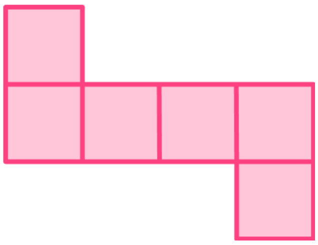
3D Shape Names and Vertices, Edges and Faces - Worksheet

Skill

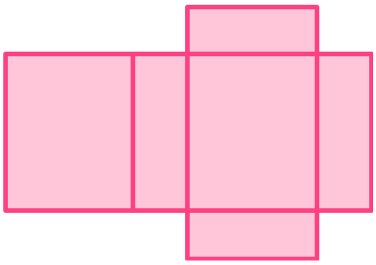
Group A - Name the 3D shape

Write the name of the 3D shape given the net:

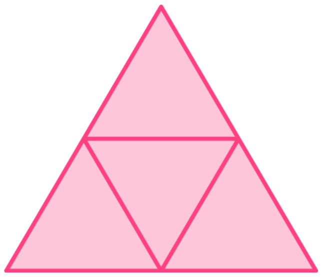
1)



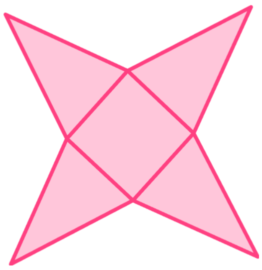
2)



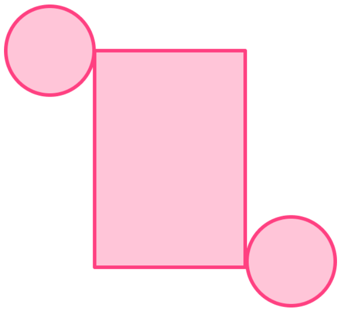
3)



4)



5)



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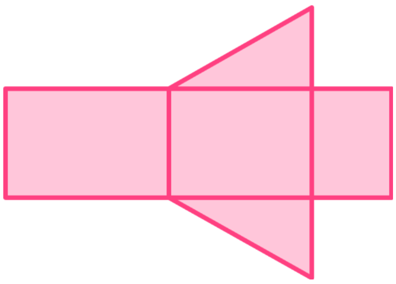
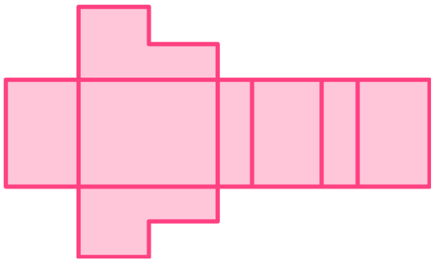
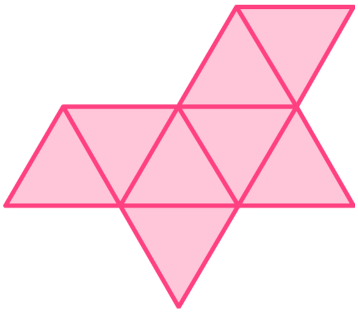


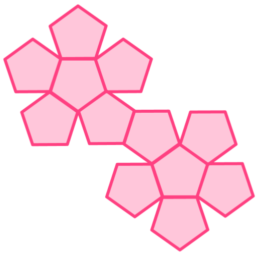
7)



8)

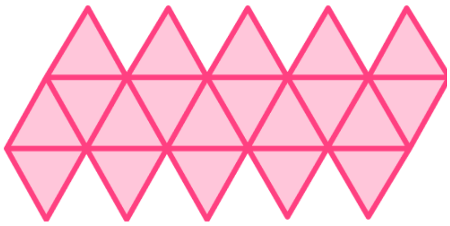


9)

