1$

=42000 $\left(\frac{25-2}{25}\right)$

= 42000$\left(\frac{23}{25}\right)$

A= ₹38,640

Extra questions:

1. If the cost price of 25 chairs is equal to the selling price of 30 chairs, find the loss per cent. On selling price of 30 chains, find the loss per cent.

2. On selling a handcart for ₹750, a labourer loses 25% .At what price should he sell the hand cart to gain 25 %?

3. A DVD player is sold for ₹3120 at a loss of 4%. What will be the gain or loss percent if it is sold for ₹3640?

4. Find the discount per cent when:

a) MP = ₹650 & SP = ₹585

b) MP = ₹1600 & SP = ₹1200

5. A shopkeeper allows a discount of 10% to his customers and still gains 20% find the marked price of an article which costs 450 to the shopkeeper.

6. A discount of 12 % is given on the marked price of a skirt it is sold for ₹880. Find its marked price.

7. Navneet purchased a motorcycle with a marked price of ₹45,000 at a discount of 5% If 10 % sales taxes is charged, find the net amount Navneet had to pay to purchase the motorcycle.

8. Find the compound interest on ₹3000 at 5% per annum for 2 years.

9. What will be the compound interest on ₹4000 on 5% per annum in 2 years?

10. Ramesh deposited ₹7500 in a bank at 12% per annum for 9 months. Find the amount received by him if the interest is calculated quarterly.

Chapter-6: Squares And Square Roots

EXERCISE: 6:1

1. $81=1^2=1$ (Consider only unit digit)
2. $272=2^2=4$
3. $799=9^2=81=1$
4. $3853=3^2=9$
5. $1234=4^2=16=6$
6. $26387=7^2=49=9$
7. $52698=8^2=64=4$
8. $99880=0$
9. $12796=6^2=36=6$
10. $55555=5^2=25=5$

2. 1057

Sol: All square numbers ends with 0, 1, 4, 5, 6 or 9 at unit's place. But the unit digit of the given number is 7. ∴ It is not a perfect square.

b) 23453

The given number ends with 7 so it is not a perfect square.

c) 7928

The above number ends with 8. It is not a perfect square.

d) 222222 –The given no ends with 2 so it is not a perfect square.

e) 7928

The given number ends with 8 so it is not a perfect square.

f) 64000

The given number ends with three zero's with odd number of zeroes. So it is no t a perfect square.

g) 89722

The above number ends with '2'. So it is not a perfect square.

h) 222000

The given number ends three zeroes. A perfect cannot be end with odd number of zeroes. So it is not a perfect square.

i) 505050

The given numbers ends with zero. A perfect square cannot be end with odd number of zeroes.

3.(i) 431

The given number is a odd perfect square because it ends with odd number 1.

ii) 2826

The given number is not a odd perfect square because it ends with 6.

iii) 7779

Yes, it is a odd perfect square number, because it ends with odd number 9.

iv) 82004.

No, it is not a odd perfect square number, because it ends with even number 4.

4. $11^2=121$

$101^2=10201$

$1001^2=1002001$

$100001^2=10000200001$

$10000001^2=100000020000001$

5. $11^2=121$

$101^2=10201$

$10101^2=102030201$

$1010101^2=1020304030201$

$101010101^2=10203040504030201$

6. $1^2+2^2+2^2=3^2$

$2^2+3^2+6^2=7$

$3^2+4^2+12^2=13^2$

$4^2+5^2+20^2=21^2$

$5^2+6^2+30^2=31^2$

$6^2+7^2+42^2=43^2$

7. i) 1+3+5+7+9

Since, the sum of first n odd natural numbers is n^2.

∴The first 5 odd natural numbers is $5^2=25$

ii) 1+3+5+7+9+11+13+15+17+19

The first 10 odd natural numbers is $10^2=100$

iii) 1+3+5+7+9+11+13+15+17+19+21+23

The first 12 odd natural numbers is $12^2=144$.

8. i) 49

Sol: 1+3+5+7+9+11+13

ii) 121

Sol: 1+3+5+7+9+11+13+15+17+19+21

9. i) 12 & 13

$12^2=144$

$13^2=169$

Hence the numbers lie between 12^2 & 13^2 is 24

ii) 25 and 26

$25^2=625$

$26^2=676$

Hence the numbers le between 25^2 & $26^2=50$

iii) 99 and 100

$99^2=9911$

$100^2=10000$

Hence the numbers ie between 9911 & 10000 is 198

EXERCISE: 6:2

1. i) $32=(30+2)^2$

$=30^2+2\times30\times2+2^2$

$=900+120+4$

$=1024$

ii) $35= (30+5)^2$

$=30^2+2\times30\times5+5^2$

$=900+300+25 = 1225$

iii) $86=(80+6)^2$

$=(80)^2+2\times80\times6+6^2$

$=6400+960+36$

$=7396$

iv) $93=(90+3)^2$

$=(90)^2+2\times90\times3+3^2$

$=8100+540+9$

$=8649$

v) $71=(70+1)^2$

$=(70)^2 + 2\times70\times1+1^2$

$=4900+140+1$

$=5041$

vi) $46=(40+6)^2$

$=(40)^2+2\times40\times6+6^2$

$=1600+480+36$

$=2116$

2. i)6

We can get Pythagorean triplets by using general form $2m, m^2-1, m^2+1$

Let us first take

$2m=6$

$m=\frac{6}{2}=3$

$m=3$

$m^2-1=3^2-1=9-1=8$

$m^2+1=3^2+1=9+1=10$

∴(6, 8, 10) is a Pythagorean triplet.

ii) 14

Consider $2m=14$

$m=\frac{14}{2}=7$

$\therefore m^2-1=7^2-1=49-1=48$

$m^2+1=7^2+1=49+1=50$

∴(14, 48, 50) is a Pythagorean triplet.

iii) 16

$2m=16$

$m=\frac{16}{2}=8$

$m=8$

$\therefore m^2-1=8^2-1=64-1=63$

$m^2+1=8^2+1=64+1=65$

∴(16, 63, 65) is a Pythagoreans triplet.

iv) 18

$2m=18$

$m=\frac{18}{2}$

$m=9$

$m^2+1=19^2+1=81+1=82$

$m^2-1=9^2-1=81-1=80$

∴(18, 80, 82) is a Pythagorean triplet.

