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## Chapter-10: Visualizing Solid Shapes

### Exercise 10.1 (Page 157 of Grade 8 NCERT)

**Q1.** 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.

| Object   | Side view  | Top view   |
|--|--|--|
| <p>(a) <br/><b>A Bottle</b></p>           | <p>(i) </p>     | <p>(i) </p>     |
| <p>(b) <br/><b>A Weight</b></p>          | <p>(ii) </p>   | <p>(ii) </p>   |
| <p>(c) <br/><b>A Flask</b></p>          | <p>(iii) </p> | <p>(iii) </p> |
| <p>(d) <br/><b>A Cup and Saucer</b></p> | <p>(iv) </p>  | <p>(iv) </p>  |

**Difficulty level:** Easy

**What is known:**

Object, Side view and Top view

**What is unknown:**

Matching

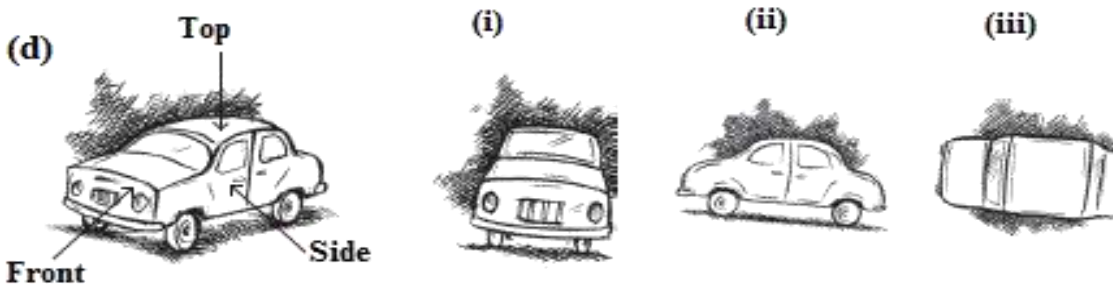
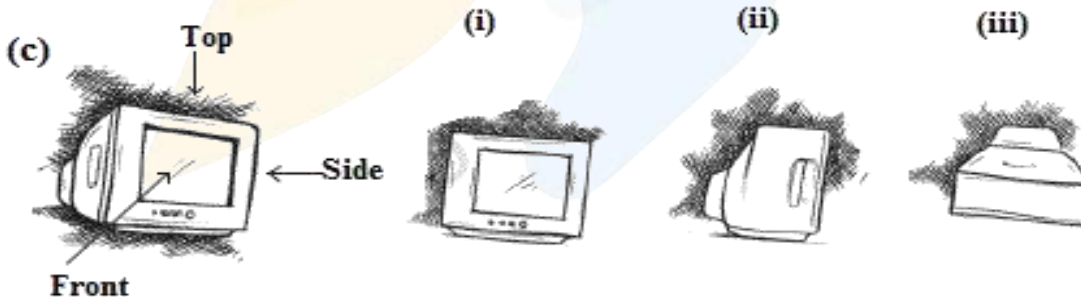
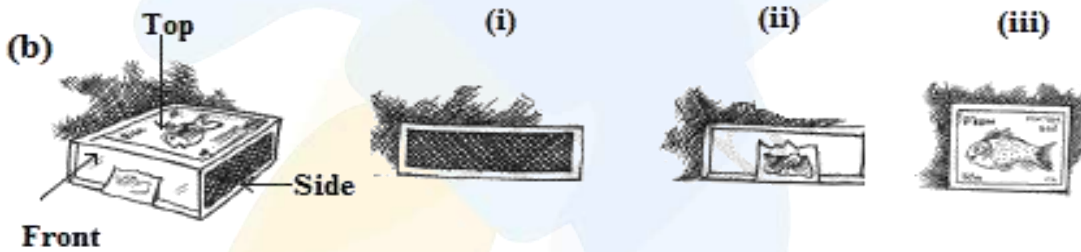
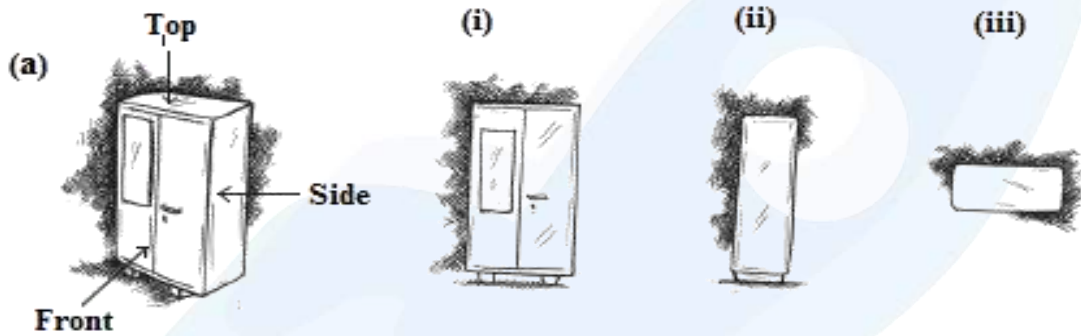
**Reasoning:**

