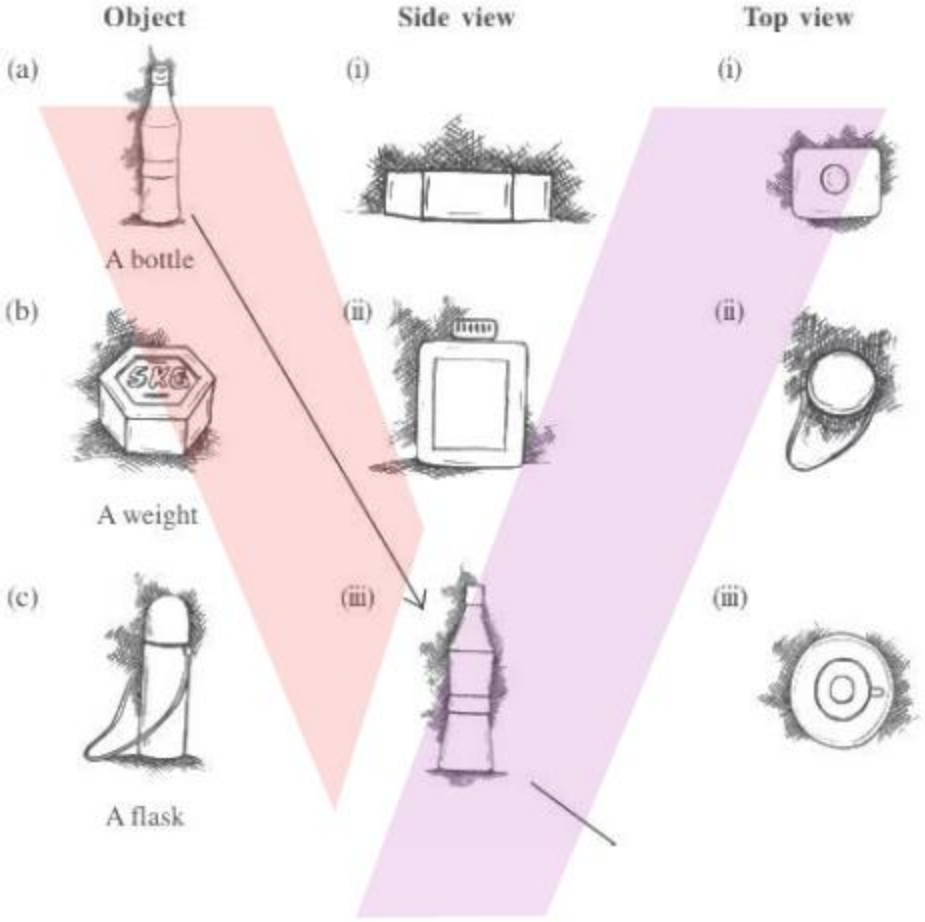
CBSE NCERT Solutions for Class 8 Mathematics Chapter 10

Back of Chapter Questions

Exercise 10.1

1. For each of the given solid, the two views are given. Match for each solid the corresponding top and front views. The first one is done for you.



(d)

Cup and Saucer

(iv)

(iv)

(e)

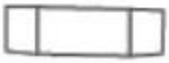
Container

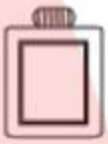
(v)

(v)

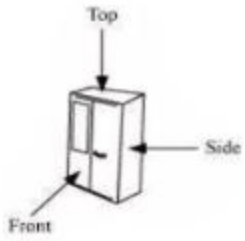
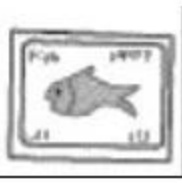
Solution:

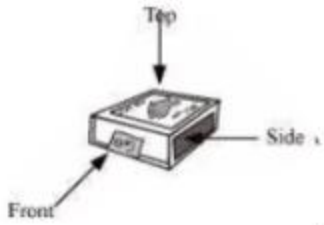
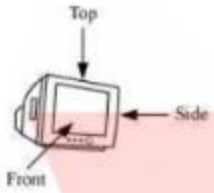
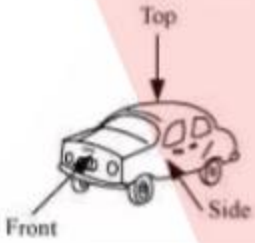
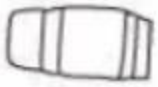
The following tables shows the objects matched with their top view and front views:

OBJECT	FRONT VIEW	TOP VIEW
(a)  A bottle	(i) 	(i) 
(b)  A weight	(ii) 	(ii) 

(c)  A flask	(iii) 	(iii) 
(d)  Cup and Saucer	(iv) 	(iv) 
(e)  Container	(v) 	(v) 

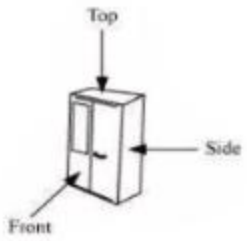
2. For each of the given solid, the three views are given. Identify for each solid the corresponding top, front and side views.