EXERCISE: 6:3

1. 9801

If the number ends with 1, then one's digit of the square root of that number may be 1 or 9.

∴One's digit of the square root of 9801 is either 1 or 9.

2. 99856

If the number ends with 6, then one's digit of the square root of that number may be 4 or 6.

∴One's digit of the square root of 99856 is either 4 or 6.

3. 998001

∴One's digit of the square root of 998001 is either 1 or 9

4. 657666025

If perfect square ends with 5 then square root also ends with

5

2. i) 153

The above number ends with '3'.

∴It is not a perfect square.

ii) 257

The above number ends with '7'

It is not a perfect square.

iii) 408

The above number ends with '8'

∴ It is not a perfect square.

iv) 441

The above number ends with 1

Yes, it is a perfect square.

3. 169-1=168

168-3 = 165

165-5=160

160-7=153

153-9=144

144-11=133

133-13=120

120-15=105

105-17=88

88-19=59

59-21=48

48-23=25

25-25=0

∴ $\sqrt{169}=13$

100

100-1=99

99-3=96

96-5=91

91-7=84

84-9=75

75-11=64

64-13=51

57-15=36

36-17=19

19-19=10

$\sqrt{100} = 0$

4. 729

3	729
3	243
3	81
3	27
3	9
	3

3×3×3×3×3×3 = 3×3×3=27 $\sqrt{729} = 27$

ii) 400

2	400
2	200
2	100
2	50
5	25
	5

2x2x2x2x5x5

2x2x5=20

$\sqrt{400} = 20$

iii) 1764

2	1764
2	882
3	441
3	147
7	49
	7

2x2x3x3x7x7=2x3x7=42

iv. 4096

2	4096
2	2048
2	1024
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

2x2x2x2x2x2x2x2x2x2x2x2=2x2x2x2x2x2=64

v. 7744

2	7744
2	3872
2	1936
2	484
2	242
11	121
	11

2x2x2x2x2x2x11x11=2x2x2x11=88

vi. 9604

2	9604
2	4802
7	2401
7	343
7	49
	7

2x2x7x7x7x7=2x7x7=98

vii. 5929

7	5929
7	841
11	121
11	11
	1

7x7x11x11
=7x11=77

viii. 9216

2	9216
2	4608
2	2304
2	1152
2	576
2	288
2	144
2	72
2	36
2	18
3	9
	3

2x2x2x2x2x2x2x2x2x2x3x3
=2x2x2x2x2x3=96

ix. 529

23	529
	23

23x23=23
$=\sqrt{529} = 23$

x. 8100

3	8100
3	2700
3	900
3	300
2	100
2	50
5	25

5

∴3x3x3x3x2x2x5x5=3x3x2x5=90

5. i) 252

2	252
2	186
7	63
3	9
	3

2x2x7x3x3
Here '7' has no pair
⟹ 7 has to be multiplied to given number to getperfect square
⟹252×7=1764
$\therefore\sqrt{1764} = 42$

ii)

2	180
2	90
5	45
3	9
	3

Here '5' has no pair
⟹ 5 has to be multiplied to given number to getperfect square
⟹180x5=900
$\therefore\sqrt{900} = 30$

iii) 1008

2 | 1008	
2 | 504	
2 | 252	
2 | 126	
2 | 63	⟹ 1008x7 = 7056
3 | 9	∴ $\sqrt{7056}$ = 84
3	

∴2x2x2x2x7x3x3

⟹Here '7' has no pair. 7 has to be multiplied to get perfect square

iv. 2028

2 | 2028	
2 | 1014	
3 | 507	
13 | 169	
13	$\sqrt{6084}$ = 78

∴2x2x3x13x13

Here '3' has no pair.

⟹ 3 has to be multiplied to get perfectsquare.

⟹2028x3=6084

V. 1458

2 | 1458	
3 | 729	
3 | 243	.
3 | 81	
3 | 7	∴ $\sqrt{2916}$ =54
3	9x3x3x3x3x3x2

Here 2 has no pair

⟹ 2has to be multiplied to givennumberfor getting perfect square.

∴1458x2=2916

VI. 768

2 | 768	∴2x2x2x2x2x2x2x3
2 | 384	∴ 3 has no pair
2 | 192	∴3 has to be multiplied
2 | 96	⟹ 768x3 = 2304
2 | 48	$\sqrt{2304}$ = 48
2 | 24	
3 | 12	
2 | 4	
2	

6. i) 252

2 | 252	2x2x7x3x3
2 | 126	Here 7 has no number
7 | 63	⟹ 7 has to be divided to get perfect square.
3 | 9	⟹ 252 ÷ 7 = 36
3	∴ $\sqrt{36}$ = 9

ii) 2925

5 2925 |	∴ 13 has no pair
5 | 585	⟹13 has to be divided to get perfect square.
3 | 117	⟹ 2925 ÷ 3 = 225
3 | 39	∴ $\sqrt{225}$ = 15
13	

iii) 396

3 | 396	Here 11 has no pair
2 | 132	⟹11 has to be divided to get perfect square
2 | 66	⟹ 396 ÷ 11
3 | 33	=36
11	∴3x3x2x2x11
	∴$\sqrt{36}$ = 6

iv) 2645

5 | 2645	Here '5' has no pair
23 | 529	⟹ 5 has to be divided to get perfect square.
23	∴ 2645 ÷ 5 = 529
	∴ 5x23x23 ∴$\sqrt{529}$ = 23

v) 2800

2 | 2800	
2 | 1400	2 x 2 x 2 x 2 x 5 x 5 x 7
2 | 700	∴ 7 has no pair
2 | 350	7 has to be divided to get perfect square
5 | 175	2800 ÷ 7
5 | 35	= 400
7	∴ $\sqrt{400}$ = 20

vi) 1620

4 | 1620	2 x 2 x 3 x 3 x 3 x 5 x 3
5 | 405	∴ 5 has no pair
3 | 81	5 has to be divided to get perfect square
3 | 27	1620 ÷ 5
3 | 9	= 324
3	∴ $\sqrt{400}$ = 20

7. It is given that each student denoted as many rupees as the number of students of the class.

Let the number of students be 'x'.

