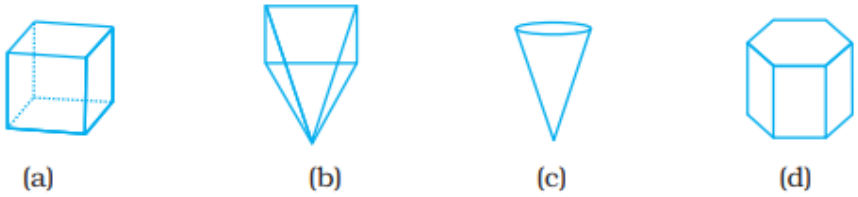
Chapter - 6
Visualising the solid shapes

Exercise

In each of the questions 1 to 21, out of four options only one is correct. Write the correct answer.

1. Which amongst the following is not a polyhedron?



Solution:-
(c)
A polyhedron is regular if its faces are congruent regular polygons and the same number of faces meet at each vertex.

2. Which of the following will not form a polyhedron?
(a) 3 triangles (b) 2 triangles and 3 parallelogram
(c) 8 triangles (d) 1 pentagon and 5 triangles

Solution:-
(a) 3 triangles
3 triangles will not form a polyhedron because it must have more than four faces. So, it is not possible in 3 triangles which have 3 faces only.

3. Which of the following is a regular polyhedron?
(a) Cuboid (b) Triangular prism (c) Cube (d) Square prism
Solution:-
(c) Cube
A cube is a platonic solid because all six of its faces are congruent squares.

4. Which of the following is a two Dimensional figure?
(a) Rectangle (b) Rectangular Prism (c) Square Pyramid (d) Square Prism

Solution:-
(a) Rectangle

Rectangle is a two dimensional figure. It has length and breadth.

5. Which of the following can be the base of a pyramid?
(a) Line segment (b) Circle (c) Octagon (d) Oval

Solution:-
(c) Octagon
A pyramid is a polyhedron whose base is a polygon and lateral faces are triangles.

6. Which of the following 3D shapes does not have a vertex?
(a) Pyramid (b) Prism (c) Cone (d) Sphere

Solution:-
Sphere.
The faces meet at edges which are line segments and the edges meet at a point called vertex. As, a sphere has no vertex and no edges.

7. Solid having only line segments as its edges is a
(a) Polyhedron (b) Cone (c) Cylinder (d) Polygon
(a) Polyhedron

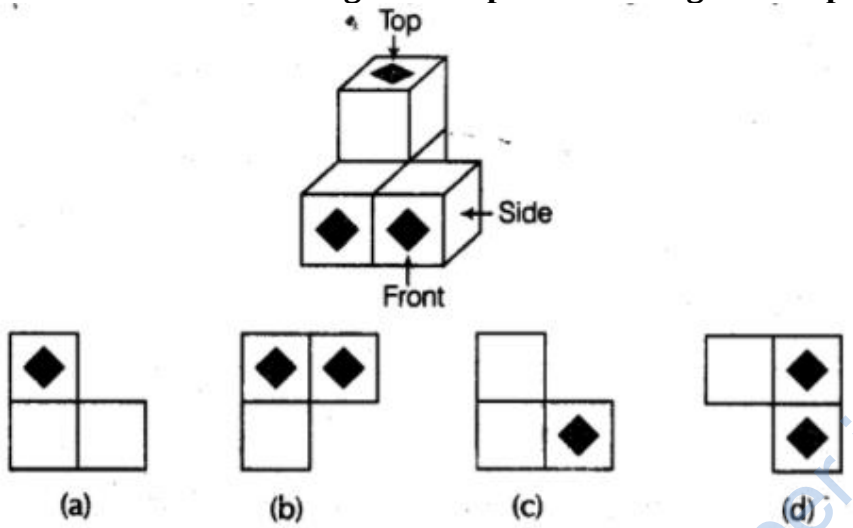
Solution:-
A polyhedron is formed by four or more polygons that intersect only at their edges. The faces of a regular polyhedron are all congruent regular polygons and the same number of faces intersect at each vertex.

8. In a solid if F = V = 5, then the number of edges in this shape is
(a) 6 (b) 4 (c) 8 (d) 2

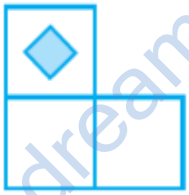
Solution:-
(c) 8
We have,
Euler's formula for any polyhedron is,
F + V – E = 2
As,
F = V = 5
And,
Face (F) = 5,
Vertex (V) = 5,
Edge (E) =?
So,
5 + 5 – E = 2
10 – E = 2
10 – 2 = E

Edges (E) = 8

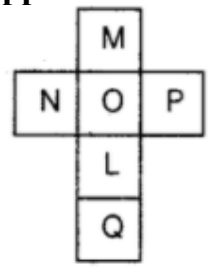
9. Which of the following is the top view of the given shape?



Solution:
(a)



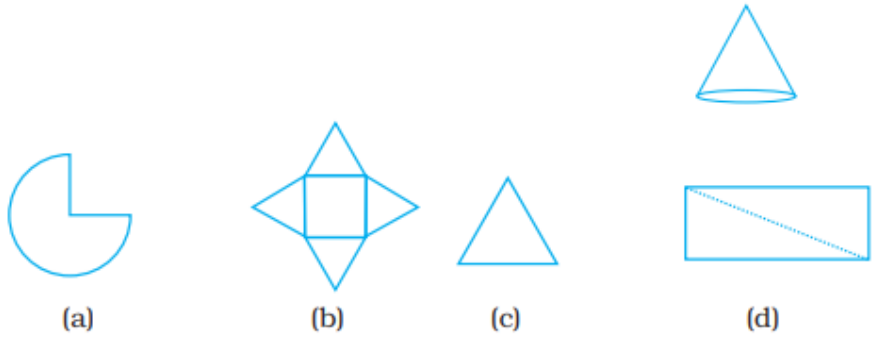
10. The net shown below can be folded into the shape of a cube. The face marked with the letter L is opposite to the face marked with which letter?



(a) M (b) N (c) Q (d) O

Solution:-
(a) M

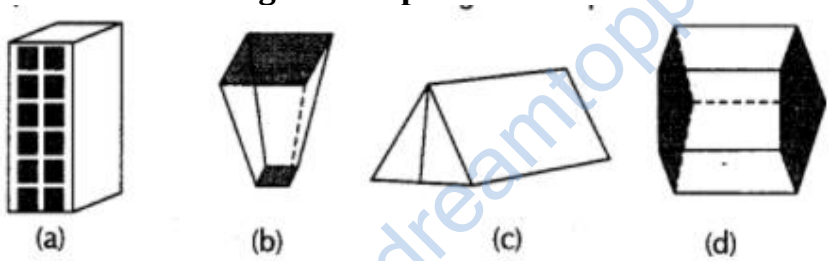
11. Which of the nets given below will generate a cone?



Solution:-

(a) Has circular base, which gives a cone**.**

12. Which of the following is not a prism?



Solution:-

(b)
As, bottom and top faces are not congruent polygons.

13. We have 4 congruent equilateral triangles. What do we need more to make a pyramid?
(a) An equilateral triangle.
(b) A square with same side length as of triangle.
(c) 2 equilateral triangles with side length same as triangle.
(d) 2 squares with side length same as triangle.

Solution:-
(b) A square with same side length as of triangle.

We have to add a square with same side length as of triangle to make a pyramid. As a pyramid is a polyhedron whose base is a polygon and lateral faces are triangles.

14. Side of a square garden is 30 m. If the scale used to draw its picture is 1cm: 5m, the perimeter of the square in the picture is
(a) 20 cm (b) 24 cm (c) 28 cm (d) 30 cm

Solution:-
(b) 24 cm

We have, side of a square garden = 30m
Scale to draw garden picture is 1cm: 5m

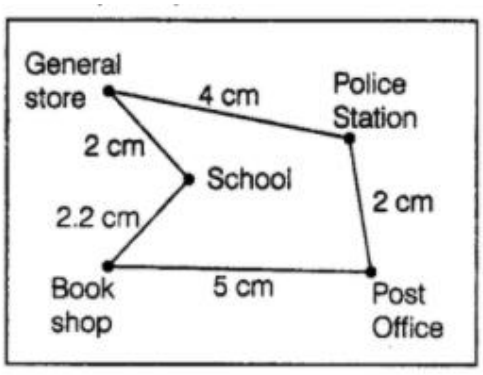
Perimeter of the square garden is = 4 × 30
= 120m
Perimeter to draw garden in picture = $\frac{120}{5}$
= 24 cm

15. Which of the following shapes has a vertex.

(a) (b) (c) (d)

Solution:-
(c)
The edges meet at a point called vertex.