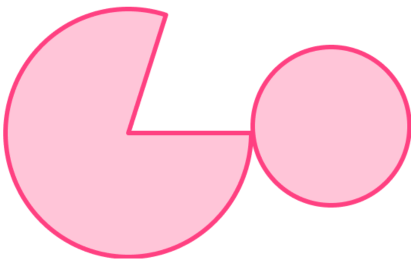


10)

11)



12)

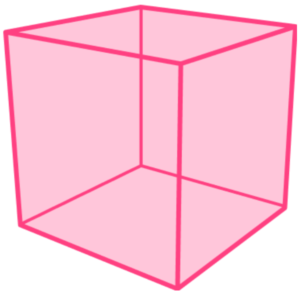


3D Shape Names and Vertices, Edges and Faces - Worksheet

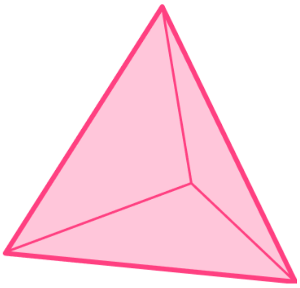
Group B - Vertices Edges Faces

Calculate the missing property for each 3D shape

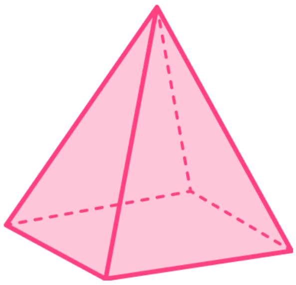
1) Vertices:



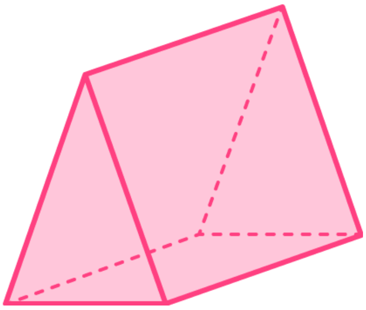
2) Edges:



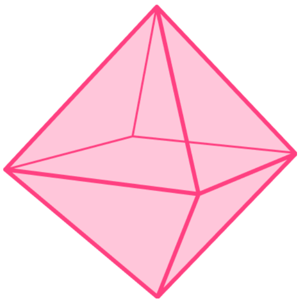
3) Faces:



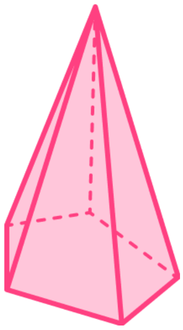
4) Edges:



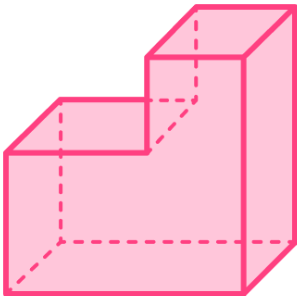
5) Vertices:



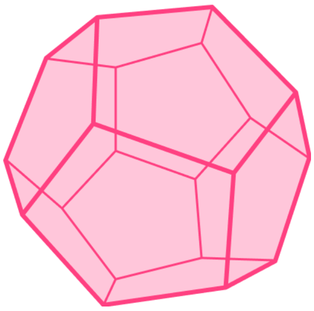
6) Vertices:



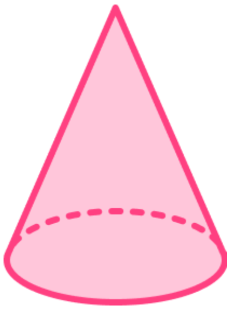
7) Faces:



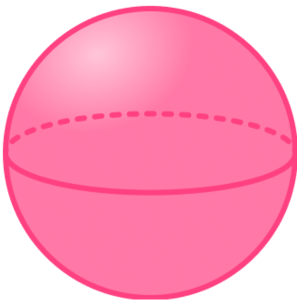
8) Faces:



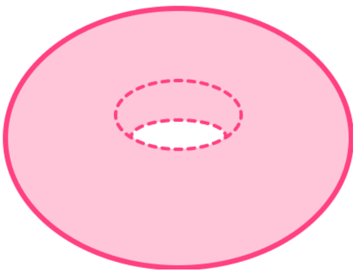
9) Edges:



10) Vertices:



11) Faces:



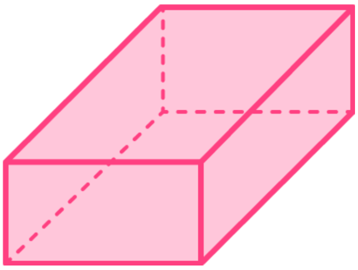
12) Vertices:

3D Shape Names and Vertices, Edges and Faces - Worksheet

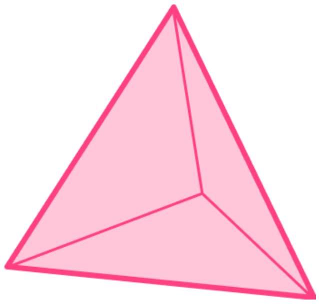
Group C - Euler Characteristic

Calculate the Euler Characteristic for the following 3D shapes using $\chi = V - E + F$

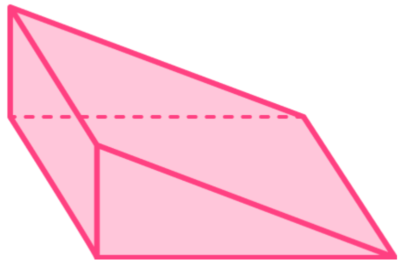
1) $V = 8,\ E = 12,\ F = 6$



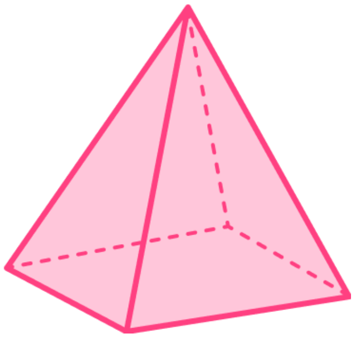
2) $V = 4,\ E = 6,\ F = 4$



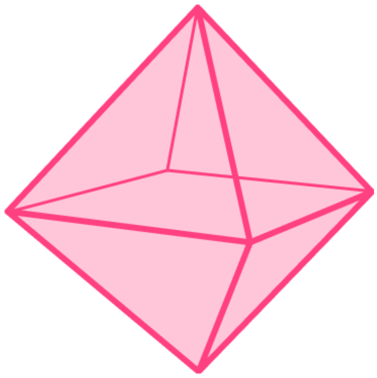
3) $V = 6,\ E = 9,\ F = 5$



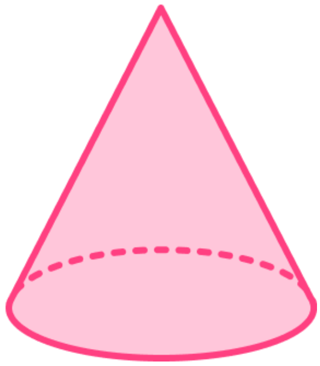
4) $V = 5,\ E = 8,\ F = 5$



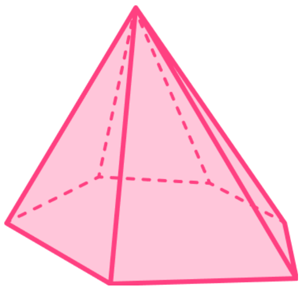
5) $V = 6,\ E = 12,\ F = 8$



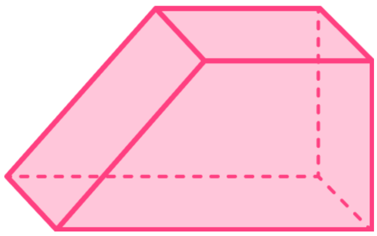
6) $V = 1,\ E = 1,\ F = 2$