Then, each student denoted by ₹ x

Total donation= ₹ x xx

$\Rightarrow x^2=2401$

$\Rightarrow x=\sqrt{2401}$

$\Rightarrow x=49$

4	2401
	6

89	801
	801
	0

∴ Hence, the number of students is 49.

8. Let the number of plants in each row be 'x'.

Then, the number of rows=x

Total number of plants in a garden=x xx

$2025=x^2$

$\Rightarrow x=\sqrt{2025}$

$\Rightarrow x=45$

Thus, the number of plants in each row is 45.

9. The number that will be perfectly divisible by each one of 4, 9 and 10 is their LCM

2	4, 9, 10
2	2, 9, 5
3	1, 9, 5
3	1 3 5
5	1 1 5
	1 1 5

LCM=2x2x3x3x5=180

Here, Prime factor 5 does not have its pair.

∴ 180 should be multiplied with 5 to obtain a perfect square.

∴ The required number

=180x5=900

10. 8, 15 and 20

2	8, 15, 20
2	4, 15, 10
2	2, 15, 5
2	2, 15, 5
3	1 3 1

LCM=2X2X2X5X3=120

Here prime factors, 2, 3 and 5 does not have their respective pairs.

∴120 is not a perfect square.

∴ 120 should be multiplied with 2, 3 and 5 to obtain perfect square.

⇒120x2x3x5=3600

EXERCISE:6:4

1. 2304

4	2304
	16
88	704
8	704
704	0

2. 4489

6	4489
	36
127	889
7	889
889	0

∴ $\sqrt{2304}=48$ ∴ $\sqrt{4489}=67$

3. 3481

5	3481
	25
109	981
9	981
981	0

59

∴ $\sqrt{3481}=59$

4. 529

2	529
	4
43	129
3	129
129	0

23

∴ $\sqrt{529}=23$

5. 3249

5	3249
	25
107	749
7	749
749	0

57

∴ $\sqrt{3249}=57$

6. 1369

3	1369
	9
67	469
7	469
469	0

37

∴ $\sqrt{1369}=37$

7. 5776

7	5776
	49
146	876
6	876
876	0

76

∴ $\sqrt{5776}=76$

8. 7921

8	7921
	64
169	1521
9	1521
1521	0

89

∴ $\sqrt{7921}=89$

9. 576

2	576	24	
	4		
44	176		
4	176		
176	0		

$\therefore \sqrt{576} = 24$

10. 1024

3	1024	32
	9	
62	124	
2	124	
124	0	

$\therefore \sqrt{1024} = 32$

11. 3136

5	3136	56
	25	
106	636	
6	636	
636	0	

$\therefore \sqrt{3136} = 56$

12. 900

30	900
	900
	0

$\therefore \sqrt{900} = 30$

2. i) By applying bars, we obtain $64=\overline{64}$

There is only one bar.

Hence square root of 64 will have only one digit.

ii) 144

By applying bars, we obtain, $144=\overline{1}\,\overline{44}$

Since there are two bars, the square root of 144 will have 2 digits in it.

iii) $\overline{4489}$

Since there are two bars, the square root of $\overline{44}\ \overline{89}$ have will have 2 digits in it.

v) 27225

By apply bars, we obtain, $27225=\overline{2}\ \overline{72}\ \overline{25}.\ \ \overline{2}\ \overline{72}\ \ \overline{25}$

Since there are three bars, the square root of 2 72 25 will have 3 digitsin it.

vi). 390625

By apply bars, we obtain, $390625= \overline{390625}$

Since there are three bars, the square root of $\overline{390625}$will have 3 digits in it.

3. i)2.56

	1.6	
1	2.56	
	1	
26	156	
6	156	
156	0	

$\therefore \sqrt{2.56} = 1.6$

ii)7.29

	2.7	
2	7.29	
	4	
47	329	
7	329	
329	0	

$\therefore \sqrt{7.29} = 2.7$

ii) 51.84

	7.2	
7	51.84	
	49	
142	284	
2	284	
284	0	

$\therefore \sqrt{51.84} = 7.2$

iv) 42. 25

	6.5	
6	42.25	
	36	
125	0625	
5	625	
625	0	

$\therefore \sqrt{42.25} = 6.5$

v) 31.36

	5.6	
5	31.36	
	25	
106	636	
6	636	
636	0	

$\therefore \sqrt{31.36} = 5.6$

From the given number 3250-1=3249

$\sqrt{3249} = 57$

iv) 825

	28	
2	825	
	4	
48	425	
8	384	
384	41	

We get the remainder 41.

If we subtract 41 from the given number.

$\therefore 825 - 41 = 784$

$\therefore \sqrt{784} = 28$

v) 4000

	63	
63	4000	
	3969	
	31	

We get the remainder 31

If we subtract 31 from the given number.

∴ 4000-31=3969

$\sqrt{3969}=63$

4. 402

```
    20
20 | 402
     400
     ---
       2
```

We get the remainder '4'. It shows that $20^2<402$ by 2

If we subtract the remainder from the number, we get a perfect square.

⟹ 402-2=400

$$\therefore \sqrt{400} = 20$$

ii) 1989

```
     44
4  | 1989
     16
     ----
84 |  389
     389
     ---
      53
```

We get the remainder53.

It shows that $44^2<1989$ by 53. If we subtract the remainder from the given number, we get a perfect square.