16. In the given map, the distance between the places is shown using the scale 1 cm : 0.5 km. Then the actual distance (in km) between school and the book shop is



(a) 1.25 (b) 2.5 (c) 2 (d) 1.1

Solution:-
(d) 1.1
Scale = 1 cm: 0.5km
Then the actual distance between school and the book shop is = 2.2 × 0.5
= 1.1 cm

17. Which of the following cannot be true for a polyhedron?
(a) V = 4, F = 4, E = 6 (b) V = 6, F = 8, E = 12
(c) V = 20, F = 12, E = 30 (d) V = 4, F = 6, E = 6

Solution:-
(d)
V = 4,
F = 6,
E = 6

We have, Euler's formula for any polyhedron is,
F + V – E = 2

Face (F) = 6,
Vertex (V) = 4,
Edge (E) =6
Then,
6 + 4 – 6 = 2

LHS = 6 + 4 -6
= 10 – 6
= 4
RHS= 2
By comparing LHS and RHS
LHS ≠ RHS

18. In a blueprint of a room, an architect has shown the height of the room as 33 cm. If the actual height of the room is 330 cm, then the scale used by her is
(a) 1:11 (b) 1:10 (c) 1:100 (d) 1:3

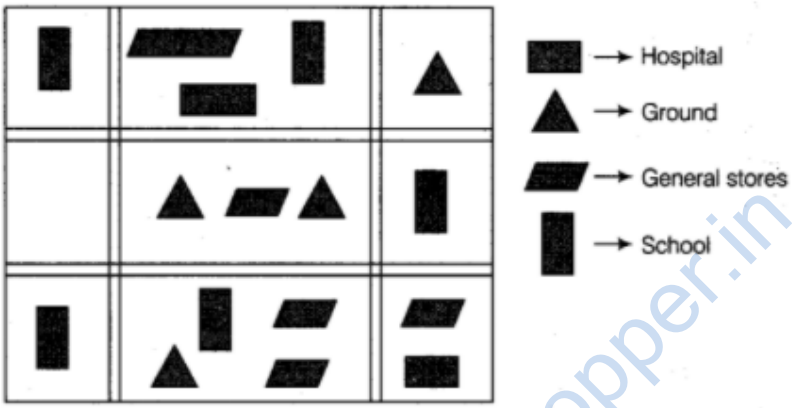
Solution:-
(b) 1: 10
We have,
An architect has shown the height of the room as 33 cm
The actual height of the room is 330 cm
So,
The scale used by an architect is = Drawn size/actual size

$= \frac{33}{330}$

$= \frac{1}{10}$

$= 1: 10$

19. The following is the map of a town. Based on it answer question 19-21.



The number of hospitals in the town is
(a) 1 (b) 2 (c) 3 (d) 4

Solution:-
(b) 2

20. The ratio of the number of general stores and that of the ground is
(a) 1 : 2 (b) 2 : 1 (c) 2 : 3 (d) 3 : 2

Solution:-
(d) 3: 2
The number of general stores = 6
The number of ground = 4
Then,

The ratio of the number of general stores and that of the ground is $= \frac{6}{4}$

$= \frac{3}{2}$

$= 3: 2$

21. According to the map, the number of schools in the town is
(a) 4 (b) 3 (c) 5 (d) 2

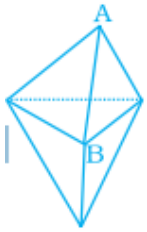
Solution:-
(c) 5

In questions 22 to 41, fill in the blanks to make the statements true.

22. Square prism is also called a _____.

Solution:-
Square prism is also called a cube.
A cube is a platonic solid because all six of its faces are congruent squares.

23. Rectangular prism is also called a _____.



Solution:-
Rectangular prism is also called a Cuboid.

24. In the figure, the number of faces meeting at B is _____.

Solution:-
The number of faces meeting at B is 4.

25. A pyramid on an n sided polygon has _____ faces.

Solution:-
A pyramid on an n sided polygon has n+1 faces.

26. If a solid shape has 12 faces and 20 vertices, then the number of edges in this solid is _____.

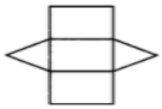
Solution:-

If a solid shape has 12 faces and 20 vertices, then the number of edges in this solid is 30.
We have,
Euler's formula for any polyhedron is,
F + V – E = 2

Given, F = 12, V = 20
Face (F) = 12,

Vertex (V) = 20,
Edge (E) =?

So,
12 + 20 – E = 2
32 – E = 2
32 – 2 = E
Edges (E) = 30

27. The given  **net can be folded to make a _____.**

Solution:-

The given net can be folded to make a prism.

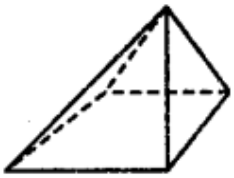
28. A solid figure with only 1 vertex is a _____.

Solution:-

A solid figure with only 1 vertex is a cone.

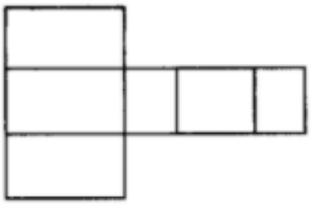
29. Total number of faces in a pyramid which has eight edges is_____.

Solution:-
Total number of faces in a pyramid which has eight edges is 5.



30. The net of a rectangular prism has _____ rectangles. (Hint: Every square is a rectangle but every rectangle is not a square.)

Solution:-
The net of a rectangular prism has six rectangles.



31. In a three-dimensional shape, diagonal is a line segment that joins two vertices that do not lie on the _____ face.

Solution:-
In a three-dimensional shape, diagonal is a line segment that joins two vertices that do not lie on the same face.

32. If 4 km on a map is represented by 1 cm, then 16 km is represented by _____ cm.

Solution:-
If 4 km on a map is represented by 1 cm, then 16 km is represented by 4 cm.
As,
$\frac{16}{4}$ = 4 cm

33. If actual distance between two places A and B is 110 km and it is represented on a map by 25 mm. Then the scale used is _____.

Solution:-
If actual distance between two places A and B is 110 km and it is represented on a map by 25 mm. Then the scale used is 1: 4400000

We have,

Actual distance between two places A and B is = 110km
Distance is represented on a map by = 25 mm
So,

$$\text{The scale used is} = \frac{Size\ drawn\ on\ map}{Actual\ distance}$$
$$= \frac{25mm}{110km}$$

Also,
1km = 1000m
1m = 100cm
1cm = 10mm

1 km = 10,00,000
So,
110km = 11,00,00,000 mm

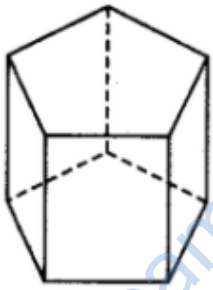
Therefore,

$$\frac{25mm}{110km} = \frac{25}{11,00,00,000}$$

= 1/4400000
= 1: 4400000

34. A pentagonal prism has _____ faces.

Solution:-
A pentagonal prism has 7 faces.



35. If a pyramid has a hexagonal base, then the number of vertices is _____.

Solution:-

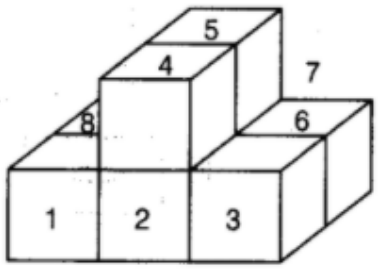
If a pyramid has a hexagonal base, then the number of vertices is 7.

36.  **is the _____ view of** 

Solution:
Top view.

37. The number of cubes in  **are _____.**

Solution:
The number of cubes is 8.



38. If the sum of number of vertices and faces in a polyhedron is 14, then the number of edges in that shape is _____.

Solution: 12
Euler‟s Formula for any polyhedron = F + V –E = 2
F = Faces and
V = Vertices and
E = Edges

Therefore,
14 – E = 2
E = 12

39. Total number of regular polyhedra is _____.

Solution:

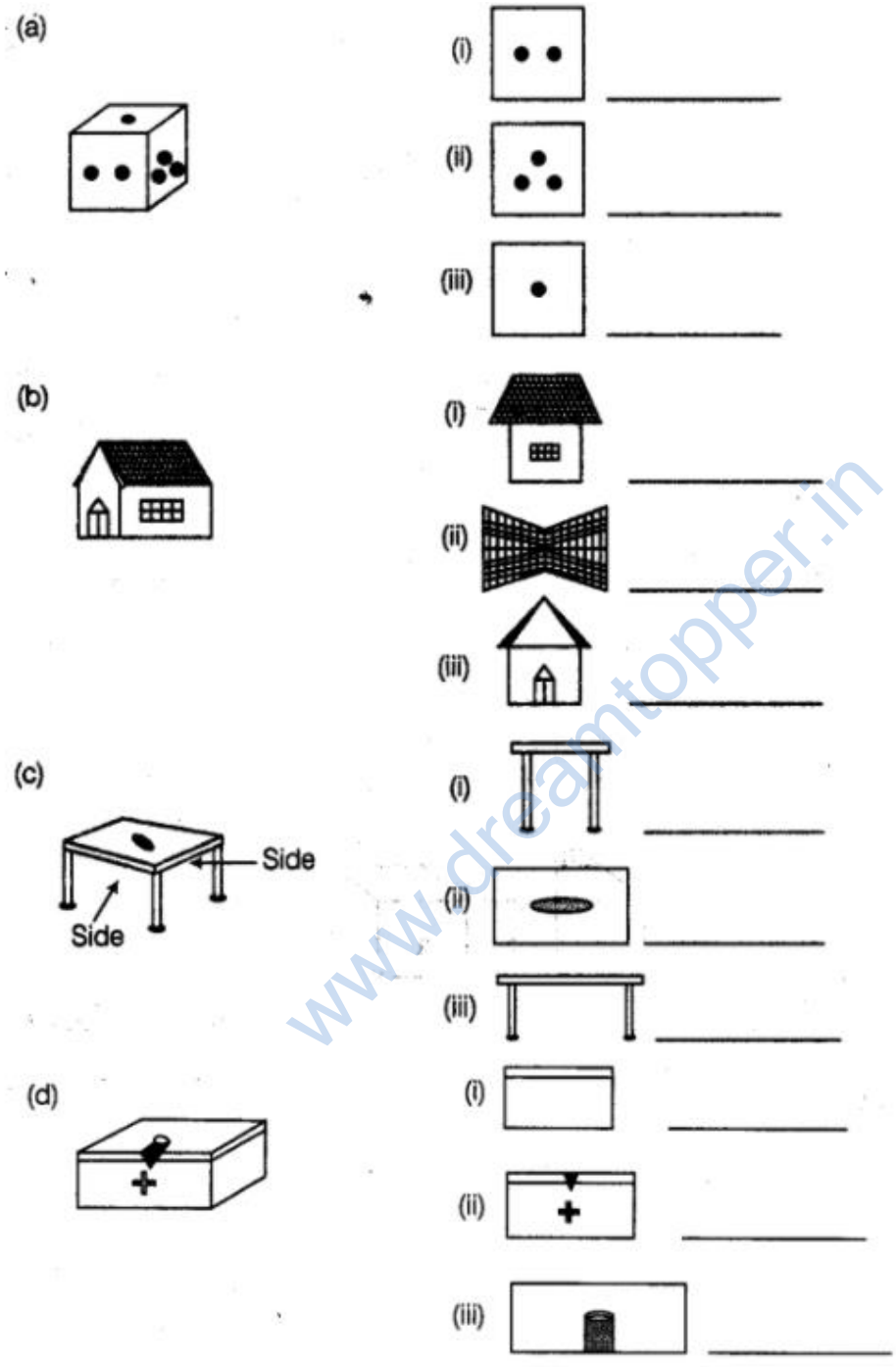
Total number of regular polyhedra is 5.