Match the correct side view and top view to the object.

**Solution:**

| Object | Side view | Top view |
|--------|-----------|----------|
| a)     | (iii)     | (iv)     |
| b)     | (i)       | (v)      |
| c)     | (iv)      | (ii)     |
| d)     | (v)       | (iii)    |
| e)     | (ii)      | (i)      |

**Q2.** For each of the given solid, the three views are given. Identify for each solid the corresponding top, front and side views.



**Difficulty level: Easy**

**What is known:**

Object, Top view, Front view and Side view




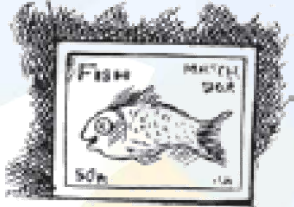

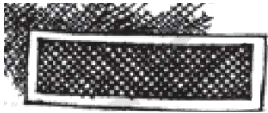
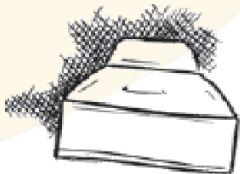


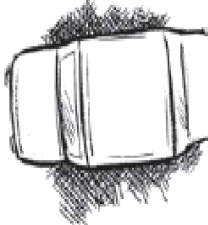


**What is unknown:**

Matching

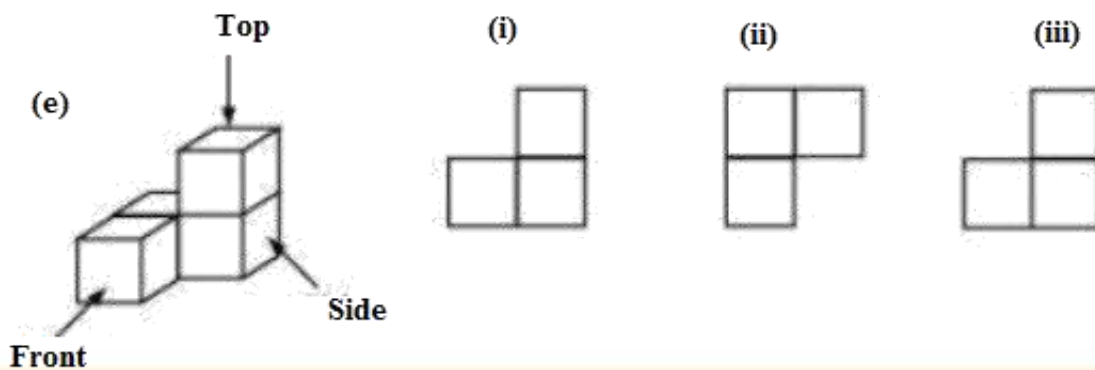
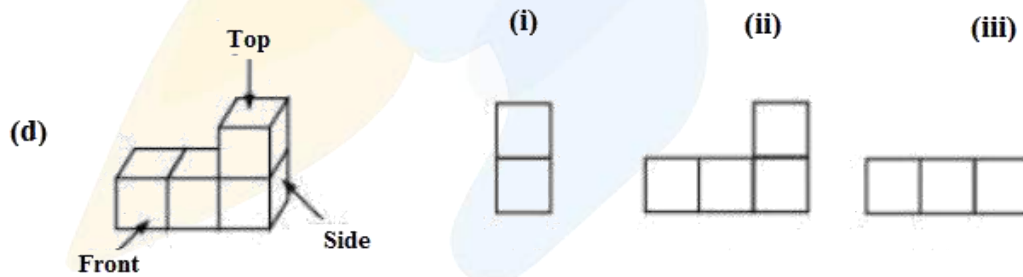
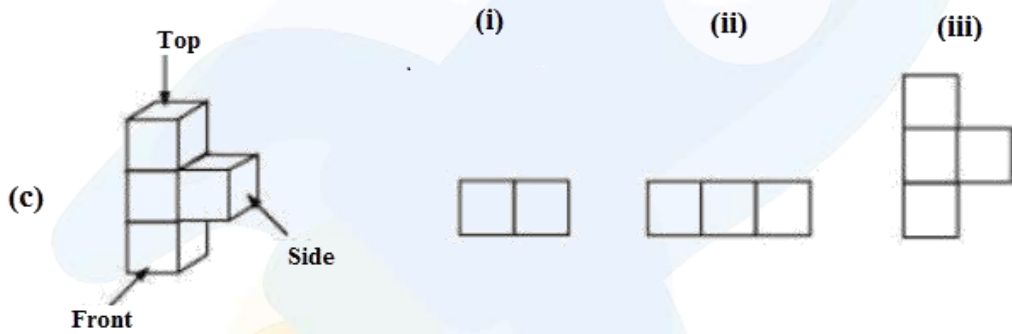
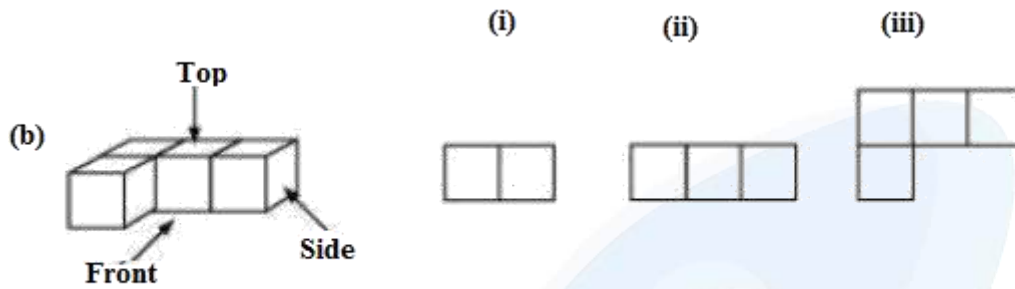
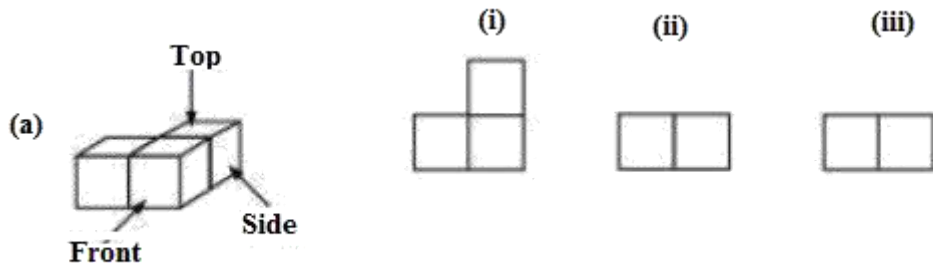
**Reasoning:**

Match the correct side view, front view and top view to the object.