⟹ 1989-5=1936

$$\sqrt{1936} = 44$$

iii) 3250

```
      57
5   | 3250
      25
     ----
107 |  750
      749
     ----
        1
```

We get the remainder 1. It shows that $57^2<3250$ by 1.

If we subtract the remainder.

5.i) 525

```
      22
2   | 525
      4
     ----
42  |  125
       84
     ----
       41
```

The remainder is 41. This shows that $22^2< 525$. Next perfect Square number is $23^2-525=529-525$

Hence the number to be added. $23^2-525=529-525=4$

ii)2925

```
      54
5   | 2925
      25
     ----
104 |  425
      416
     ----
        9
```

The remainder is 9. This shows that $54^2< 2925$.

Next perfect number square is 55^2. $55^2=3025$

Hence the number to be added 3025-2925=100

iii) 396

```
      19
1   | 396
      1
     ----
29  |  296
      261
     ----
       35
```

The remainder is 35.

This shows that $19^2<396$

Next perfect square number is 20^2. $20^2=400$

Hence the number to be added 400-396=4

ii)1750

```
      41
4   | 1750
      16
     ----
81  |  150
       81
      ----
        69
```

The remainder is 69.

This shows that $41^2<1750$

The next perfect square number is $42^2=1764$

∴Hence the number to be added 1764-1750=14

iii) 252

```
1   | 252  | 15
      1    |
     ----  |
25  |  152 |
      125  |
     ----  |
125   27   |
```

∴The remainder is 27.
This shows that $15^2 < 252$.
Next perfect square number is $16^2=256$
∴Hence the number to be added 256-252=4

iv) 1825

1	1825	42
	16	
82	225	
2	164	
164	61	

The remainder is 61.
$\Rightarrow 42^2 < 1825$.
The next perfect square number is $43^2=1849$.
Hence the number to be added1849-1825=24.

v) 6412.

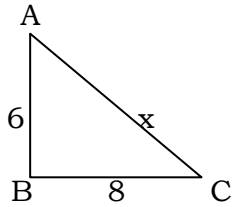
	80
80	6412
	6400
	012

The remainder is 12.
$\Rightarrow 80^2 < 6412$.
The next perfect square number is $81^2=6561$.
Hence the number to be added 6561-6412=149

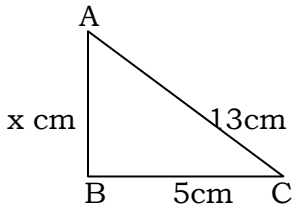
6. Given that area of square=441m²
$\Rightarrow a^2=441$
$a = \sqrt{441}$
$\Longrightarrow a = 21$

	21
2	441
	4
41	041
	41
	0

∴ Hence the length of the side of square 21m.
7. a) AB=6cm, BC=8cm, Find AC by Pythagorean Theorem,
$AC^2=AB^2+BC^2$
$AC^2=6^2+8^2$
$AC^2=36+64$
$AC^2=100$
$AC=\sqrt{100}$
AC=10cm



b) AC=13cm, BC=5 cm find AB.
By Pythagorean Theorem,
$AC^2=AB^2+BC^2$
$13^2= x^2+5^2$
$169-25=x^2$
$144=x^2$
$x=\sqrt{144}$
x=12cm



∴ AB = 12cm

8. It is given that,
No. of plants in a garden=1000
No. of rows=No. of columns.
i.e., the number which should be added to 1000 to make it a perfect Square has to be calculated.

	31
3	1000
	9
61	100
	61
	39

The remainder is 39.
∴ The square of 31<1000
i.e., $31^2<1000$
The next number is 32 and $32^2=1024$
Hence the number to be added to 1000 to make a perfect square.
=1024-1000=24
Hence the required plants is 24.
9. No. of children in a school =500
No. of rows=No. of columns.
The number of children who will be left out in his arrangement has to be calculated.

	22
2	500
	4
42	100
	84
	16

∴ The remainder is 16.
It shows that $22^2 < 500$ by 16.
If we subtract the reminder from the number.
∴ 500-16=484.
Thus the number of children who will be left out is 16.

Chapter - 11: Mensuration

Exercise : 11.1

1. Perimeter of square = 4s

=4(60m) = 240 m

Perimeter of rectangle = 2 (length+ breadth)

=2 (80+b)

= 160+2b

Given that perimeter of square = Perimeter of rectangle

240 = 160+2b

240-160=2b

80=2b

b=40

Area of square = $S^2 = (60)^2 = 3600m^2$

Area of rectangle = l×b = $(80\times40)\ m^2$

$=3200m^2$

Thus the area of the square field is larger than the area of rectangular field.

2. Area of the square plot = $(25m)^2$

$= 625m^2$

Area of the house = $15m\times20m = 300m^2$

Area of the remaining portion = Area of square plot - Area of house

= 625-300

$= 325m^2$

The cost of developing the garden around the house is ₹55/m^2

Total cost of developing the garden of area $325m^2$ = Rs (55×325)

= Rs 17,875

3. Length of the rectangle = [20-(3.5+3.5) m] = 13m

Circumference of 1 semi - circular part = $\pi r=\frac{22}{7}\times3.5$ = 11 m

Circumference of both semi - circular parts = (2×11)m = 22m

Perimeter of the garden = AB + length of both semi - circular regions BC and DA + CD

= 13+22+13=48 m

Area of the garden = Area of rectangle + Area of two semicircular regions

$= [(13\times7)+2\times\frac{1}{2}\times\frac{22}{7}\times(35)^2]m^2$

$[91+38.5]\ m^2$

$= [129.5]m^2$

4. Area of the parallelogram = Base × height

Hence, area of one tile = 24 cm ×10 cm

=240cm2

Required number of tiles $=\frac{\text{Area of floor}}{\text{Area of each tile}}$

$=\frac{1080\,m^2}{240\,cm^2}$

$=\frac{1080\times100\times100\,cm^2}{240\,cm^2}$

= 45000 tiles

Thus 45,000 tiles are required

5. a) Radius (r) of a semi - circular part = $\left(\frac{2.8}{2}\right)$cm

=1.4 cm

Perimeter of the given figure = 2.9 cm+πr

$= 2.8+\left(\frac{22}{7}\times1.4\right)$

= 2.8+4.4

=7.2 cm

b) Radius (r) of semicircular part = $\left(\frac{2.8}{2}\right)$= 1.4 cm

Perimeter of the given figure = 1.5+2.8+1.5+π (1.4 cm)

$=5.8+\frac{22}{7}(1.4)$

=5.8+22(0.2)

=5.8+4.4=10.2 cm

c) Radius (r) of semi - circular part = $\left(\frac{28}{2}\right)$cm=1.4 cm

Perimeter of the given figure (c) = 2cm +πr+2cm

$= 4cm +\frac{22}{7}\times1.4$

=4+4.4=8.4cm

Thus, the ant will have to take a longer round for the food piece.