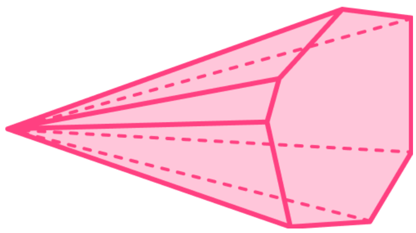
7) $V = 7,\ E = 12,\ F = 7$



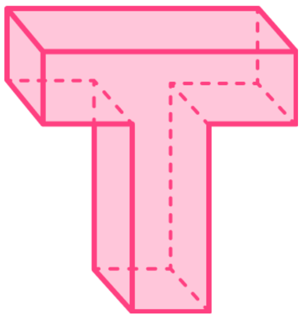
8) $V = 8,\ E = 12,\ F = 6$



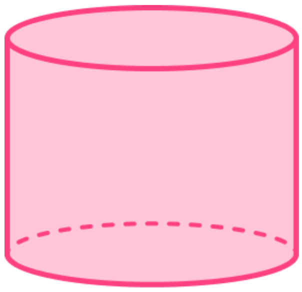
9) $V = 8,\ E = 14,\ F = 8$



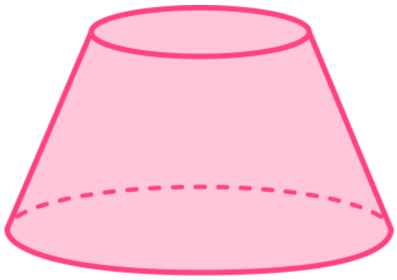
10) $V = 16,\ E = 24,\ F = 10$



11) $V = 0,\ E = 2,\ F = 3$



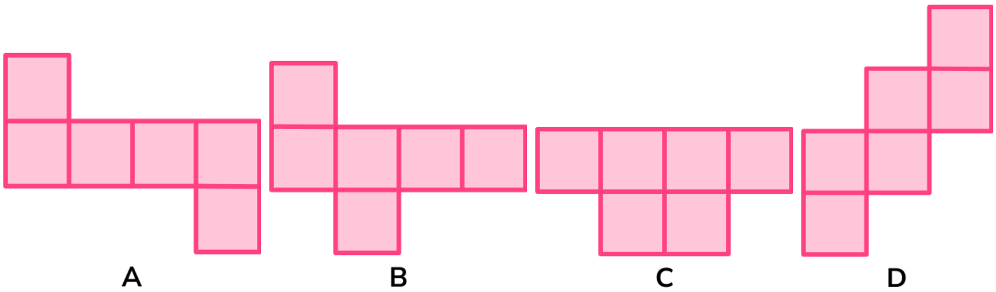
12) $V = 0,\ E = 2,\ F = 3$



3D Shape Names and Vertices, Edges and Faces - Worksheet

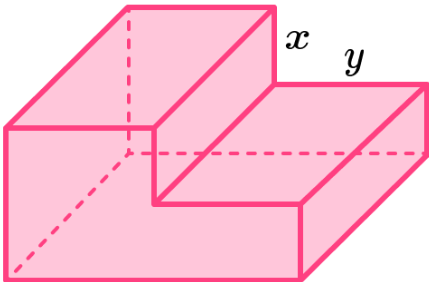
Applied

1) (a) Which of the following nets does **not** make a cube?



(b) How many vertices does a cube have?

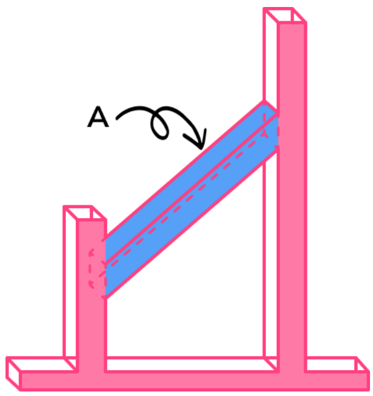
2) (a) Below is a sketch of an L-shaped prism. Calculate the number of faces of the prism.