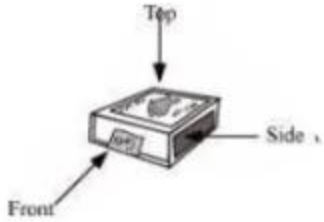
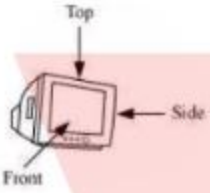
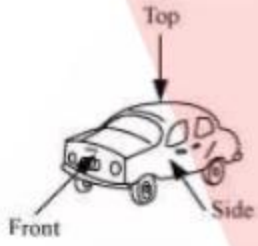
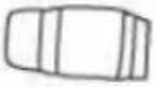
(a) 			
(b)			

			
(c) 			
(d) 			

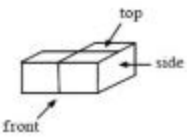
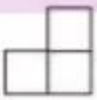
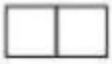
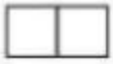
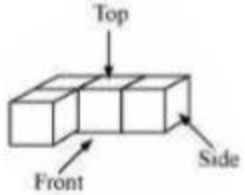
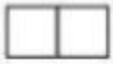
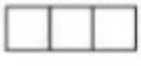
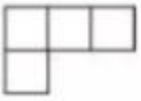
Solution:

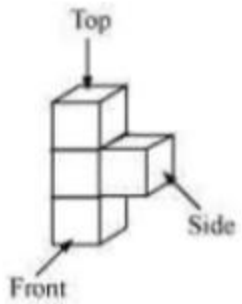
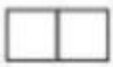
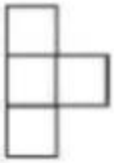
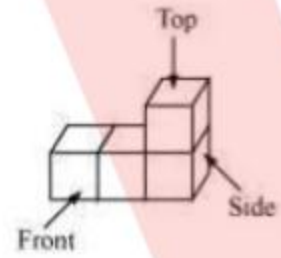
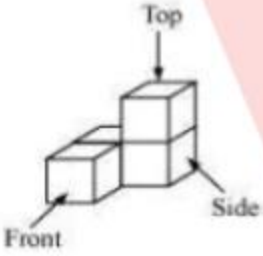
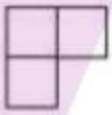
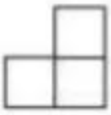
The front, top and side views of the object are as shown below:

(a) 	 Front view	 Side view	 Top view

(b) 	 Side view	 Front view	 Top view
(c) 	 Front view	 Side view	 Top view
(d) 	 Front view	 Side view	 Top view

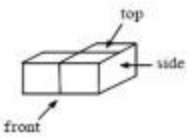
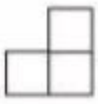
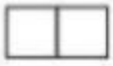
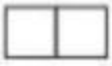
3. For the given solid, identify the top view, front view and the side view.

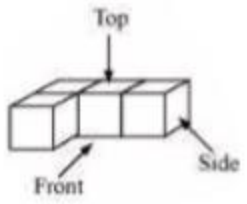
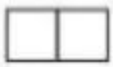
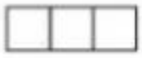
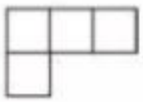
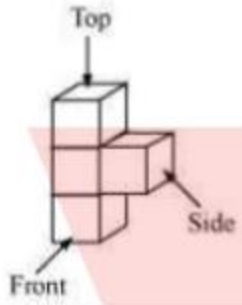
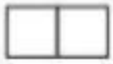
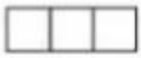
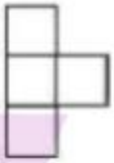
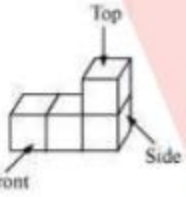
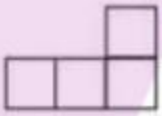
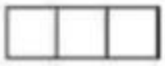
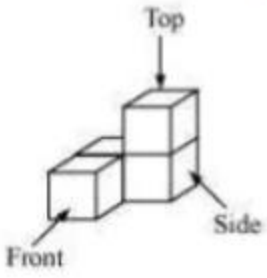
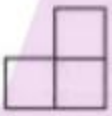
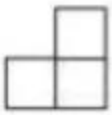
(a) 			
(b) 			