40. A regular polyhedron is a solid made up of _____ faces.

Solution:

A regular polyhedron is a solid made up of congruent faces.

41. For each of the following solids, identify the front, side and top views and write it in the space provided.



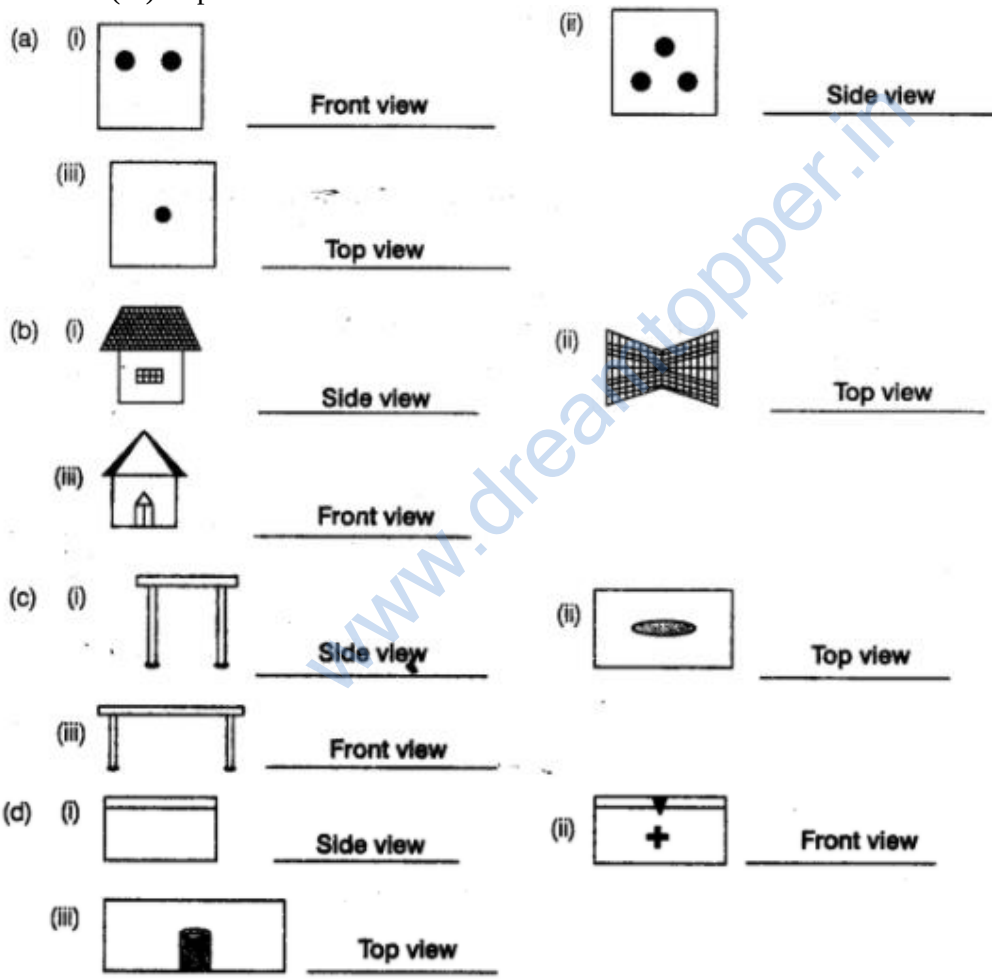
Solution:

a) (i) Front View,
(ii) Side View and
(iii) Top View

b) (i) Side View,
(ii) Top View and
(iii) Front View

c) (i) Side View,
(ii) Top View and
(iii) Side View

d) (i) Side View,
(ii) Front View and
(iii) Top View



In each of the questions 42 to 61, state whether the following statements are true (T) or false (F).

42. The other name of cuboid is tetrahedron.

Solution:

The given statement is false. Rectangular prism is a another name of cuboids.

43. A polyhedron can have 3 faces.

Solution:
The given statement is false. A polyhedron can have four faces.

44. A polyhedron with least number of faces is known as a triangular pyramid.

Solution:
The given statement is true. A polyhedron has four faces. A polyhedron is termed as a pyramid when it has four faces.

45. Regular octahedron has 8 congruent faces which are isosceles triangles.

Solution:
The given statement is false. Regular octahedron has 8 congruent faces which are equilateral triangles.

46. Pentagonal prism has 5 pentagons.

Solution:
The given statement is false. Pentagonal prism has two pentagonal faces.

47. Every cylinder has 2 opposite faces as congruent circles, so it is also a prism.

Solution:
The given statement is false. All the faces of cylinder are uneven (not flat), means it has 2 opposite faces. So, it does not satisfy the requirement of prism.

48. Euler's formula is true for all three-dimensional shapes.

Solution:
The given statement is false.
Euler‟s Formula is only true for polyhedrons.
F + V –E = 2

In which,
F = Faces and

V = Vertices and
E = Edges

49. A polyhedron can have 10 faces, 20 edges and 15 vertices.

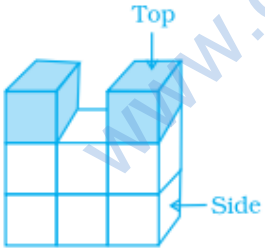
Solution:

The given statement is false.
Euler‟s Formula is true for any polyhedrons.
F + V – E = 2

In which,
F = Faces and
V = Vertices and
E = Edges

Given, F = 10 and
V = 15 and
E = 20
So,
10 + 15 – 20 = 2
25 – 20 = 2
5 ≠ 2
Therefore, the given value does not satisfy the “Euler‟s formula”.

50. The top view of



is

Solution:

The given statement is true.

51. The number of edges in a parallelogram is 4.

Solution:

The given statement is true.

52. Every solid shape has a unique net.

Solution:

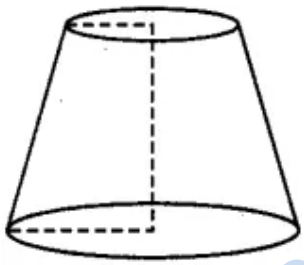
The given statement is false.

A net is an even or flat figure. Net can be folded to form a closed, 3- dimensional object. So, the solid shape has more than one unique net.

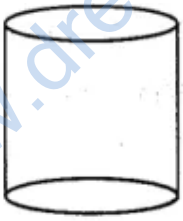
53. Pyramids do not have a diagonal.

Solution:
The given statement is true. In pyramids we cannot form two opposite vertex. So, we say that, Pyramids do not have a diagonal.

54. The given shape is a cylinder.



Solution:
The given statement is false. Figure shown in question is Frustum. The shape of cylinder is given below:



55. A cuboid has atleast 4 diagonals.

Solution:
The given statement is true.

56. All cubes are prisms.

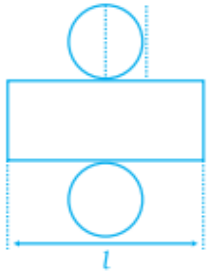
Solution:
The given statement is true. A cube have congruent square top, square base and also its lateral sides are parallelograms. These all properties of cube satisfies the condition of prism.

57. A cylinder is a 3-D shape having two circular faces of different radii.

Solution:

The given statement is false. A cylinder is a 3- D shape having two circular faces of same radii.

58. On the basis of the given figure, the length of a rectangle in the net of a cylinder is same as circumference of circles in its net.



Solution:

The given statement is true.

59. If a length of 100 m is represented on a map by 1 cm, then the actual distance corresponding to 2 cm is 200 m.

Solution:

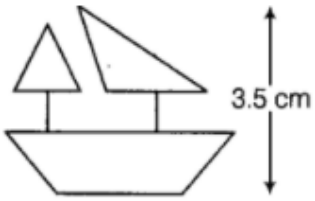
The given statement is true.

Given,

Length of 100 m is represented on a map by 1 cm. So, the actual distance corresponding to 2 cm = 2 x 100

= 200 m

60. The model of a ship shown is of height 3.5 cm. The actual height of the ship is 210 cm if the scale chosen is 1: 60.



Solution:

The given statement is true.

We know that,

$$Scale = \frac{Shown\ height}{Actual\ height}$$

Given,

Shown height = 3.5 cm and

Actual height = 210 cm

Now,

by putting the value in above formula

$$\frac{Shown\,height}{Actual\,height} = \frac{3.5}{210}$$

$$= \frac{1}{60}$$

So, the ratio is 1: 60.

61. The actual width of a store room is 280 cm. If the scale chosen to make its drawing is 1:7, then the width of the room in the drawing will be 40 cm.

Solution:

The given statement is true.
Given,
The actual width of a store room = 280 cm and
Scale = 1: 7.