(b) The base of the prism in part a) is a square with an area of $64cm^2$. If the vertical height of the prism is $8cm$, will the volume of the L-shape prism be greater than or less than the volume of a cube with width $8cm$? Explain your answer.

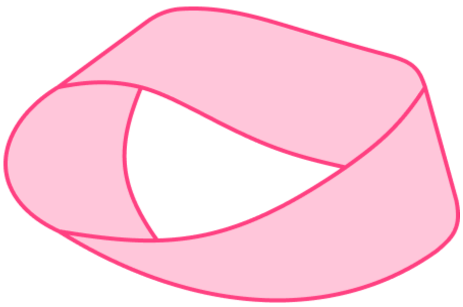
3D Shape Names and Vertices, Edges and Faces - Worksheet

3) **(a)** Below is the diagram of a show jumping wing. The wing is made from 4 planks of wood; two are vertical, one is horizontal and one is fixed at an angle between the two verticals. What is the name of the 3D shape labelled A?



(b) If the edges of each plank of wood are completely flush with one another, determine the Euler Characteristic of the 3D shape.

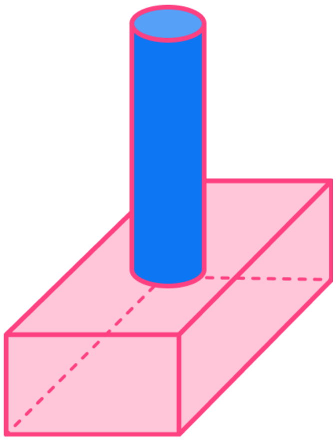
4) **(a)** The Möbius Strip has one face, one edge and no vertices. Determine the Euler Characteristic of the 3D shape.



(b) What 3D shape also has one face but no vertices and no edges?

3D Shape Names and Vertices, Edges and Faces - Exam Questions

1) **(a)** A cylinder is joined to a cuboid to make a new 3D shape. How many faces does the new 3D shape have?



....

(1)

(b) The volume of the cylinder is $\frac{1}{3}$ of the volume of the cuboid. The cuboid has the following dimensions: $8(H) \times 6(W) \times 3(D)$.

What is the volume of the cylinder?

....

(2)

(3 marks)

---

2) **(a)** A Platonic Solid is a 3D shape which has faces which are regular polygons. The faces are congruent and the same number of faces meet at each vertex.

Which of these solid is a Platonic Solid? Circle your answer.

Sphere	Cuboid
Cube	Square-based pyramid

(1)

(b) Name a Platonic Solid which has all their faces being equilateral triangles?

....

(1)

(2 marks)

3D Shape Names and Vertices, Edges and Faces - Exam Questions

3) **(a)** The cross sectional area of a 3D shape is made up of similar squares. The 3D shape has 5 vertices. What is the name of the 3D shape?

....
(1)

(b) Which two 3D shapes have 3 faces, 2 edges and no vertices?

....
(2)
(3 marks)

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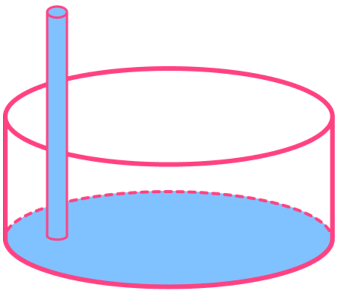
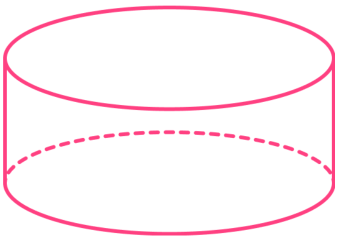
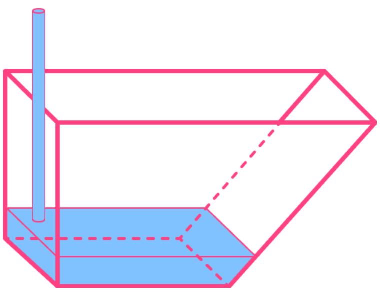
4) **(a)** Tank A is a cylinder. The cross sectional area of the cylinder is a circle. The tank is starting to fill with water. Sketch a line marking where the tank would be half full.