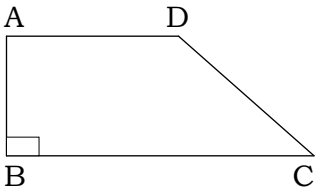
(b) Because the perimeter of the figure given in alternative (b) is the greatest among all.

Exercise: 11.2

1. Area of trapezium = ½×(sum of parallel sides)×h
=½×h×(a+b)
=½×0.8 (1.2+1)
=0.4(2.2)
=0.88m²

2. Given that, area of trapezium = 34cm²
and height = 4 cm
Let the length of one parallel side be x
∴Area of trapezium = ½×h×(a+b)
34=½×4×(10+x)
$\frac{34}{2}$=10+x
17-10=x
x=7
∴ The length of the other parallel side is 7 cm.

3. Length of the fence of trapezium.
ABCD = AB+BC+CD+DA
=120m=AB+48+17+40
120=AB+105
120-105=AB
AB = 15m



Area of field ABCD = ½(AD+BC)×AB
=½×(40+48)×15
=½×88×15 = 660 m²

4. Given that length of the diagonal, d = 24m length of the ⊥lr
h_1& h_2 from the opposite vertices to the diagonal are h_1=8m and h_2=13m
Area of quadrilateral = ½d (h_1+h_2)
=½×24(8+13)
=12(21)
=25²m²
Thus, the area of quadrilateral = 25²m²

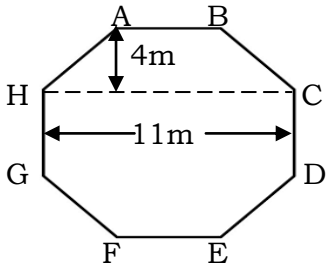
5. Given that diagonals of rhombus are 7.5 and 12 cm
∴Area of rhombus = ½×d_1d_2
=½×7.5×15
=45.0=45 cm²

6. Let the length of the other diagonal of rhombus be 'x'
A rhombus is a special case of ||gm = base ×height
=5×4.8
=24.0 cm²
Also, area of the rhombus = ½d_1d_2
24 = ½×8×d_2
$\frac{24\times2}{8}$ = d_2
d_2=6 cm

7. Area of rhombus = ½d_1d_2
Area of each tile = ½×45×30
=675cm²
Area of 3000 tiles = 675×3000 cm²
=2025000cm²
=202.5m²
The cost of polishing is 4/m²
Cost of polishing 202.5m² area = 4×202.5 = 810
Thus the cost of polishing the floor is 810.

8. Let the length of the field along the road be l mts.
Hence, the length of the field along the river will be $2l$ mts
Area of trapezium = ½ ×h (a+b)
10500 = ½×(l+2l)×100
=3l
3l=210
l=70 mts
Thus the length of the field along the river = 2×70 = 140 mts

9. Side of rectangular octagon = 5 cm
Area of trapezium ABCH = Area of trapezium DEFG
Area of trapezium ABCH=½×4(11+5)=16×2=32m²
Area of rectangle HGDC = 11×5 = 55m²
Area of octagon = Area of trapezium ABCH + Area of trapezium GDEF + Area of rectangle HGDC
=32+32+55
=119m²



10. Jyoti way of finding area as follows

Area of pentagon = 2 (Area of trapezium ABCF)

$=2[\frac{1}{2}\times\frac{15}{2}\times(15+30)]$

$=2(\frac{15}{4}\times 45)$

$=7.5\times45$

$=337.5m^2$

Area of pentagon = Area of Δ ABE+ Area of square BCDE

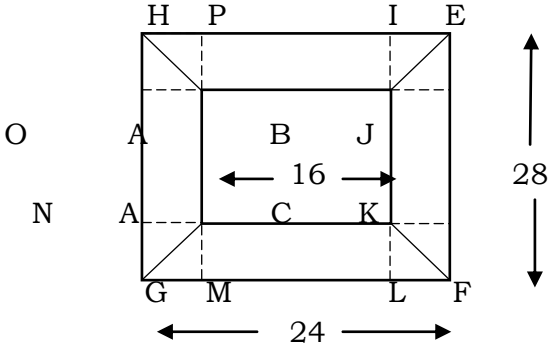
$= [½\times15\times(30-15)+ (15)^2]$

$=½\times15\times15+225$

$=112.5+225$

$=337.5m^2$

11. Given that, the width of each section is same.



Given that, the width of each section is same.

1B = BJ = CK = CL =DM = DM = AO = AP

1L = IB +BC +CL

28 = IB +20+CL

IB+CL = 28-20 = 8cm

1B = CL = 4 cm

Hence, 1B = BJ = CK=CL=DM=DN=AO=AP=4cm

Area of section BEFC = Area of section CDGF

$=½(20+28)\times4\ cm^2$

$=(48)\times2\ cm^2$

$=96\ cm^2$

Area of section CDGF = Area of section ABEH

Exercise: 11.3

1. We know that

Total surface area of the cuboid = 2 (lb+ bh+ hl)

Total surface area of cube = 6a2

TSA of cuboid = 2[(60) (40) + (40)(50)+(50)(60)]

$= 2[2400+2000+3000]\ cm^2$

$= [2\times7400]\ cm^2$

$=14800\ cm^2$

TSA of cube (b) = $6(50)2\ cm^2$

Thus the cuboid box (a) will require lesser amount of material.