We have,

Scale = $\frac{Size\,Drawing}{Actual\,size}$

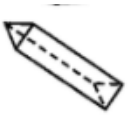
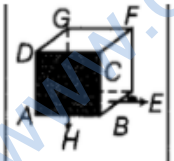
So,
Width of the room in the drawing = Actual size x scale

$$= 280 \times \frac{1}{7}$$

$$= \frac{280}{7}$$

$$= 40$$

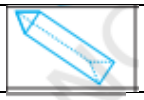
62. Complete the table given below:

S. No.	Solid	Shape of Solid	Number of faces (F)	Number of vertices (V)	Number of edges (E)	$F+V$	$E+2$
a.	Cuboid						
b.	Triangular Pyramid						
c.	Square Pyramid						
d.	Rectangular Pyramid						
e.	Pentagonal Pyramid						
f.	Hexagonal Pyramid						
g.	Triangular Prism						
h.	Square Prism						
i.	Cube						
j.	Pentagonal Prism						
k.	Octagonal Prism						
l.	Heptagonal Prism						

Solution.

By using Euler's formula for polyhedron,

S.No.	Solid	Shape of	No. of	No. of	No. of		

		solid	faces F	vertices V	edges E	F+V	E+2
a.	Cuboids		6	8	12	14	14
b.	Triangular Pyramid		4	4	6	8	8
c.	Square Pyramid		5	5	8	10	10
d.	Rectangular Pyramid		5	5	8	10	10
e.	Pentagonal Pyramid		6	6	10	12	12
f.	Hexagonal Pyramid		7	7	12	14	14
g.	Triangular Prism		5	6	9	11	11
h.	Square Prism		6	8	12	14	14
i.	Cube		6	8	12	14	14
j.	Pentagonal Prism		7	10	15	17	17
k.	Octagonal Prism		10	16	24	26	26
l.	Heptagonal Prism		9	14	21	23	23

63. How many faces does each of the following solids, have?
(a) Tetrahedron (b) Hexahedron (c) Octagonal Pyramid (d) Octahedron

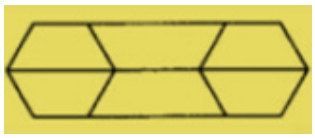
Solution:
Faces of all the given solids are given below:

(a)Tetrahedron: It has 4 faces.
(b)Hexahedron: It has 6 faces.
(c)Octagonal Pyramid: It has 9 faces
(d)Octahedron: It has 8 faces.

64. Draw a prism with its base as regular hexagon with one of its face facing you. Now draw the top view, front view and side view of this solid.

Solution:

- The prism with its base as regular hexagon:



- The top view is:

- The front view is:

- The side view is:

65. How many vertices does each of the following solids have?
(a) Cone (b) Cylinder (c) Sphere
(d) Octagonal Pyramid (e) Tetrahedron (f) Hexagonal Prism

Solution:
The vertices of given solids are:

a) Cone: It has 1 vertex.
b) Cylinder: It has zero vertices.
c) Sphere: It has zero vertices.
d) Octagonal Pyramid: It has 1 vertex.
e) Tetrahedron: It has 4 vertices
f) Hexagonal Prism: It has 12 vertices.

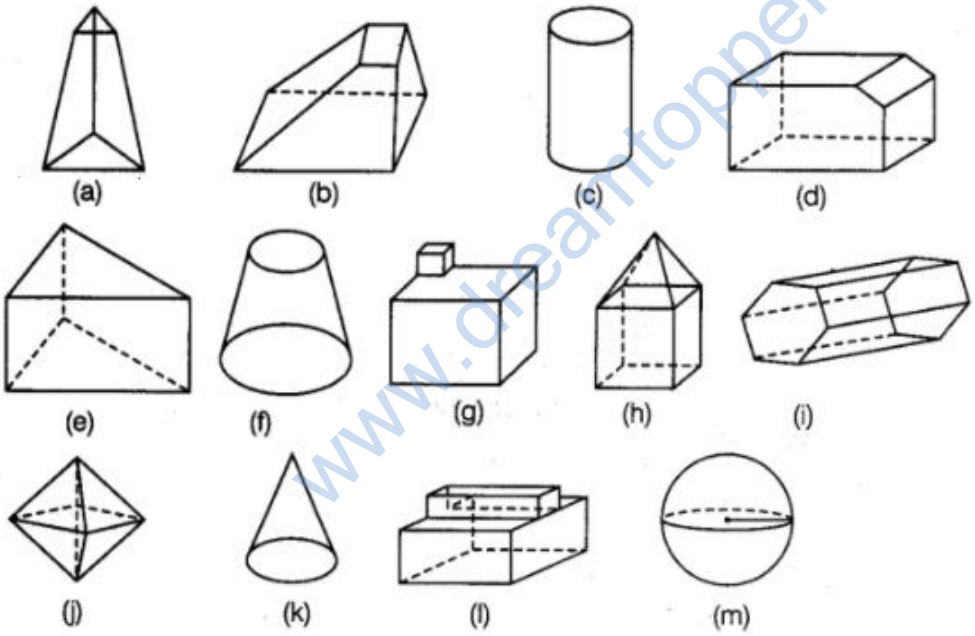
66. How many edges does each of following solids have?

(a) Cone (b) Cylinder (c) Sphere
(d) Octagonal Pyramid (e) Hexagonal Prism (f) Kaleidoscope

Solution:
The edges of given solids are:

a) Cone: It has 1 edge.
b) Cylinder: It has 1 edge.
c) Sphere: It has no edge.
d) Octagonal Pyramid: It has 16 edges.
e) Hexagonal Prism: It has 18 edges.
f) Kaleidoscope: It has 9 edges.

67. Look at the shapes given below and state which of these are polyhedra using Euler's formula.



Solution:
We have,
a)
According to the figure,
Faces = 5,
Vertices = 6, and
Edges = 9.

By putting the given values in Euler"s formula,
F + V – E = 2
5 + 6 – 9 = 2

11 – 9 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

b)
According to the figure,
Faces = 6,
Vertices = 8, and
Edges = 12.
By putting the given values in Euler‟s formula,
F + V – E = 2
6 + 8 – 12 = 2
14 – 12 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

c)
According to the figure,
Faces = 3,
Vertices = 0, and
Edges = 2.
By putting the given values in Euler‟s formula,
F + V – E = 2
3 + 0 – 2 = 2
3 – 2 = 2
1 ≠ 2
Therefore, these given value do not satisfy Euler‟s formula. So, the given figure is not a polyhedral.

d)
According to the figure,
Faces = 7,
Vertices = 10, and
Edges = 15.
By putting the given values in Euler‟s formula,
F + V – E = 2
7 + 10 – 15 = 2
17 – 15 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

e)
According to the figure,
Faces = 5,
Vertices = 6, and
Edges = 9.
By putting the given values in Euler‟s formula,

F + V – E = 2
5 + 6 – 9 = 2
11 – 9 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

f)
According to the figure,
Faces = 3,
Vertices = 0, and
Edges = 2.
By putting the given values in Euler‟s formula,
F + V – E = 2
3 + 0 – 2 = 2
1 ≠ 2
Therefore, these given value do not satisfy Euler‟s formula. So, the given figure is not a polyhedral.

g)
According to the figure,
Faces = 11,
Vertices = 11, and
Edges = 20.
By putting the given values in Euler‟s formula,
F + V – E = 2
11 + 11 – 20 = 2
22 – 20 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

h)
According to the figure,
Faces = 9,
Vertices = 9, and
Edges = 16.
By putting the given values in Euler‟s formula,
F + V – E = 2
9 + 9 – 16 = 2
18 – 16 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

i)
According to the figure,
Faces = 8,
Vertices = 12, and
Edges = 18.

By putting the given values in Euler‟s formula,
F + V – E = 2
8 + 12 – 18 = 2
20 – 18 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

j)
According to the figure,
Faces = 8,
Vertices = 6, and
Edges = 12.
By putting the given values in Euler‟s formula,
F + V – E = 2
8 + 6 – 12 = 2
14 – 12 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

k)
According to the figure,
Faces = 2,
Vertices =1 , and
Edges = 0.
By putting the given values in Euler‟s formula,
F + V – E = 2
2 + 1 – 0 = 2
3 – 0 = 2
3 ≠ 2
Therefore, these given value do not satisfy Euler‟s formula. So, the given figure is not a polyhedral.

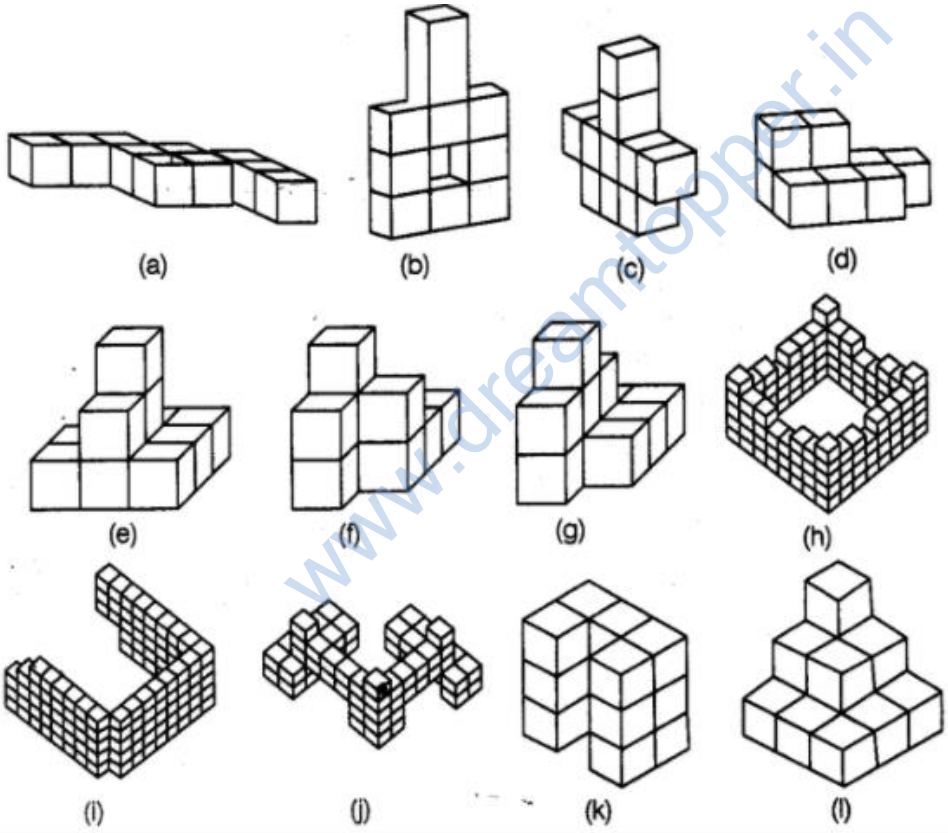
l)
According to the figure,
Faces = 10,
Vertices = 16, and
Edges = 24.
By putting the given values in Euler‟s formula,

F + V – E = 2
10 + 16 – 24 = 2
26 – 24 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula. So, the given figure is a polyhedral.

m)
According to the figure,

Faces = 1,
Vertices = 0, and
Edges = 1.
By putting the given values in Euler‟s formula,
F + V – E = 2
1 + 0 – 1 = 2
1 – 1 = 2
0 ≠ 2
Therefore, these given value do not satisfy Euler‟s formula. So, the given figure is not a polyhedral.

68. Count the number of cubes in the given shapes.

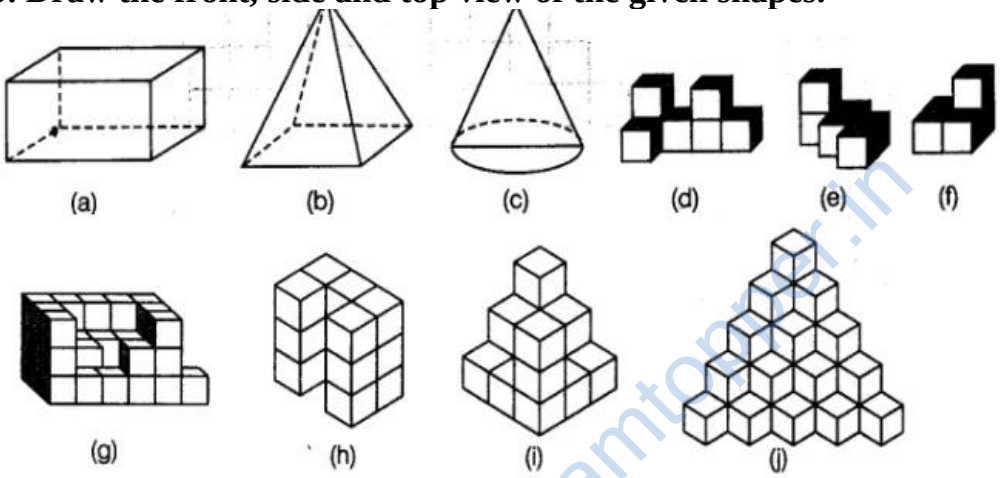


Solution:

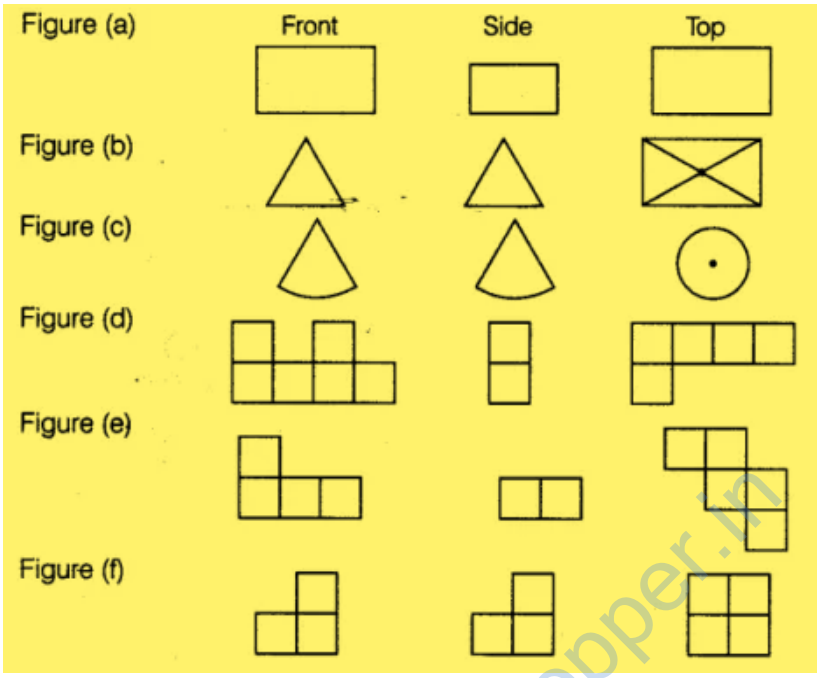
As per questions:
a) Total cubes in figure are: 10
b) Total cubes in figure are: 10
c) Total cubes in figure are: 10
d) Total cubes in figure are: 9
e) Total cubes in figure are: 11

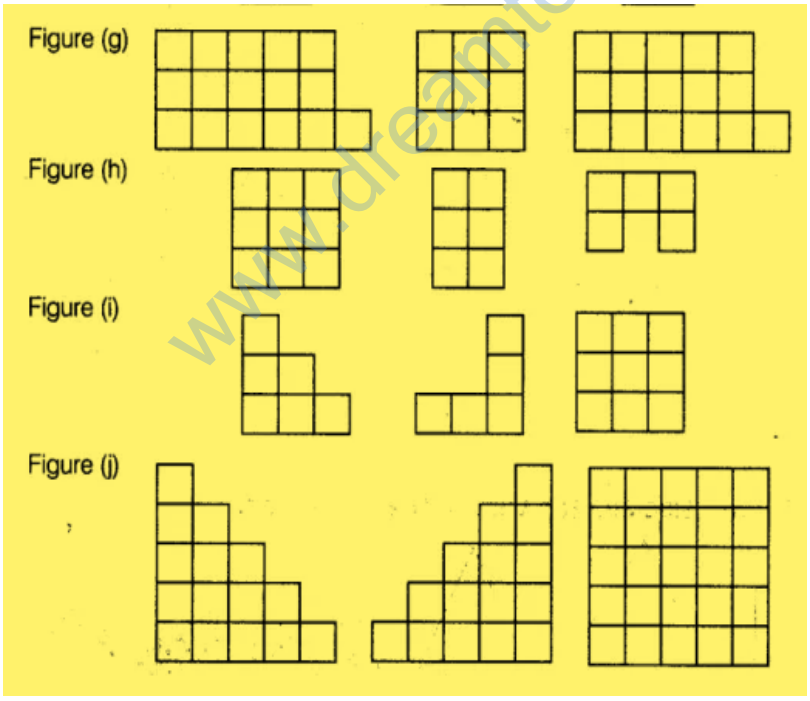
f) Total cubes in figure are: 9
g) Total cubes in figure are: 11
h) Total cubes in figure are: 110
i) Total cubes in figure are: 113
j) Total cubes in figure are: 66
k) Total cubes in figure are: 15
l) Total cubes in figure are: 14

69. Draw the front, side and top view of the given shapes.



Solution:
According to question:





70. Using Euler's formula, find the value of unknown x, y, z, p, q, r, in the following table

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Faces	7	y	9	p	6	8
Vertices	10	12	z	6	q	11
Edges	x	18	16	12	12	r

Solution:

Euler‟s Formula is for any polyhedron = F + V – E = 2
F = Faces and
V = Vertices and
E = Edges

i)
Given,
F = 7 and
V = 10 and
E = x

According to the formula:
7 + 10 – x = 2
17 – x = 2
-x = 2 – 17
x = 15

ii)
Given,
F = y and
V = 12 and
E = 18

According to the formula:
12 + y – 18 = 2
-6 + y = 2
y = 2 + 6
y = 8

iii)
Given,
F = 9 and
V = z and
E = 16

According to the formula:
9 + z – 16 = 2
-7 + z = 2

z = 2 + 7
z = 9

iv)
Given,
F = p and
V = 6 and
E = 12

According to the formula:
p + 6 – 12 = 2
p – 6 = 2
p = 2 + 6
p = 8

v) Given,

F = 6 and
V = q and
E = 12

According to the formula:
6 + q – 12 = 2
–6 + q = 2
q = 2 + 6
q = 8

vi) Given,

F = 8 and
V = 11 and
E = r

According to the formula:
8 + 11 – r = 2
19 – r = 2
r = 19 – 2
x = 17

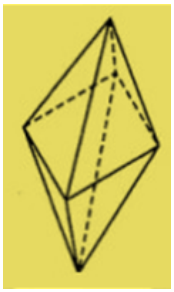
71. Can a polyhedron have V = F = 9 and E = 16 ? If yes, draw its figure.

Solution:

Euler‟s Formula is for any polyhedrons = F + V – E = 2

Given,
F = 9 and
V = 9 and

E = 16
According to the formula:
9 + 9 – 16 = 2
18 – 16 = 2
2 = 2
Therefore, these given value satisfy Euler‟s formula.
So, the given figure is a polyhedral.
Now,
As per given data the figure is:



This figure is octagonal pyramid.

72. Check whether a polyhedron can have V = 12, E = 6 and F = 8.

Solution:

As per question:
Euler‟s Formula is for any polyhedrons =.F + V – E = 2
Given,
F = 8 and
V = 12 and
E = 6
According to the formula:
8 + 12 –6 = 2
20 – 6 = 2
14 ≠ 2
As, given value do not satisfy Euler‟s formula.
So, the given figure is not a polyhedral.

73. A polyhedron has 60 edges and 40 vertices. Find the number of its faces.

Solution:

As per question:
Euler‟s Formula is for any polyhedrons = F + V – E = 2
Given,
F = a and
V = 40 and

E = 60
According to the formula:
a + 40 – 60 = 2
a – 20 = 2
a = 20 + 2
a = 22

74. Find the number of faces in the given shapes:

Solution:
We have,
The number of faces is first figure = 14
The number of faces is second figure = 10
The number of faces is third figure = 16

75. A polyhedron has 20 faces and 12 vertices. Find the edges of the polyhedron.

Solution:
Euler‟s Formula is for any polyhedrons = F + V – E = 2
Given,
F = 20 and
V = 12 and
E = a
According to the formula:
20 + 12 – a= 2
32 – a = 2
a = 32 – 2
a = 30

76. A solid has forty faces and, sixty edges. Find the number of vertices of the solid.

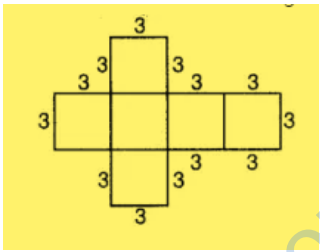
Solution:
Euler‟s Formula is for any polyhedrons = F + V – E = 2

Given,
F = 40 and
V = a and
E = 60

According to the formula:
40 + a – 60 = 2
a – 20 = 2
a = 20 + 2
a = 22

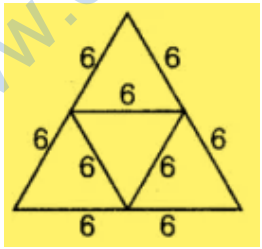
77. Draw the net of a regular hexahedron with side 3 cm. (Hint: Regular hexahedron - cube)

Solution:
The net of a regular hexahedron with side 3 cm each is shown below:

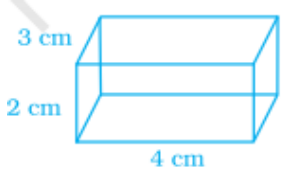


78. Draw the net of a regular tetrahedron with side 6 cm.

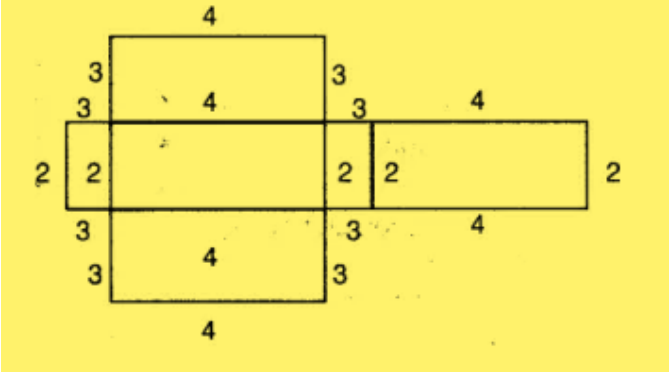
Solution:
The net of a regular tetrahedron with side 6 cm each is shown below:



79. Draw the net of the following cuboid:



Solution:
The net of the given cuboid is shown below:



80. Match the following:

Figure	Name
(a)  (b)  (c)  (d) 	**(a) Hexahedron** **(b) Hexagonal Prism** **(c) Square Pyramid** **(d) Cone**

Solution:

In figure (i), the base and top both are the hexagonal polygons.
So, it is a hexagonal prism.

In figure (ii), only one vertexes available.
So, it is a cone.

In figure (iii), the base is square and rest four faces are equilateral triangles.
So, it is a square pyramid. .

In figure (iv), the base is square and it has 6 faces and 8 vertices.
So, it is a hexahedron (cube). [As Cube is also known as Hexahedron.]

So, the correct matching is:
(i) -- (b)
(ii) -- (d)
(iii) -- (c)
(iv) -- (a)

81. Complete the table given below by putting tick mark across the respective property found in the solids mentioned.

	Properties	Cone	Cylinder	Prism	Pyramid
1.	The figure is a polyhedron.				
2.	The figure has diagonals.				
3.	The shape has curved edges.				
4.	The base of figure is a polygon.				
5.	The bases are congruent.				
6.	The base of figure is a polygon and other faces meet at a single point.				
7.	The base of figure is a curved edge and other faces meet at a single point.				

Solution:

The complete table is shown below:

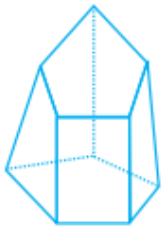
	Properties	Cone	Cylinder	Prism	Pyramid
1.	The figure is a polyhedron.	×	×	✓	✓
2.	The figure has diagonals.	×	×	×	✓
3.	The shape has curved edges	✓	✓	×	×
4.	The base of figure is a polygon.	×	×	✓	✓
5.	The bases are congruent	×	✓	✓	×
6.	The base of figure is a polygon and other faces meet at a single point.	×	×	×	✓
7.	The base of figure is a curved edge and other faces meet at a single point.	✓	×	×	×

82. Draw the net of the following shape.

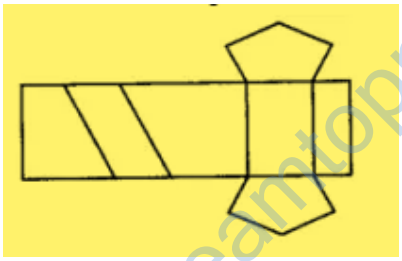
Solution:

The net of the given shape is shown below:

83. Draw the net of the following solid.

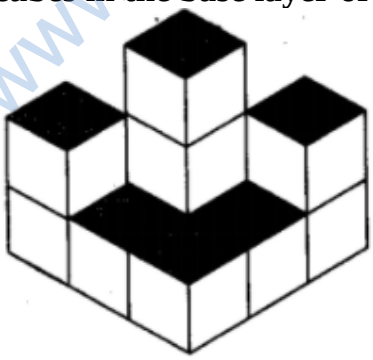


The net of the given solid is shown below:

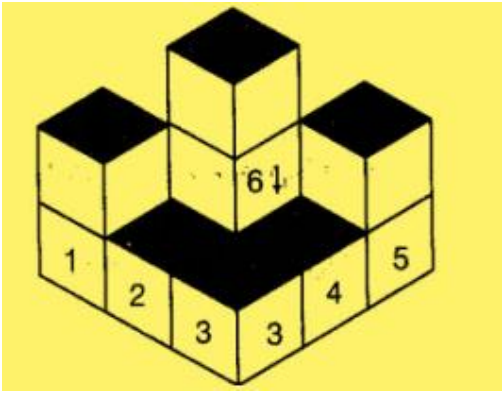


If we open this solid shape, we will find above net.

84. Find the number of cubes in the base layer of the following figure.

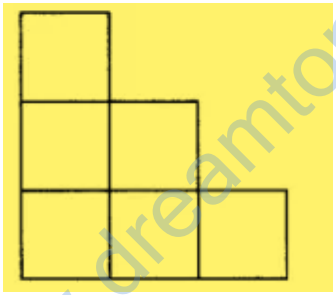


Solution:
The number of cubes in the the base layer of the figure is 6.



85. In the above figure, if only the shaded cubes are visible from the top, draw the base layer.

Solution:
The base layer of the figure is :



If we see the given figure from top, we will only see upper layer not base layer.

86. How many faces, edges and vertices does a pyramid have with n sided polygon as its base?

Solution:
In a pyramid,

The number of faces of pyramid = one more than the number of sides of polygon base.

Faces = n + 1

The number of vertices of pyramid = one more than the number of sides of polygon base.

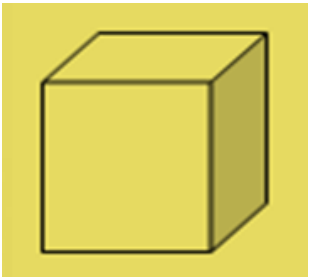
Vertices = n + 1

The number of edges of pyramid = two times the number of sides of polygon base.

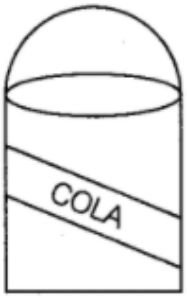
Vertices = 2n

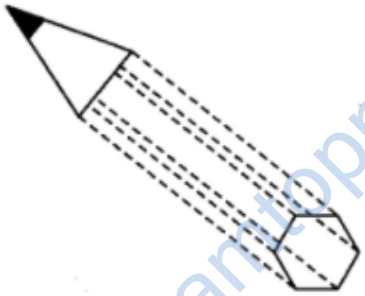
87. Draw a figure that represents your mathematics textbook. What is the name of this figure? Is it a prism?

Solution:
The shape of book is generally cuboids and cuboids look alike rectangular prism.
A figure that represents the mathematics textbook is shown below:



88. In the given figures, identify the different shapes involved.



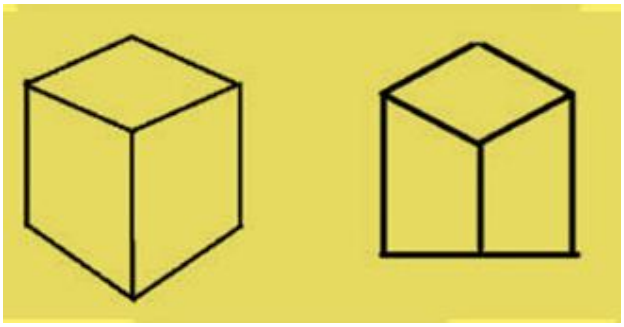


Solution:
We have,
In the first figure, cylinder is mounted by the hemisphere.
So, the given figure is made by using the cylinder and hemisphere.