(c) 			
(d) 			
(e) 			

Solution:

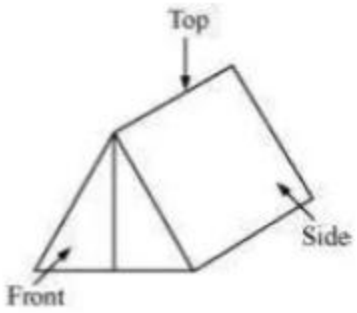
The objects and their labeled side, top and front views are as shown below:

(a) 	 Top view	 Front view	 Side view
(b)			

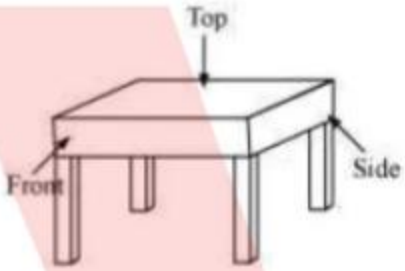
	 Side view	 Front view	 Top view
(c) 	 Top view	 Side view	 Front view
(d) 	 Side view	 Front view	 Top view
(e) 	 Front view	 Top view	 Side view

4. Draw the front view, side view and the top view of the given objects:

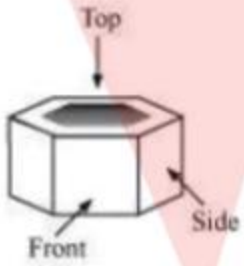
   (a) A military tent



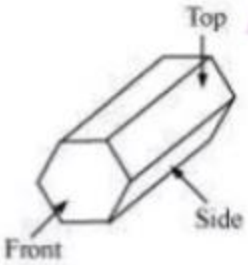
(b) A table



(c) A nut

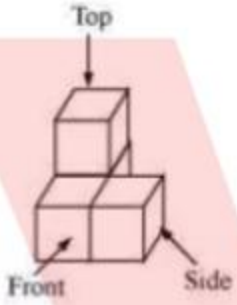


(d) A hexagonal block

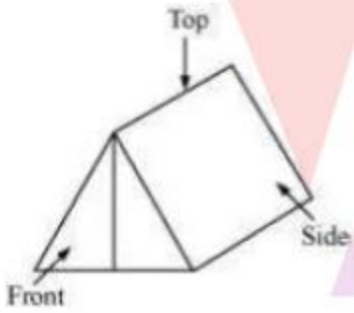
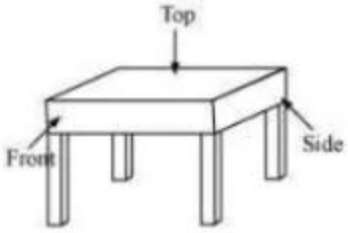


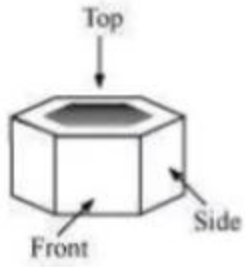
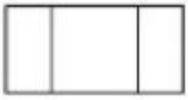
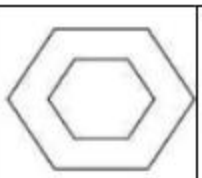
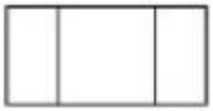
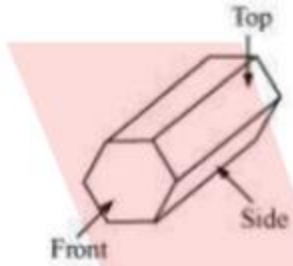
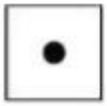
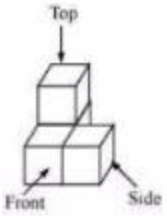
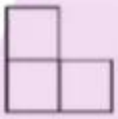
(e) A dice