2. Total surface area of suitcase = 2[(80) (48)+(48)(24)+24(80)]

$=2[3840+1152+1920]$

$=13824\ cm^2$

Total surface of 100 suitcases = $(13824\times100)\ cm^2$

$=1382400\ cm^2$

Required tarpaulin = l×b

$1382400\ cm^2=l\times96$ cm

$l=\frac{1382400}{96}$ = 14400 cm

l=144m

Thus, 144m of tarpaulin is required to cover 100 suitcases.

3. Given that, surface area of cube = 600 cm2

Let the length of each side of cube be L.

Surface area of cube = $6(side)^2$

$600\ cm^2 = 6l^2$

$l^2=\frac{600}{6}$

$l^2= 100\ cm^2$

l=10 cm

Thus the side of the cube is 10 cm.

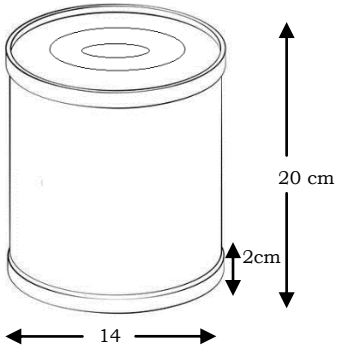
4. Length of the cabinet =2m

Breadth of cabinet = 1m

Height of the cabinet = 1.5m

Area of cabinet that was painted = 2h (l+b)+lb

=2×1.5[2+1] + 2×1
=3.0[3] + 2
=9+2=11m²
5. Given that
Length l=15m,
Breadth = 10m
Height = 7m
Area of the hall to be painted =Area of the wall + Area of the celing
=2h (l+ b) +l×b
=2(7) [15+10]+15×10
=14[25]+150
=500m²
It is given that 100m² area can be painted from each can.
No. of cans required to paint an area of 500 m².
$=\frac{500}{100}=5$
Hence, 5 cans are required to paint the walls and the ceiling of the cuboid hall.
6. From two figures,
Heights are same.
The difference b/w the two figures is that one is a cylinder and the other is a cube.
Lateral surface area of the cube =4l²=4(7)²=196cm²
Lateral surface area of the cylinder = $2\pi rh=2\times\frac{22}{7}\times\frac{7}{2}\times7$ = 154 cm²
Hence, the cube has larger LSA.
7. Total surface area of cylinder = $2\pi r(r+h)$
= $[2\times\frac{22}{7}\times7(7+3)]$ m²
=44(10) = 440m²
Thus 440m² sheet of metal is required
8. A hollow cylinder is cut along its height to form rectangular sheet.
Area of cylinder = Area of rectangular sheet
4224 = 33×length
length $=\frac{4224}{33}$
= 128 cm
Thus, the length of rectangular sheet is 128 cm.
Perimeter of the rectangular sheet = 2(l+b)
=2(128+33)
=2(161)
=322 cm
9. In one revolution, the roller with cover an area equal to its lateral surface area.
Thus, in 1 revolution, area of the road covered = $2\pi rh$
$=2\times\frac{22}{7}\times42\times1$m
=44×6×1m
$=\frac{264}{100}$m²
In 750 revolutions, area of the road covered
= $(750\times\frac{264}{100})$m²
=1980 m²
10. Height of the label = 20 cm - 20m-2cm
=20-4 cm
=16 cm
Radius of the label = $\left(\frac{14}{2}\right)$ cm
= 7 cm
Label is the form of a cylinder having its radius and height as 7 cm and 16 cm.
Area of the label = $2\pi rh$
$=2\times\frac{22}{7}\times7\times16$
=44×16 cm²
=704 cm²



Exercise: 11.4

1. a) We will find volume
b) We will find the surface area
c) We will find the volume

2. The height and diameter of these cylinder A and B are interchanged WKT volume of cylinder = $\pi r^2 h$

$=\frac{22}{7}\times\frac{7}{2}\times\frac{7}{2}\times 14$

$=539\ cm^2$

Volume of cylinder B = $\pi r^2 h$

$=\left(\frac{22}{7}\times 7\times 7\times 7\right)cm^3$

$=1078\ cm^3$

Volume of cylinder B is greater

Surface area of cylinder A = $2\pi r(r+h)$

$=2\times\frac{22}{7}\times\frac{7}{2}\left(\frac{7}{2}+14\right)$

$=22\left(\frac{7+28}{2}\right)$

$=11(35)$

$=385\ cm^2$

Surface area of cylinder 13 = $2\pi r(r+h)$

$=2\times\frac{22}{7}\times 7(7+7)$

$=44(14)$ $= 616\ cm^2$

Thus, the surface area of cylinder B is also greater than the surface Area of cylinder A.

3. Let height be 'h'

Given that Area of circle is $180\ cm^2$

$=l\times b=180\ cm^2$

Also given volume of cuboid = $900\ cm^3$

lbh = 900

$180\times h = 900$ (lb = 180)

$h=\frac{900}{180}$

h=5 cm

4. Volume of cuboid = $60\ cm\times 54\ cm\times 30\ cm$

$= 97200\ cm^3$

Side of the cube= 6 cm

Volume of the cube = $6^3 cm^3$

$=216 cm^3$

Required number of cubes = $\frac{Volume\ of\ cuboid}{Volume\ of\ box}$

$=\frac{97200}{216}$ $= 450$

Thus 450 cubes can be place in the given cuboid.