**Solution:**

| Object          | Top View  | Front View   | Side View   |
|-----------------|---|--|---|
| a) An almirah   |   |    |   |
| b) A Match Box  |  |  |  |
| c) A Television |  |  |  |
| d) A car        |  |  |  |

**Q3.** For each given solid, identify the top view, front view, side view.



**Difficulty level: Easy**

**What is known:**

Object, Top view, Front view and Side view

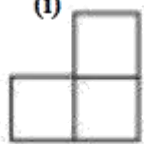




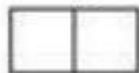

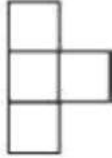



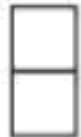
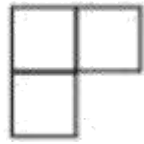
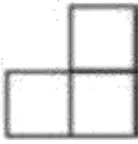
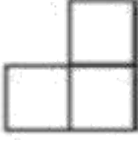
**What is unknown:**

Matching

**Reasoning:**

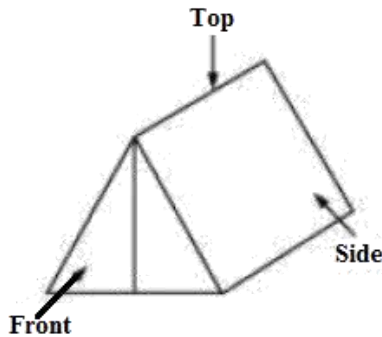
Match the correct side view, front view and top view to the object.

**Solution:**

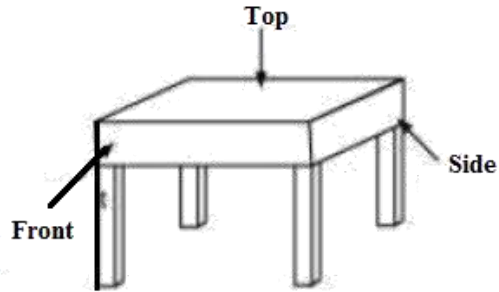
|     | Top view   | Front view   | Side view   |
|-----|--|--|---|
| (a) | (i)<br>     | (ii)<br>    | (iii)<br>  |
| (b) | (iii)<br> | (ii)<br>  | (i)<br>  |
| (c) | (i)<br>   | (iii)<br> | (ii)<br> |
| (d) | (iii)<br> | (ii)<br>  | (i)<br>  |
| (e) | (ii)<br>  | (iii)<br> | (i)<br>  |

