Exercise

Question 1.

If a polyhedron has 8 faces and 8 vertices, find the number of edges in it.

Solution:-

Faces =8

Vertices =8

Using Euler's formula,

F+V-E=2

8+8-E=2

-E=2-16

E=14

Question 2.

If a polyhedron has 10 vertices and 7 faces, find the number of edges in it.

Solution:-

Vertices =10

Faces =7

Using Euler's formula

F+V-E=2

7+10-E=2

-E=-15

E=15

Question 3.

State, the number of faces, number of vertices and number of edges of:

(i) a pentagonal pyramid

Solution:-

(i) A pentagonal pyramid

Number of faces =6

Number of vertices =6

Number of edges =10

(ii) A hexagonal prism

Solution:-

(ii) A hexagonal prism

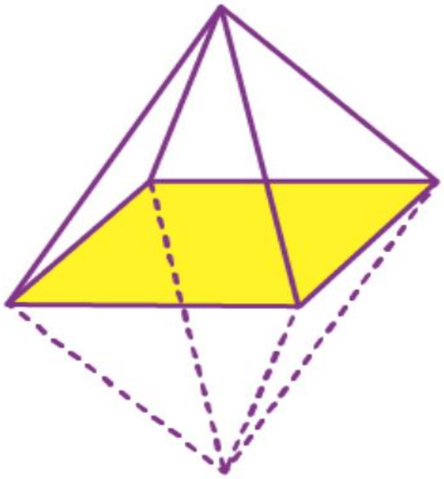
Number of faces = 8

Number of vertices =12

Number of edges =18

Question 4.

Verily Euler’s formula for the following three dimensional figures:



Solution:

(i) Number of vertices = 6

Number of faces =8

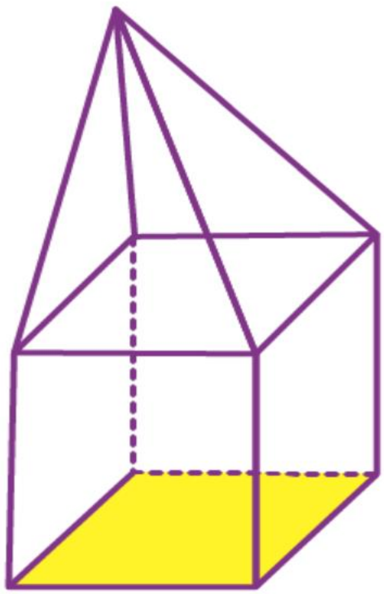
Number of edges =12

Using Euler formula

F+V-E=2

F+V-12=2

2=2 hence proved.



Solution:

(ii) Number of vertices =9

Number of faces =8

Number of edges =15

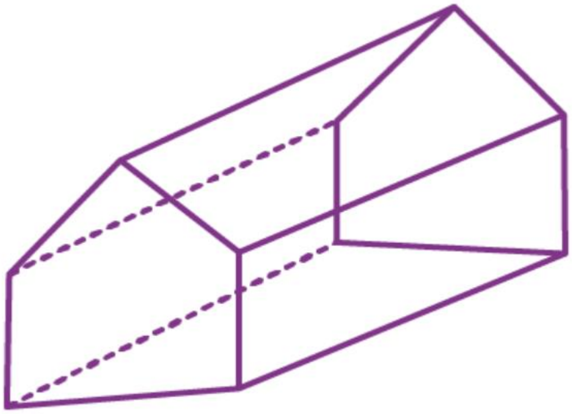
Using, Euler's formula,

F+V-E=2

9+8-15=2

2=2

Hence proved.



Solution:-

(iii) Number of vertices =9

Number of faces =5

Number of edges =12

Using, Euler's formula,

F+V-E=2

9+5-12=2

2=2 hence proved.

Question 5.

Can a polyhedron have 8 faces, 26 edges and 16 vertices?

Solution:-

Number of faces =8

Number of vertices =16

Number of edges =26

Using Euler's formula

F+V-E

$8+16-26\neq-2$

$8+16-26\neq-2$

$-2\neq2$

No, a polyhedron cannot have 8 faces, 26 edges and 16 vertices.

Question 6.

Can a polyhedron have?

(i) 3 triangles only?

Solution:-

(i) No.

(ii) 4 triangles only?

Solution:-

(ii) Yes.

(iii) A square and four triangles?

Solution:-

(iii) Yes.

Question 7.

Using Euler's formula, find the values of x, y, z.