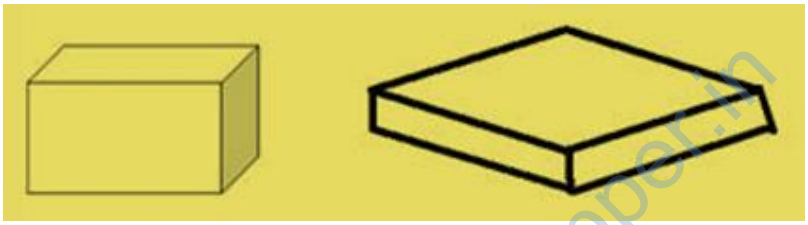
In the second figure, hexagonal prism is mounted by cone.
So, the given figure is made by using the hexagonal prism and cone.

89. What figure is formed if only the height of a cube is increased or decreased?

Solution:
If the height of a cube is increased:



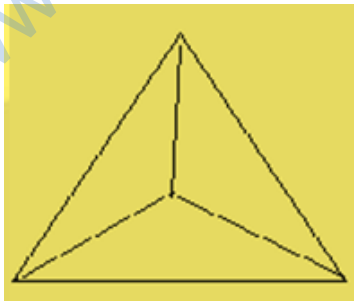
If the height of a cube is decreased:



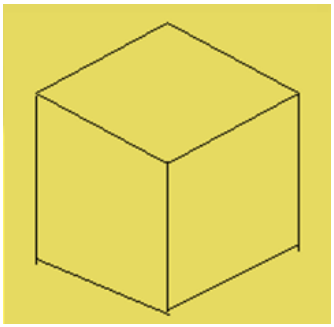
90. Use isometric dot paper to draw each figure.
(a) A tetrahedron.
(b) A rectangular prism with length 4 units, width 2 units and height 2 units.

Solution:

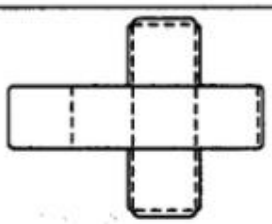
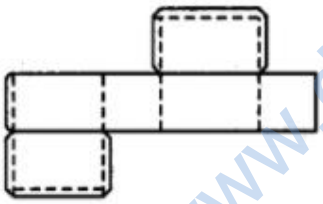
a) A tetrahedron.

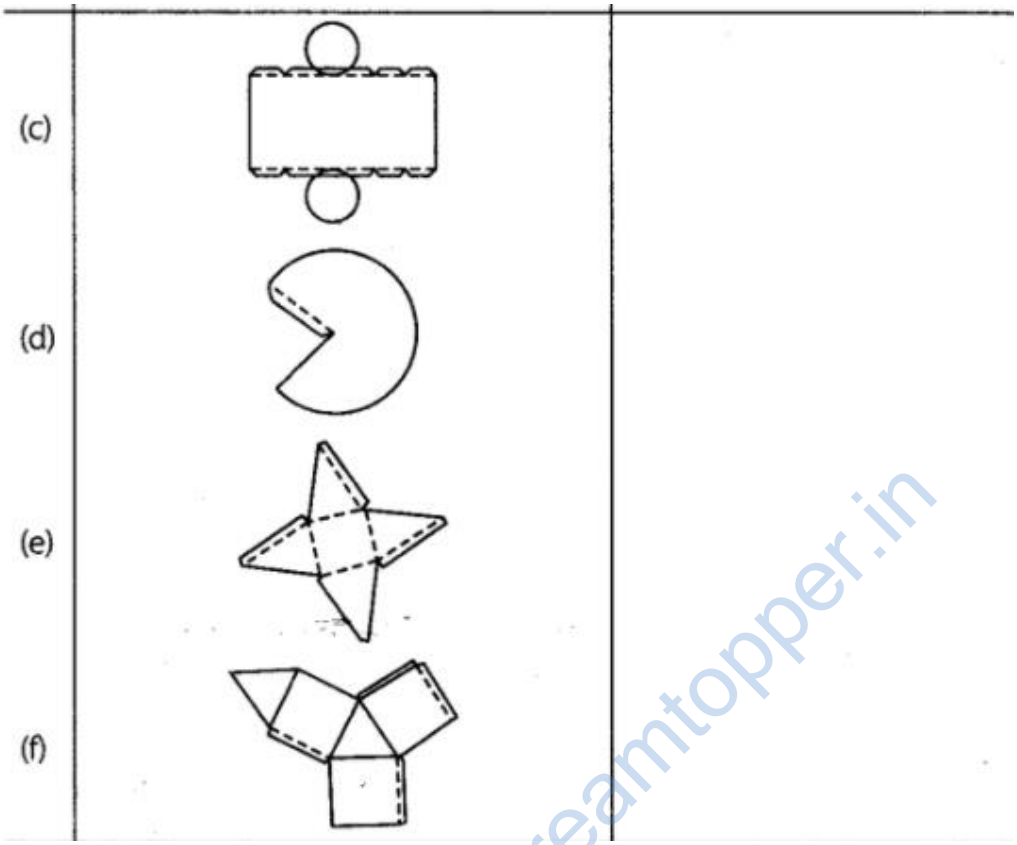


b) A rectangular prism with length 4 units, width 2 units and height 2 units.

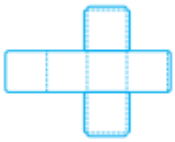
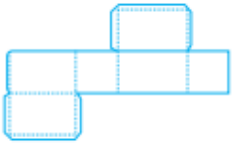


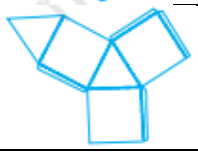
91. Identify the nets given below and mention the name of the corresponding solid in the space provided.

	Nets	Name of solid
(a)		
(b)		



Solution:

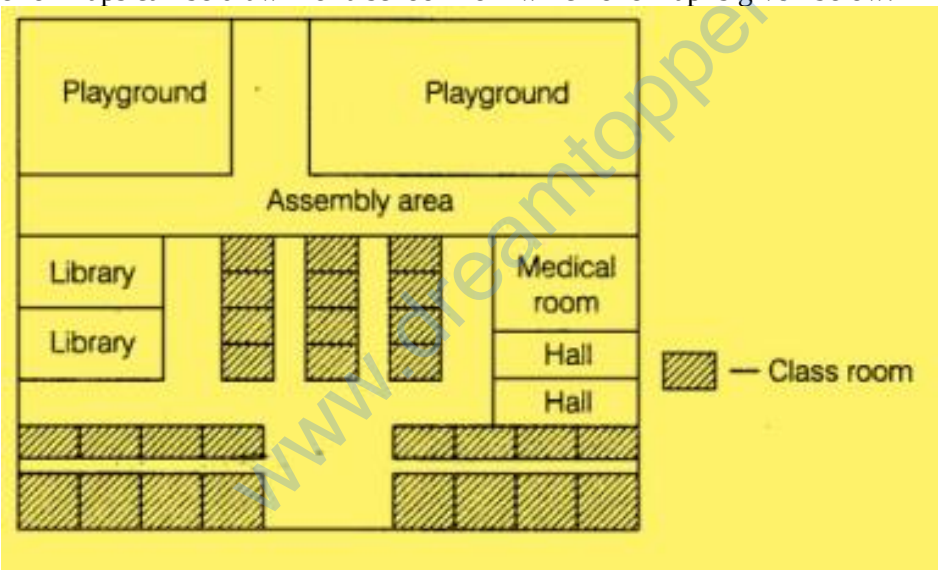
Nets	Name of solid
(a) 	Cube
(b) 	Cuboid
(c) 	Cylinder
(d) 	Cone

(e) 	Square Pyramid
(f) 	Triangular Prism

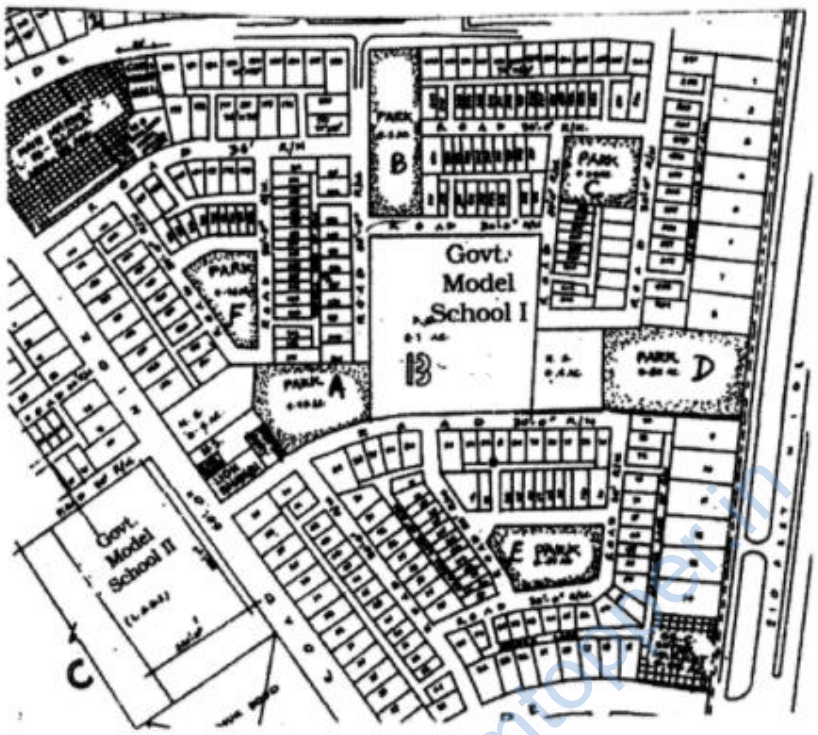
92. Draw a map of your school playground. Mark all necessary places like 2 library, Playground, Medical Room, Classrooms, Assembly area, etc.