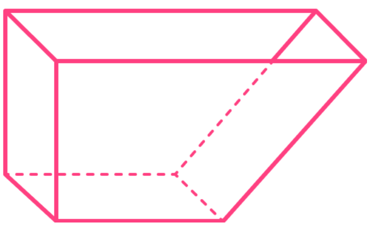




(1)

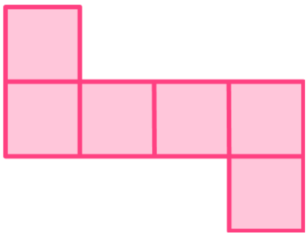
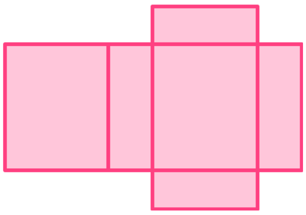
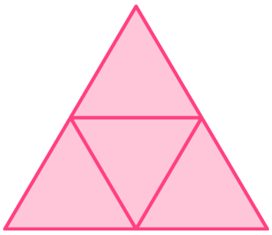
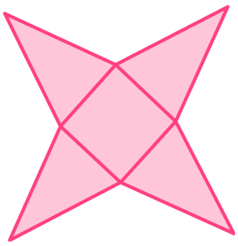
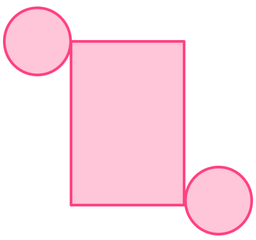
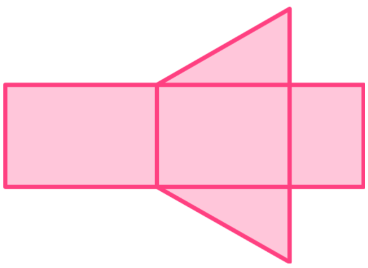
(b) Tank B is a trapezoidal prism. It is filled with water. Sketch a line marking where the tank would be half full.



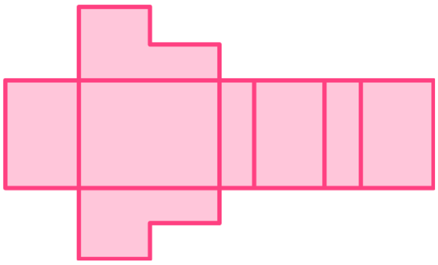
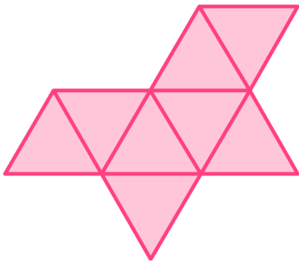
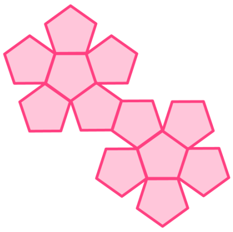
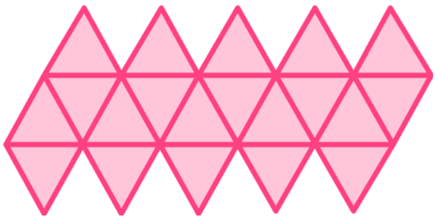
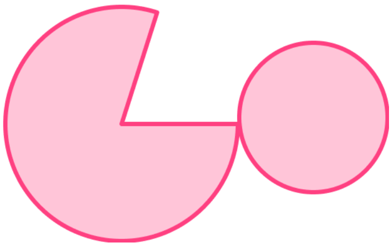


(1)
(2 marks)

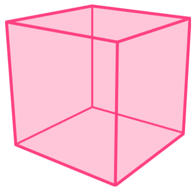
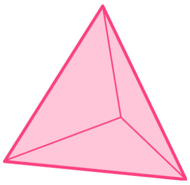
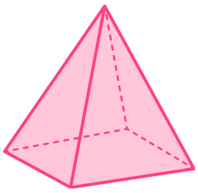
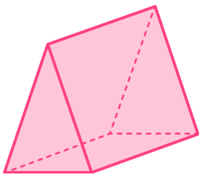
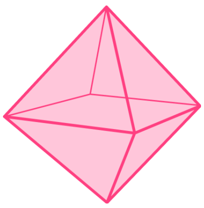
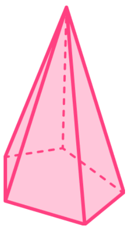
3D Shape Names and Vertices, Edges and Faces - Answers

	Question	Answer
	Skill Questions	
Group A	Write the name of the 3D shape given the net.	
	1) 	**1)** Cube
	2) 	**2)** Cuboid
	3) 	**3)** Tetrahedron
	4) 	**4)** Square Based Pyramid
	5) 	**5)** Cylinder
	6) 	**6)** Triangular Prism

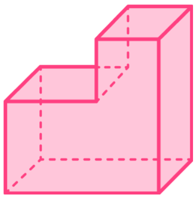
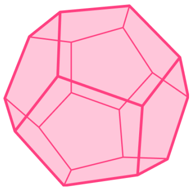
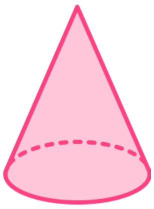
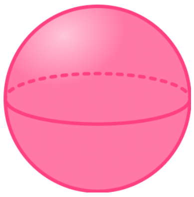
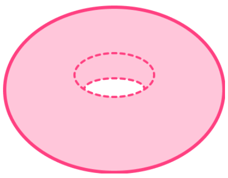
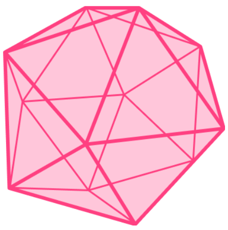
3D Shape Names and Vertices, Edges and Faces - Answers

Group A contd	**7)** 	**7)** L-Shaped Prism
	8) 	**8)** Octahedron
	9) 	**9)** Dodecahedron
	10) 	**10)** Pentagonal Pyramid
	11) 	**11)** Icosahedron
	12) 	**12)** Cone

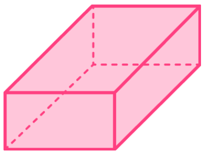
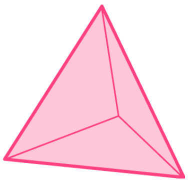
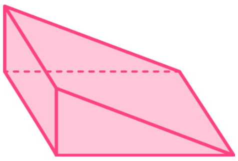
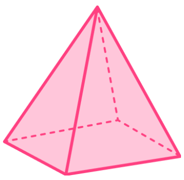
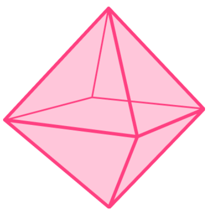
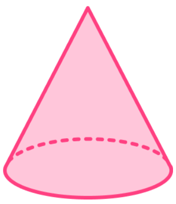
3D Shape Names and Vertices, Edges and Faces - Answers

Group B	Calculate the missing property for each 3D shape	
	1) Vertices: 	**1)** $V = 8$
	2) Edges: 	**2)** $E = 6$
	3) Faces: 	**3)** $F = 5$
	4) Edges: 	**4)** $E = 9$
	5) Vertices: 	**5)** $V = 6$
	6) Vertices: 	**6)** $V = 6$