	Faces	Vertices	Edges
(i)	x	15	20
(ii)	6	Y	8
(iii)	14	26	z

Solution:-

(i)F+V-E=2

x+15-20=2

x-5=2⇒x=2+5=7

(ii)F+V-E=2

15+y-26=2

y-11=2

y=2+11⇒y=13

(iii) F+V-E=2

14+26-Z=2

-Z=2-40⇒Z=38

Question 8.

What is the least number of planes that can enclose a solid? What is the name of the solid?

Solution:-

The least number of planes that can enclose a solid is 4.

The name of the solid is Tetrahedron.

Question 9.

Is a square prism same as a cube?

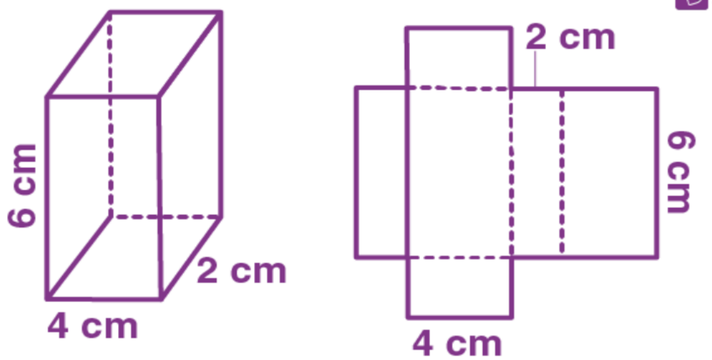
Solution:

Yes, a square prism is same as a cube.

Question 10.

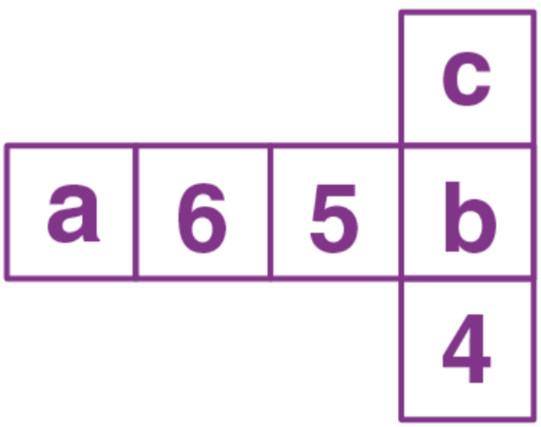
A cubical box is $6\text{cm}\times4\text{cm}\times2\text{cm}$. Draw two different nets of it.

Solution:

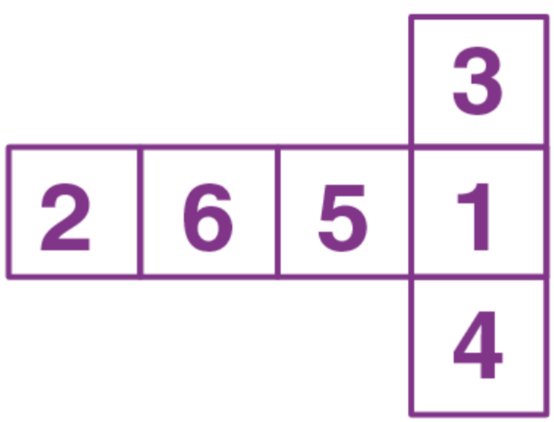


Question 11.

Dice are cubes where the sum of the numbers on the opposite faces is 7. Find the missing numbers a, b and c.



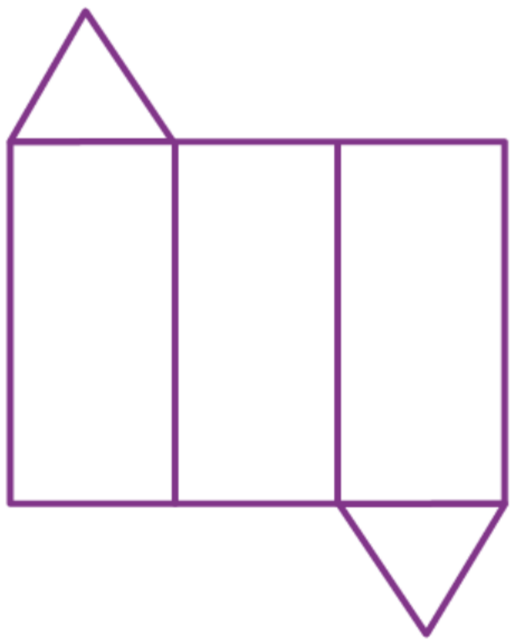
Solution:-



Question 12.