(f) A solid



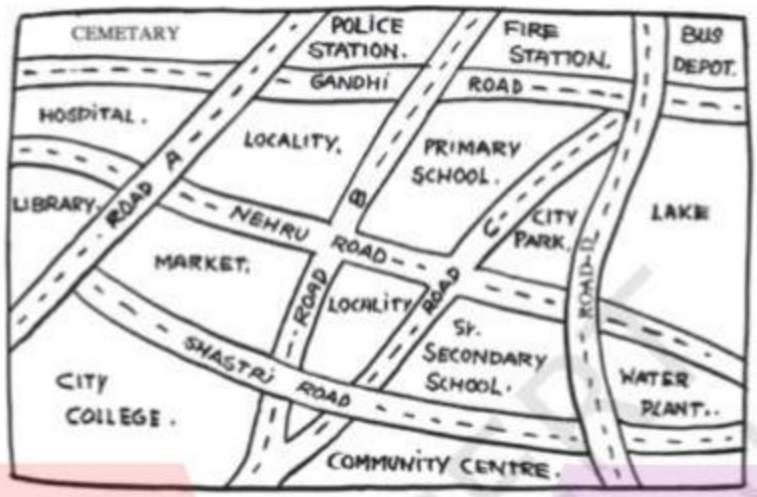
Solution:

Object	Front view	Top view	Side view
(a) A military tent 			
(b) A table 			
(c) A nut			

			
(d) A hexagonal block 			
(e) A dice 			
(f) A solid 			

Exercise 10.2

1. Look at the given map of a city.



Answer the following:

(a) Colour the map as follows: Blue-water, red-fire station, orange-library, yellow - schools, Green - park, Pink - College, Purple - Hospital, Brown - Cemetery.

(b) Mark a green 'X' at the intersection of Road 'C' and Nehru Road, Green 'Y' at the intersection of Gandhi Road and Road A.

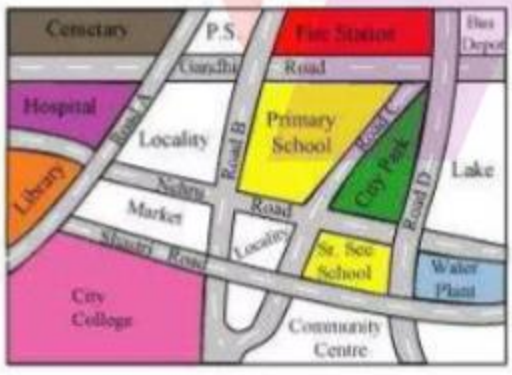
(c) In red, draw a short street route from Library to the bus depot.

(d) Which is further east, the city park or the market?

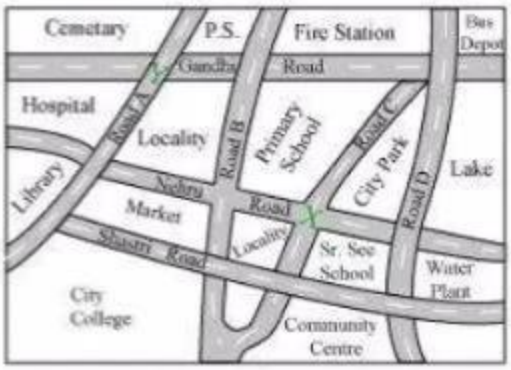
(e) Which is further south, the primary school or the Sr. Secondary School?

Solution:

(a) The required coloured map is as shown:



(b) The marks X, C and Y at the required intersections are as shown:



(c) The shortest route between the required places is as shown:

(d) Amongst the city park and the market, the place that is further east is the city park.

(e) Amongst the Primary School and the Sr. Secondary School, the place that is further south is the Sr. Secondary School.

Exercise 10.3

1. Can a polyhedron have for its faces

(i) 3 triangles?

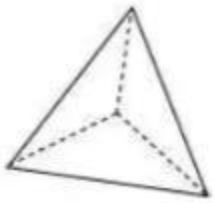
(ii) 4 triangles?

(iii) A square and four triangles?

Solution:

(i) No. The minimum number of faces a polyhedron can have is four. Therefore, a polyhedron with only three triangles is not possible.

(ii) Yes. A polyhedron with four triangles is possible. It is as shown below:



Such a polyhedron is called a triangular pyramid.

(iii) Yes. A polyhedron with a square and four triangles is possible. It is as shown below:

Such a polyhedron is called a square pyramid.

2. Is it possible to have a polyhedron with any given number of faces? (**Hint:** Think of a pyramid)

Solution:

No. The minimum number of faces a polyhedron can have is four. It is therefore not possible to have a polyhedron with less than four faces.

3. Which are prisms among the following?

(i) A nail

(ii) Unsharpened pencil

(iii) A table weight

(iv) A box

Solution:

(i) A nail has a curved surface. Hence, it is not a polyhedron. Therefore, it cannot be a prism also.

(ii) An unsharpened pencil has its base and top surfaces to be congruent and other lateral faces to be parallelograms. Therefore, it is a prism.