Solution.

A number of maps can be drawn for a school from which one map is given below:



93. Refer to the given map to answer the following questions.

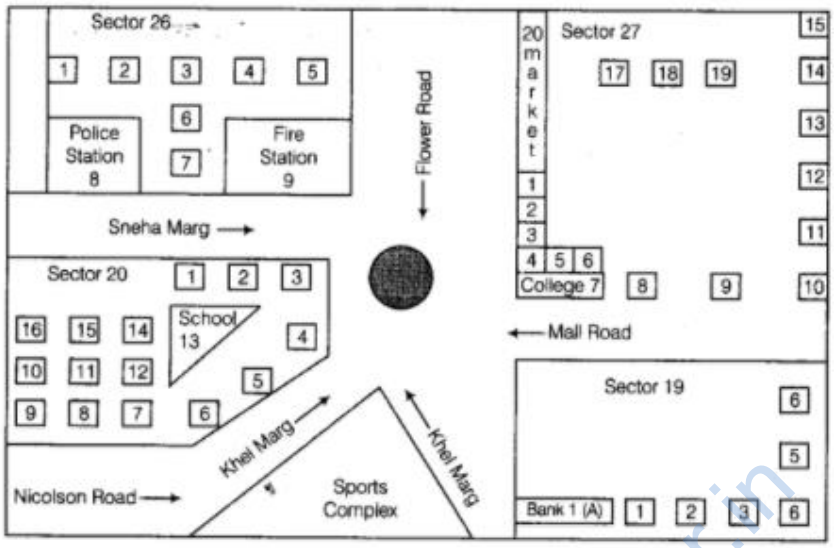


(a) What is the built-up area of Govt. Model School I ?
(b) Name the schools shown in the picture.
(c) Which park is nearest to the dispensary?
(d) To which block does the main market belong?
(e) How many parks have been represented in the map?

Solution:

a) 2.1 acre.
b) Govt. model school I and govt. model school are two schools shown in picture.
c) Park A
d) Block A
e) Six parks

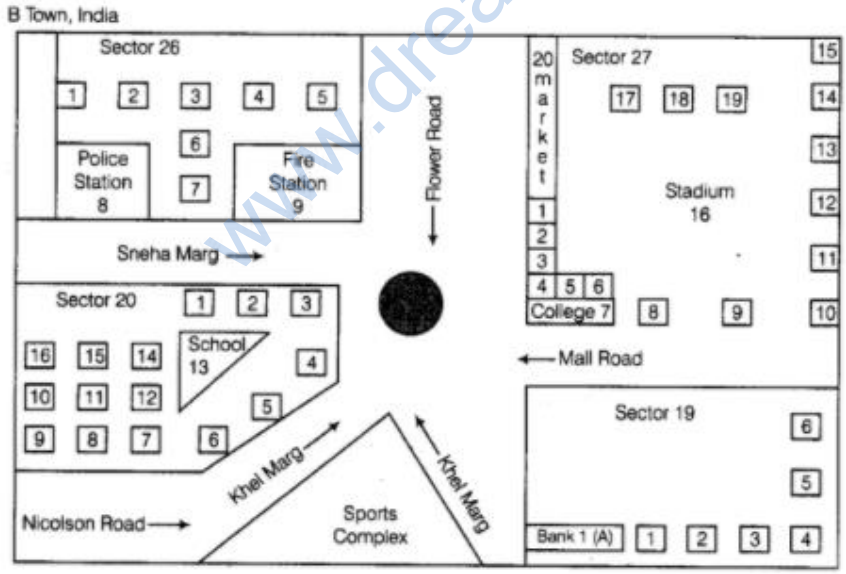
94. Look at the map given below.
Answer the following questions.
(a) Which two hospitals are opposite to each other?
(b) A person residing at Niti Bagh has to go to Chirag Delhi after dropping her daughter at Asiad Tower. Mention the important landmarks he will pass alongwith the roads taken.
(c) Name of which road is similar to the name of some month.



Solution.

The given map is not sufficient to answer these questions.

95. Look at the map given below.



Now answer the following questions.
(a) Name the roads that meet at round about.
(b) What is the address of the stadium?
(c) On which road is the Police Station situated?
(d) If Ritika stays adjacent to bank and you have to send her a card, what address will you write?

(e) Which sector has maximum number of houses?
(f) In which sector is Fire Station located?
(g) In the map, how many sectors have been shown?

Solution.
From map,

(a) Flower road, Khel marg, Mall road and Sneha marg meet at round.

(b) The address of the stadium is:
Sector 27.
BTown, India

(c) The police station is situated on Sneha marg.

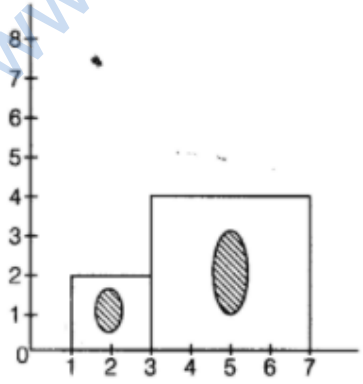
(d) Sneha's address is:
H.N-1Nr. Bank 1 (A)
Sector 19, B town, India

(e) Sector 27 has maximum number of houses.

(f) Fire station is located in sector 26.

(g) In the map, four sectors have been shown.

96. A photographer uses a computer program to enlarge a photograph. What is the scale according to which the width has enlarged?



Solution:
Given,
The width before editing the photograph = 2 units
The width after editing the photograph = 4 units
So,

$$Scale = \frac{\text{The width before editing the photograph}}{\text{The width after editing the photograph}}$$

$$= \frac{2}{4}$$

$$= \frac{1}{2}$$

Scale = 1:2

97. The side of a square board is 50 cm. A student has to draw its image in her notebook. If the drawing of the square board in the notebook has perimeter of 40 cm, then by which scale the figure has been drawn?

Solution:

Given,
The side of square board = 50cm.
So,
Perimeter of square board = 4×side
= 4×50
= 200cm
The drawing of the square board in the notebook has perimeter of 40 cm.
So,
Scale = 200 ÷ 40
Scale = 5: 1

98. The distance between school and house of a girl is given by 5 cm in a picture, using the scale 1 cm : 5 km. Find the actual distance between the two places?

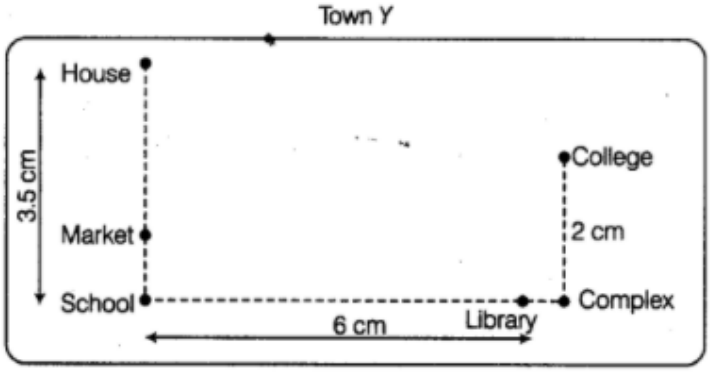
Solution:

Given,
The scale 1cm: 5 km
So,
5cm in picture = 5 × 5 km of actual distance
= 25 km of actual distance

So, the actual distance among two places = 25 km.
Now,
We can say that 5cm shows = 25 km of actual distance.

99. Use a ruler to measure the distance in cm between the places joined by dotted lines. If the map has been drawn using the scale 1 cm :10 km, find the actual distances between
(1) School and Library

(2) College and Complex
(3) House and School

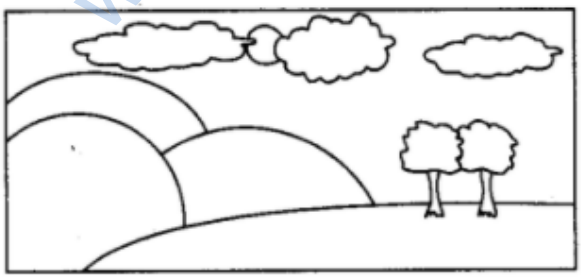


Solution:
We have,
1) The distance between school and library = 6cm
So, the actual distance = 6 × 10
= 60km.

2) The distance between college and complex = 2cm
So, the actual distance = 2 × 10
= 20km.

3) In the given figure, the distance between school and house = 3.5cm
So, the actual distance = 3.5 × 10
= 35km.

100. The actual length of a painting was 2 m. What is its length in the photograph if the scale used is 1 mm : 20 cm



Solution:

The actual length of a painting = 2 m.
Scale used in the painting = 1mm: 20 cm
So,
The length of painting in photograph = Scale × Actual size.
= (1÷20) × 200
= 10 mm

101. Find the scale.
(a) Actual size 12 m Drawing size 3 cm
(b) Actual size 45 feet drawing size 5 inches

Solution:

We have,
a)
Scale= size drawn ÷ actual size
= 3 cm ÷ 12 m
= 1 cm ÷ 4 m

Therefore, scale = 1 cm: 4 m

b)
Scale = size drawn ÷ actual size
= 5 inches ÷ 45 feet
= 1 inch ÷ 9 feet

Therefore, scale = 1 inch: 9 feet

102. In a town, an ice cream parlour has displayed an ice cream sculpture of height 360 cm. The parlour claims that these ice creams and the sculpture are in the scale 1:30. What is the height of the ice creams served?

Solution:

An ice cream sculpture of height = 360 cm
Scale used for sculpture and ice cream = 1: 30
The height of ice cream served= Scale × actual size
= (1 × 360) ÷ 30
= 12 cm