Name the polyhedron that can be made by folding each of the following nets:

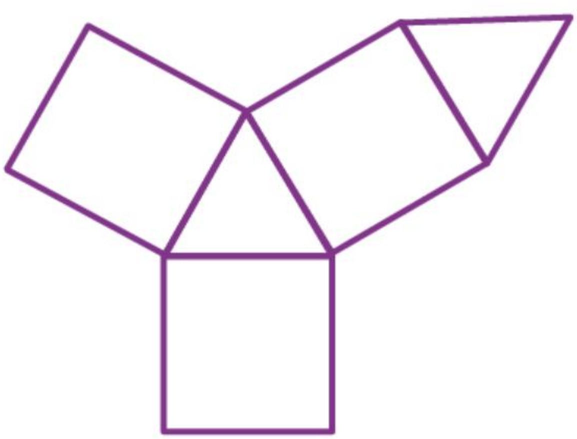
(i)



Solution:-

(i) Triangular prism. It has 3 rectangles and 2 triangles.

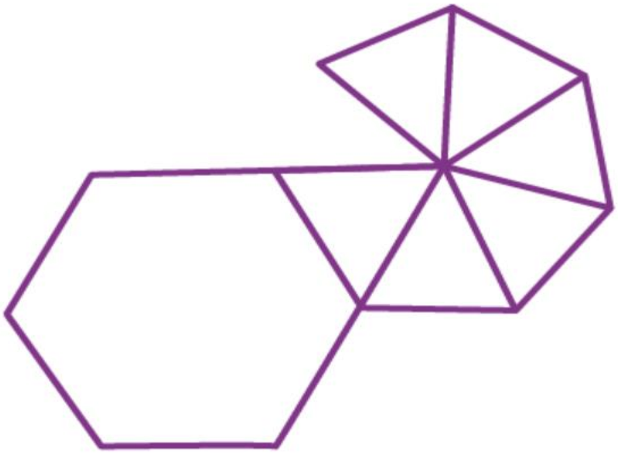
(ii)



Solution:-

(ii) Triangular prism. It has 3 rectangles and 2 triangles.

(iii)

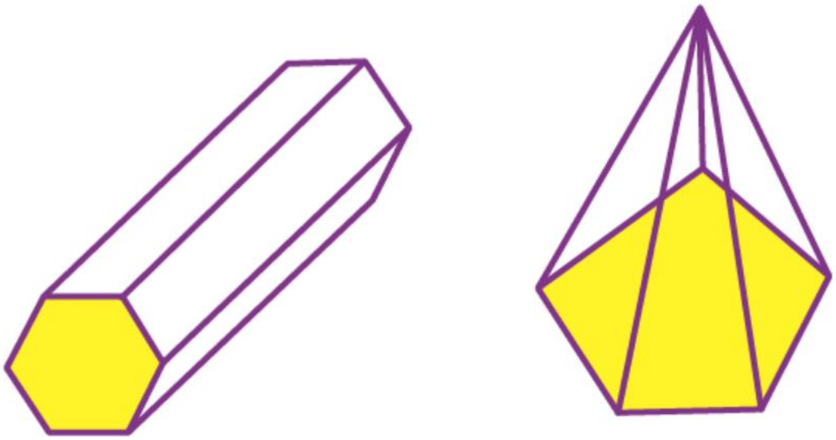


Solution:-

(iii) Hexagonal pyramid as it has a hexagonal base and 6 triangles.

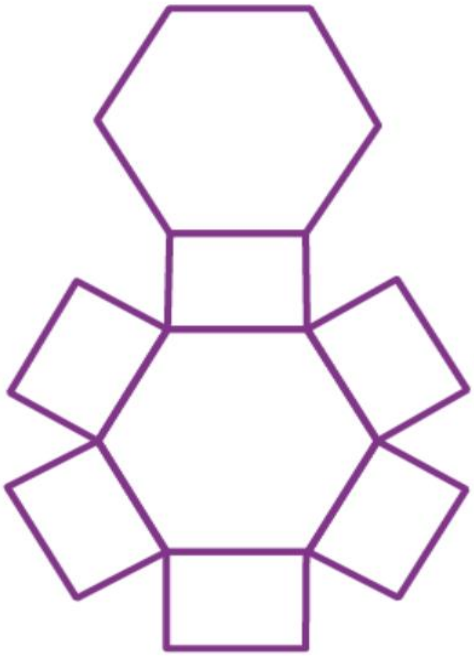
Question 13.

Draw nets for the following polyhedrons:



Solution:-

Net of hexagonal prism:



Net of pentagonal pyramid: