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1. Can a polyhedron have for its faces:

(i) 3 Triangles?

(ii) 4 triangles?

(iii) A square and four triangles?

Solution:

i) No, such polyhedrons are not possible. Such figures should have minimum 4 faces.

ii) Yes, a triangular pyramid has 4 triangular faces.

iii) Yes, as square pyramid has a square face and 4 triangular faces.

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

Solution: It is possible, only if the number of faces are greater than or equal to 4.

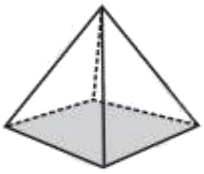
3. Which are prisms among the following:

(i) 

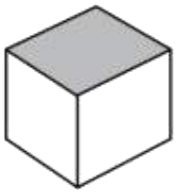
A nail

(ii) 

Unsharpened pencil

(iii) 

A table weight

(iv) 

A box

i) A nail: Not a polyhedron as it has a curved surface. This is not a prism.
ii) Unsharpened Pencil: t is a prism.
iii) A table Weight: It is not a prism.
iv) A Box: It is a prism.

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

Solution:

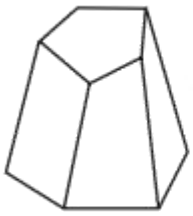
i) A cylinder can be looks like circular prism, a prism with circular base.

ii) A cone can be a circular pyramid, a pyramid with circular base.

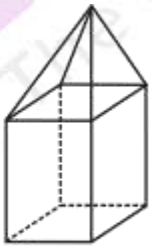
5. Is a square prism same as a cube? Explain.

Solution: yes, a square prism can also be a cube. A square prism has a square as its base. However, its height is not necessarily same as the side of the square. Thus, a square prism can also be a cuboid.

6. Verify Euler's formula for these solids.



(i)



(ii)

Solution:

i) Number of faces, F = 7
Number of edges, E = 15
Number of vertices, V = 10
As per formula**, F + V - E = 2**
Substitute the values, we have
F + V - E = 7 + 10 - 15
= 2
Verified.

ii)
Here F = 9
V = 9
E = 16
Using formula, F+ V- E = 2
F+ V- E = 9+9-16 = 2
Hence, Euler's formula is verified.

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

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

Solution:
Euler's formula: F + V - E = 2
Where , F = Faces, V = Vertices and E = Edges

i) F + 6 - 12 = 2
F = 2 + 6
F = 8

ii) 5 + V - 9 = 2
V-4 = 2
V = 6

iii) 20 + 12 - E = 2
32 - E = 2
E = 30

8. Can a polyhedron have 10 faces, 20 edges and 15 vertices?
Solution: From the given data, we have
F = 10
E = 20
V = 15
Every polyhedron satisfies Euler's formula, which is stated as, F + V - E = 2
For the given polygon, F + V - E = 10 + 15 - 20 = 25 - 20 = 5, which is not equal to 2
Therefore, A polyhedron is not possible as Euler's formula is not satisfied.