**Q4.** Draw the top view, front view and side view of the given objects.

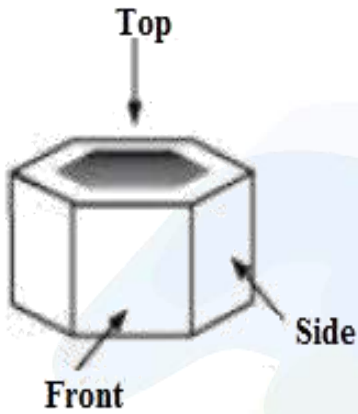
(a) A Military Tent



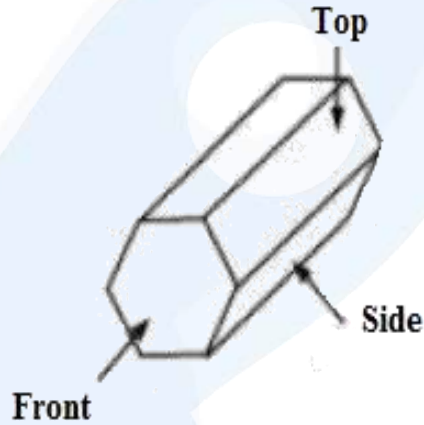
(b) A Table



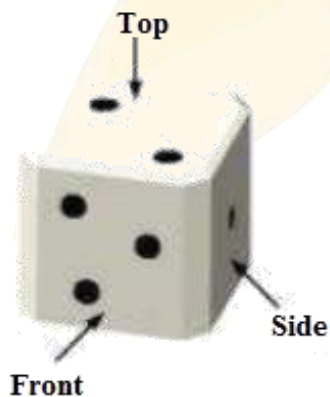
(c) A Nut



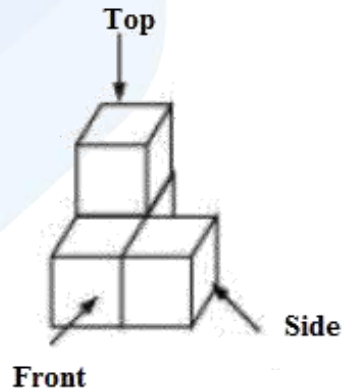
(d) A Hexagonal block



(e) A Dice



(f) A Solid



**Difficulty level:** Easy

**What is known:**

Object, Top view, Front view and Side view

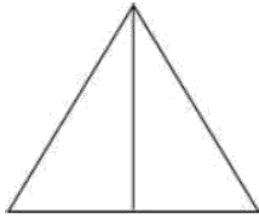


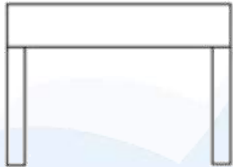


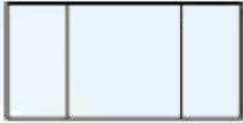

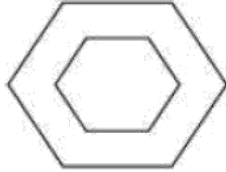

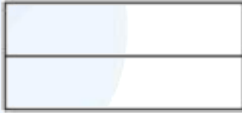

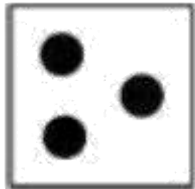
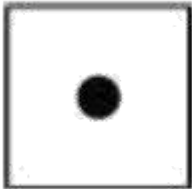
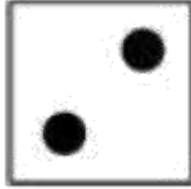
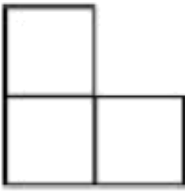
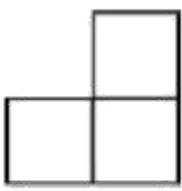
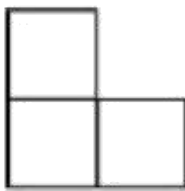
**What is unknown:**

Matching

**Reasoning:**

Match the correct side view, front view and top view to the object.

**Solution:**

|                              | Front view  | Side view  | Top view  |
|------------------------------|---|--|---|
| <b>(a) A Military tent</b>   |    |    |    |
| <b>(b) A table</b>           |   |   |   |
| <b>(c) A Nut</b>             |  |  |  |
| <b>(d) A Hexagonal Block</b> |  |  |  |
| <b>(e) A Dice</b>            |  |  |  |
| <b>(f) A Solid</b>           |  |  |  |



### Exercise 10.3 (Page 166 of Grade 8 NCERT)

- Q1.** Can a polyhedron have for its faces  
(i) 3 triangles?      (ii) 4 triangles?      (iii) a square and four triangles?

**Difficulty level:**

Easy

**What is known:**

Shape of faces.

**What is unknown:**

Shape of faces of a polyhedron.

**Reasoning:**

A polyhedron is made up of polygonal regions which are called its faces; these faces meet at edges which are line segments; and the edges meet at vertices which are points. A polyhedron has at least 4 faces.

**Solution:**

- (i) No. There are only 3 faces.
- (ii) Yes. A triangular pyramid can be formed with 4 triangles
- (iii) Yes. A square pyramid can be formed with 1 square and 4 triangles

- Q2.** Is it possible to have a polyhedron with any given number of faces?  
(**Hint:** Think of a pyramid).