5. Diameter of the base = 140 cm

Radius = $\frac{140}{2}$

= 70 cm

$=\frac{70}{100}$m

Volume of cylinder = $\pi r^2 h$

$1.54 m^3=\frac{22}{7}\times\frac{70}{100}\times\frac{70}{100}\times h$

$h=\frac{1.54\times 7\times 100\times 100}{22\times 70\times 70}$

=1m

6. Radius of cylinder = 1.5m

Length of cylinder = 7m

Volume of cylinder =7m

Volume of cylinder = $\pi r^2 h$

$=\left(\frac{22}{7}\times 1.5\times 1.5\times 7\right)m^3$

$49.5 m^3$

$1 m^3=1000L$

Required quantity = $(4.95\times 1000)L$

$=49500L$

49500 L of milk can be stored in the tank.

7. i) Let initially the edge of the cube be L.

Initial surface area = $6L^2$

If each edge of the cube is doubled, then it becomes 2L.

New surface area = $6(2L)^2$

$=24L^2$

$=4\times 6L^2$

Clearly, the surface area will be increased by 4 times.

ii) Initial volume of the cube = L^3

When each edge of the cube is doubled, it becomes 2L.

New volume = $(2L)^3=8L^3=8\times L^3$

Clearly, the volume of the cube will be increased by 8 times.

8. Volume of cuboid reservoir = $108 m^3$

$= (108\times 1000)L$

$=108000L$

It is given that water is being poured the rate of 60L per minute

Required number of hours = $\frac{108000}{3600}$ $= 30$ hours

Thus, it will take 30 hours to fill the reservoir.

Direct and Inverse Proportions

Exercise- 13.1

1. A table of the given information is formed as

No. of hours	4	8	12	24
Packing charges (in Rs)	60	100	140	180

The ratio of parking charges to resp. no. of hrs can be calculated as

$\frac{60}{4} = 15, \frac{100}{8} = \frac{25}{2}, \frac{140}{12} = \frac{35}{3}, \frac{180}{24} = \frac{15}{2}$

As each ratio is not same, parking charges is direct proportion to parking time.

2.

Parts of red pigment	1	4	7	12	20
Parts of base	8	X_1	X_2	X_3	X_4

According to direct proportion,

$\frac{x_1}{4}=\frac{8}{1} = x_1=4\times8=32$

$\frac{x_2}{7}=\frac{8}{1}=x_2=7\times8=56$

$\frac{x_3}{12}=\frac{8}{1} = x_3=8\times12=96$

$\frac{x_4}{20}=\frac{8}{1}=x_4=8\times20=160$

The table can be drawn as,

Parts of red pigment	1	4	7	12	20
Parts of base	8	32	56	96	160

3) Let the parts of red pigment required to mix with 1800 mL of base be x.

The given information in form of table as,

Parts of red pigment	1	X
Parts of base (in mL)	75	1800

The parts of red pigment & parts of base are in direct proportion

$\therefore \frac{1}{75}=\frac{x}{1800} = x = \frac{1\times800}{75} = 24$

Thus, 24 parts of red pigments should be mixed with 1800m base.

4. Let the no. of bottles filled by machine in 5 hrs be x.

The given information in form of table as,

No. of. bottles	840	X
Time taken (hrs)	6	5

The no. of bottles & time taken to fill these bottles are direct proportion.

$\therefore \frac{840}{6}=\frac{x}{5}$

$x=\frac{840\times5}{6}=700$

Thus 700 bottles will be filled in 5 hrs.

5. Let the actual length of bacteria be x cm & enlarged length of bacteria is y cm. If photograph is enlarged for 20,000 times the given information in form of table as,

Length of bacteria (cm)	5	X	y
No. of times photograph of Bacteria was enlarged	50000	1	20000

The no. of times, photograph of bacteria was enlarged length of bacteria are in direct proportions.

$\frac{5}{50,000}=\frac{x}{1}$

$x=\frac{1}{10,000} = 10^{-4}$

Actual length of bacteria is 10^{-4}. Let length of bacteria when photograph of bacteria is enlarged 20,000 times be y .

$\frac{5}{50,000}=\frac{y}{20,000}$

$y=\frac{20,000\times5}{50,000} = 2$

Hence enlarged length of bacteria is 2cm.

6. Let the length of mast of model ship be X cm.

The gn. Info in form of table as,

	Height of mast	Length of ship
Model ship	9 cm	X
Actual ship	12 m	28 m

We know, dimensions of actual ship & model ship is directly proportional to each other.

$\frac{12}{9}=\frac{28}{x}$

$x=\frac{28\times9}{12}=21$

Thus, length of model ship is 21 cm.

7. Let the no. of sugar is 5KG of sugar be X.

The gn info in form of table as,

Amt. of sugar (kg)	2	5
No. of crystals	9×10^6	X

The amount of sugar & no. of crystals it contains are directly proportional to each other. $\frac{2}{9\times10^6}=\frac{5}{x}$

Hence, no. of sugar crystals is 2.25×10^7

7. Let the no. of sugar crystals in 1.2 kg of sugar be y. The given information in form of table as,

Amt. of sugar (kg)	2	1.2
No. of crystals	9×10^6	y

$\frac{2}{9\times10^6}=\frac{1.2}{y}$

$y=\frac{1.2\times9\times10^6}{2}=5.4\times10^6$

Hence no. of sugar crystals is 5.4×10^6

8. Let the distance represented on Map, be X cm.

The given information in form of table as,

Distance covered on road in (km)	18	72
Distance represented on map (cm)	1	X

The distances covered on road & represented on map are directly proportional to each other.

$\frac{18}{1}=\frac{72}{x}\Rightarrow x=\frac{72}{18}=4$

Hence distance represented on map is 4 cm.

9. Let the length of shadow of other

i) Pole be x m

1m = 100 cm

The given information in form of table as,

Height of pole (m)	5.60	10.50
Length of shadow (m)	3.20	X

More, the height of an object, more will be length of shadow.

Thus, height of an object & length of its shadow are directly proportional to each other.

$\frac{5.60}{3.20}=\frac{10.50}{X}$

$x=\frac{10.50\times3.20}{5.60}=6$

Hence, length of shadow will be 6m.

ii) Let the height of pole be y m

The gn.info in form of table as,

Height of pole (m)	5.60	Y
Length of shadow (m)	3.20	5

Height of pole & length of shadow are proportional to each other.

$\frac{5.60}{3.20}=\frac{y}{5}=y=\frac{5\times5.60}{3.20}$

=8.75

Thus, Height of pole is 8.75 m (or) 8m 75 cm.

10. Let the distance travelled by truck in 5 hrs be X km

We know, 1 hr = 60 min

5 hrs = (5×60)

= 300 min

The gn. info in the form of table as,

Distance travelled (km)	14	X
Time (min)	25	300

Distance travelled by truck & time taken are directly proportional to each other. $\frac{14}{25}=\frac{x}{300}=x=\frac{14\times300}{25}=168$

Hence distance travelled by truck is 168 km.

Exercise: 13.2

1) i, iv and v are inverse proportions.

2. A table of given Information as follows:

No. of. winners	1	2	4	5	8	10	20
Prize for each winner (Rs)	100000	50000	X_1	X_2	X_3	X_4	X_5

From table, we obtain

$1\times100000\neq2\times50000=100000$

Thus, no. of winners & amount given to each are inversely proportional to each other.

$1\times100000=4\times X$

$x_1=\frac{100000}{4}=5\times X_2$

$x_2=\frac{100000}{5}=20000$

$1\times100000=8\times X_3$

$x_3=\frac{100000}{8}$

=12500

$1\times100000=10\times X4$

$X4=\frac{100000}{10}=10000$

$1\times100000=20\times X5$

$X5=\frac{100000}{20}$ =5000

A table of given information as,

No. of spokes	4	6	8	10	12
Angle b/w a pair of consecutive spokes	90^0	60^0	X_1	X_2	X_3

From the given table, $4\times90^0 = 360^0 = 6\times60^0$

Thus no. of spokes & angle b/w consecutive spokes are inversely proportional to other.

$4\times90^0=X_1\times8$

$X1=\frac{4\times90^0}{8}=45^0$

Similarly, $X2 = \frac{4\times90^0}{10}=36^0$

$X_3 = \frac{4\times90^0}{12}=30^0$

Thus, following table is obtained.

No. of spokes	4	6	8	10	12
Angle b/w pair of consecutive spokes	90^0	60^0	45^0	36^0	30^0

i) Yes, the no. of spokes & angles formed b/w pair of consecutive spokes are in inverse proportion.

ii) Let the angle b/w pair of consecutive spokes on a wheel with 15 spokes be X.

$4\times90^0=15\times x$

$X=\frac{4\times90^0}{15}=24^0$

Hence angle b/w pair of consecutive spokes of wheel, has 15 spokes in it is 24^0.

iii) Let the no. of spokes in a wheel, which has 40^0 angles b/w a pair of consecutive spokes be y.

$\therefore 4\times90^0 = y\times40^0$

$y=\frac{4\times90^0}{15}=9$

Hence, no of spokes in such a wheel is 9.

4. No. of remaining children = 244 = 20

Let the no. of sweets which each of the 20 students will get, be x.

The following table is obtained

No. of students	24	20
No. of sweets	5	X

If the no. of students is lesser, then each student get no. of sweets.

Since, this is a case of inverse proportion.

$24\times5=20\times x$

$x=\frac{24\times5}{20}=6$

Hence, each student will get 6 sweets.

5. Let the no. of days that the food will last if there were 10 more animals in cattle be x table is,

No. of animals	20	20+10=30
No. of days	6	x

More, the no. of animals, lesser will be no. of days for the food will last .

Hence, no. of days the food will last & no. of animals are inversely proportional to each other.

$20\times6=30\times x$

$x=\frac{20\times6}{30}=4$

Thus, food will last for 4 days.

6. Let the no. of days required by 4 persons to complete the job be X the following table is obtained.

No. of days	4	X
No. of persons	3	4

If no. of persons is more, than it will take less time to complete job they are inversely proportional.

$4\times3=x\times4$

$x=\frac{4\times3}{4}=3$

The no of days required to complete the job is3.

7. Let the no. of boxes filled by using 20 bottles in each box be x. the following table is obtained

No. of. bottles	12	20
No of boxes	25	x

More no. of bottles, lesser will be no. of boxes.

They are inversely proportional to each other.

$12\times25=20\times x$

$x=\frac{12\times25}{20}=15$

Hence, the no. of boxes required to pack these bottles is 15.

8. Let the number of machines required to produce articles in 54 days be x.

The following table is obtained

Number of machines	42	X
Number of days	63	54

It is a inverse proportion

$\therefore 42\times63=x\times54$

$\frac{42\times63}{54}=x$ $\quad\therefore x=49$

Hence, the required number of machines to produce the given number of articles in 54 days is 49.

9. Let the time taken by the car to reach the destination, while travelling with a speed of 80km/hr, be x hours.

Speed in km/hr	60	80
Time taken in hrs	2	X

More the speed of the car, lesser will be the time taken to reach the destination.

Hence, the speed of the car and the time taken by the inversely proportional to each other.

$60\times2=80\times x$

$x=\frac{120}{80}=\frac{3}{2}$=1½ hr

The time required by the car to reach the given destination is 1½ hour.

10. i) let the number of days required by 1 man to fit all the windows be x.

No. of. persons	2	1
No. of days	3	x

Lesser the no. of persons, more will be the number of days to fill all windows, Hence this is a case of inverse prop

$\therefore 2\times3=1\times x$ $\quad x=6$

Hence the number of days taken by 1 man to fit all the windows is 6 days.

ii) Let the number of persons required to fit all the windows be y.

No. of. person	2	Y
No. of days	3	1

It is inverse proportion

$\therefore 2\times3=y$ $\quad\Rightarrow y=6$

Hence 6 person are required to fit all the windows.

11. Let the duration of each period when there are 9 period a day in the school be x min.

Duration of each period	45	X
No. of periods	8	9

It is an inverse proportion $45\times8 = x\times9$

$\frac{45\times8}{9}=x\Rightarrow x=40$

Hence, the duration of each period will be 40 min.