(iii) A table weight has a polygon for a base and the lateral surfaces are triangles. Therefore, the given figure is not a prism but a pyramid.

(iv) A box has its base and top surfaces to be congruent and other lateral faces to be parallelograms. Therefore, it is a prism.

Hence, an unsharpened pencil and a box are prisms.

4. (i) How are prisms and cylinders alike?

(ii) How are pyramids and cones alike?

Solution:

(i) A prism is a polyhedron which has a regular polygon for its base and parallelograms for its lateral sides. If the number of lateral sides are increased, the figure turns out to resemble a cylinder. Hence, a cylinder can be visualized as a prism with infinite number of faces or lateral sides. It can therefore be thought as a circular prism.

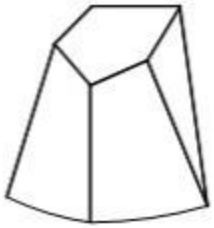
(ii) A pyramid is a polyhedron which has a regular polygon for its base and triangles for its lateral sides. If the number of lateral sides are increased, the figure turns out to resemble a cone. Hence, a cone can be visualized as a pyramid with infinite number of faces or lateral sides. It can therefore be thought as a circular pyramid.

5. Is a square prism same as a cube? Explain.

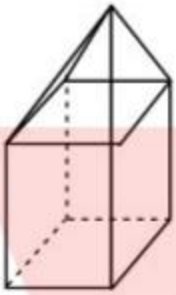
Solution:

No. A square prism need not be a cube. A square prism has a square for its base, but the lateral sides may or may not be squares, that is, the height of the sides can be different from the length of the side of the base. Hence, a square prism is not the same as a cube.

6. Verify Euler's formula for these solids:



(i)



Solution:

The Euler's formula is stated as follows:

$F + V - E = 2$

Where, F is the number of faces.

V is the number of vertices

E is the number of edges of a polyhedron.

(i) Here, number of faces $= F = 7$

Number of vertices $= V = 10$

Number of edges $= E = 15$

Substituting these values in Euler's formula:

$F + V - E = 2$

$\Rightarrow 7 + 10 - 15 = 2$

$\Rightarrow 2 = 2$

LHS = RHS

Therefore, the Euler's formula is verified.

(ii) Here, number of faces $= F = 9$

Number of vertices $= V = 9$

Number of edges $= E = 16$

Substituting these values in Euler's formula:

$F + V - E = 2$

$\Rightarrow 9 + 9 - 16 = 2$

$\Rightarrow 2 = 2$

LHS = RHS

Therefore, the Euler's formula is verified.

7. Using Euler's formula, find the unknowns:

Faces	?	5	20
Vertices	6	?	12
Edges	12	9	?

Solution:

Euler's formula is given by:

$F + V - E = 2$

Where, F is the number of faces.

V is the number of vertices

E is the number of edges of a polyhedron.

(i) Given, number of vertices = 6

Number of edges = 12

Substituting these values in the Euler's formula:

$F + V - E = 2$

$\Rightarrow F + 6 - 12 = 2$

$\Rightarrow F = 2 - 6 + 12$

$\Rightarrow F = 8$

Therefore, the number of faces = 8

(ii) Given, number of faces = 5

Number of edges = 9

Substituting these values in the Euler's formula:

$F + V - E = 2$

$\Rightarrow 5 + V - 9 = 2$

$\Rightarrow V = 2 - 5 + 9$

$\Rightarrow V = 6$

Therefore, the number of vertices $= 6$

(iii) Given, number of faces $= 20$

Number of vertices $= 12$

Substituting these values in the Euler's formula:

$F + V - E = 2$

$\Rightarrow 20 + 12 - E = 2$

$\Rightarrow E = 20 + 12 - 2$

$\Rightarrow E = 30$

Therefore, the number of edges $= 30$

Hence, the completed table is as follows:

Faces	8	5	20
Vertices	6	6	12
Edges	12	9	30

8. Can a polyhedron have 10 faces, 20 edges and 15 vertices?

Solution:

Given, number of faces $= F = 10$

Number of edges $= E = 20$

Number of vertices $= V = 15$

Substituting these values in Euler's formula:

$F + V - E = 2$

$\Rightarrow 10 + 15 - 20 = 2$

$\Rightarrow 25 - 20 = 2$

$\Rightarrow 5 = 2$

Clearly, $5 \neq 2$

Hence, this is a violation of Euler's formula. Therefore, a polyhedron with the given number of faces, vertices and edges cannot exist.