**Difficulty level:**

Easy

**What is known:**

Number of faces to form a polyhedron.

**What is unknown:**

Possibility to form a polyhedron with any given number of faces.

**Reasoning:**

A polyhedron has at least 4 faces.

**Solution:**

Yes. It is possible only when the number of faces is 4 or more than 4.

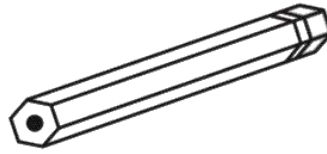
**Q3.** Which are prisms among the following?

(i)



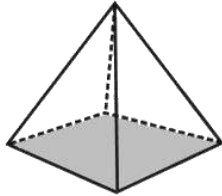
**A nail**

(ii)



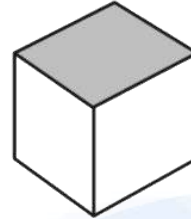
**Unsharpened pencil**

(iii)



**A table weight**

(iv)



**A box**

**Difficulty level:**

Easy

**What is known:**

A few solid shapes.

**What is unknown:**

Prism among given shapes.

**Reasoning:**

A prism is a polyhedron whose base and top are congruent polygons and whose other faces, i.e., lateral faces are parallelograms in shape.

**Solution:**

(ii) Unsharpened pencil and (iv) A box; because their bases and tops are congruent and lateral faces are parallelograms.

**Q4.** (i) How are prisms and cylinders alike?  
(ii) How are pyramids and cones alike?

**Difficulty level:**

Easy

**What is known:**

- (i) Prisms and cylinders
- (ii) Pyramids and cones

**What is unknown:**

- (i) Reason to; prisms and cylinders are alike.
- (ii) Reason to; pyramids and cones are alike.

**Reasoning:**

A prism is a polyhedron whose base and top are congruent polygons and whose other faces, i.e., lateral faces are parallelograms in shape.

A pyramid is a polyhedron whose base is a polygon (of any number of sides) and whose lateral faces are triangles with a common vertex.

**Solution:**

- (i) A prism becomes a cylinder as the number of sides of its base becomes larger and larger.
- (ii) A pyramid becomes a cone as the number of sides of its base becomes larger and larger.

**Q5.** Is a square prism same as a cube? Explain.

**Difficulty level:**

Easy

**What is known:**

A square prism.

**What is unknown:**

Whether a square prism is same as a cube.

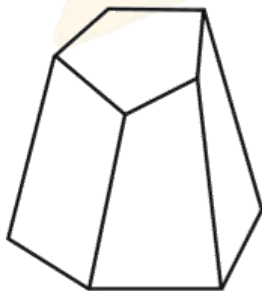
**Reasoning:**

A prism is a polyhedron whose base and top are congruent polygons and whose other faces, i.e., lateral faces are parallelograms in shape.

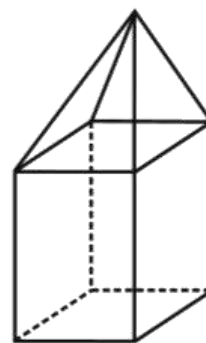
**Solution:**

No. It can be a cuboid, if the lateral faces are rectangles and bases are squares.

**Q6.** Verify Euler's formula for these solids.



(i)



(ii)

**Difficulty level:**

Easy

**What is known:**

Two solid figures.

**What is unknown:**

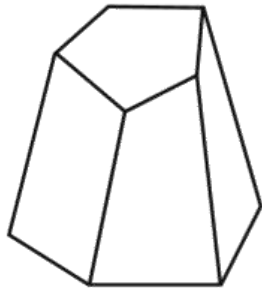
Verification of Euler's formula

**Reasoning:**

According to Euler's formula in any polyhedron,  $F + V - E = 2$ , where 'F' stands for number of faces, 'V' stands for number of vertices and 'E' stands for number of edges.

**Solution:**

- (i) In the figure we can see that top and bottom are pentagon.



Number of faces,  $F = 7$

Number of edges,  $E = 15$

Number of vertices,  $V = 10$

Let's verify Euler's formula,

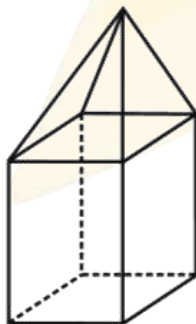
$$F + V - E = 7 + 10 - 15$$

$$= 17 - 15$$

$$= 2$$

Verified.

- (ii) In the figure we can see that its top is a square pyramid and bottom is a square prism.



Number of faces,  $F = 9$

Number of edges,  $E = 16$

Number of vertices,  $V = 9$

Let's verify Euler's formula,

$$F + V - E = 9 + 9 - 16$$

$$= 18 - 16$$

$$= 2$$

Verified.

**Q7.** Using Euler's formula find the unknown.

|                 |    |   |    |
|-----------------|----|---|----|
| <b>Faces</b>    | ?  | 5 | 20 |
| <b>Vertices</b> | 6  | ? | 12 |
| <b>Edges</b>    | 12 | 9 | ?  |

**Difficulty level:**

Easy

**What is known:**

A few faces, vertices and edges.

**What is unknown:**

Faces, vertices and edges.

**Reasoning:**

According to Euler's formula in any polyhedron,  $F + V - E = 2$ , where 'F' stands for number of faces, 'V' stands for number of vertices and 'E' stands for number of edges.

**Solution:**

- (i) Number of faces,  $F = ?$   
Number of edges,  $E = 12$   
Number of vertices,  $V = 6$

According to Euler's formula in any polyhedron,

$$F + V - E = 2$$

$$F + 6 - 12 = 2$$

$$F - 6 = 2$$

$$F = 2 + 6$$

$$F = 8$$

- (ii) Number of faces,  $F = 5$   
Number of edges,  $E = 9$   
Number of vertices,  $V = ?$

According to Euler's formula in any polyhedron,

$$F + V - E = 2$$

$$5 + V - 9 = 2$$

$$V - 4 = 2$$

$$V = 2 + 4$$

$$V = 6$$

- (iii) Number of faces,  $F = 20$   
Number of edges,  $E = ?$   
Number of vertices,  $V = 12$

According to Euler's formula in any polyhedron,

$$F + V - E = 2$$

$$20 + 12 - E = 2$$

$$32 - E = 2$$

$$E = 32 - 2$$

$$E = 30$$

|                 |           |          |           |
|-----------------|-----------|----------|-----------|
| <b>Faces</b>    | <b>8</b>  | <b>5</b> | <b>20</b> |
| <b>Vertices</b> | <b>6</b>  | <b>6</b> | <b>12</b> |
| <b>Edges</b>    | <b>12</b> | <b>9</b> | <b>30</b> |

**Q8.** Can a polyhedron have 10 faces, 20 edges and 15 vertices?

**Difficulty level:**

Easy

**What is known:**

Number of faces, vertices and edges.

**What is unknown:**

Whether a polyhedron can have given faces, vertices and edges.

**Reasoning:**

According to Euler's formula in any polyhedron,  $F + V - E = 2$ , where 'F' stands for number of faces, 'V' stands for number of vertices and 'E' stands for number of edges.

**Solution:**

Number of faces,  $F = 10$

Number of edges,  $E = 20$

Number of vertices,  $V = 15$

Let's verify Euler's formula,

$$F + V - E = 10 + 20 - 15$$

$$= 30 - 15$$

$$= 15$$

As we know that; according to Euler's formula in any polyhedron,  $F + V - E = 2$

Hence,

No. A polyhedron cannot have 10 faces, 20 edges and 15 vertices.

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