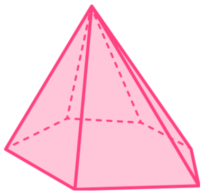
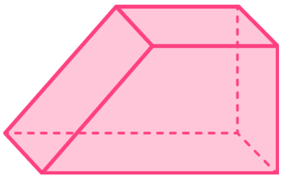
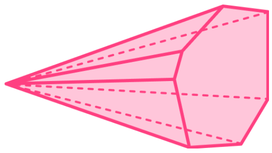
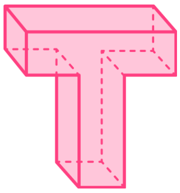
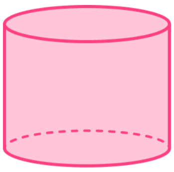
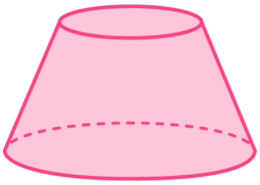
3D Shape Names and Vertices, Edges and Faces - Answers

Group B contd	**7)** Faces: 	**7)** $F = 8$
	8) Faces: 	**8)** $F = 12$
	9) Edges: 	**9)** $E = 1$
	10) Vertices: 	**10)** $V = 0$
	11) Faces: 	**11)** $F = 1$
	12) Vertices: 	**12)** $V = 12$

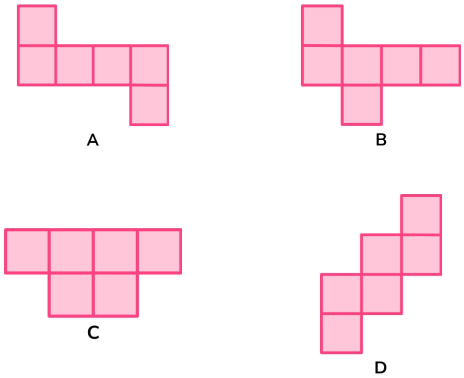
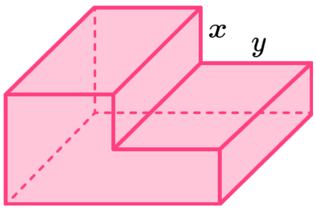
3D Shape Names and Vertices, Edges and Faces - Answers

Group C	Calculate the Euler Characteristic for the following 3D shapes using $\chi = V - E + F$	
	1) $V = 8,\ E = 12,\ F = 6$ 	**1)** $x = 2$
	2) $V = 4,\ E = 6,\ F = 4$ 	**2)** $x = 2$
	3) $V = 6,\ E = 9,\ F = 5$ 	**3)** $x = 2$
	4) $V = 5,\ E = 8,\ F = 5$ 	**4)** $x = 2$
	5) $V = 6,\ E = 12,\ F = 8$ 	**5)** $x = 2$
	6) $V = 1,\ E = 1,\ F = 2$ 	**6)** $x = 2$

3D Shape Names and Vertices, Edges and Faces - Answers

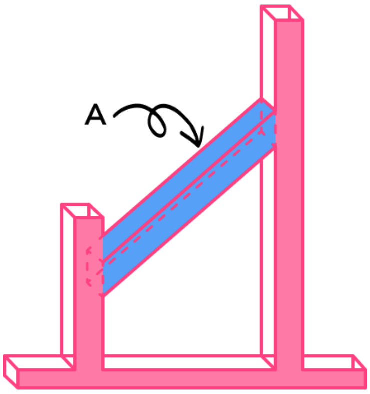
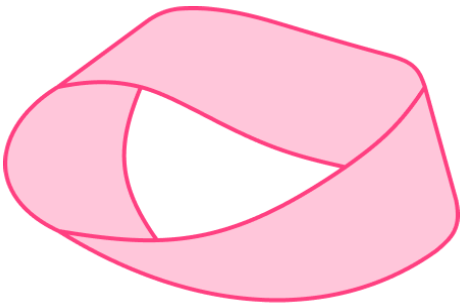
Group C contd	**7)** $V = 7,\ E = 12,\ F = 7$ 	**7)** $x = 2$
	8) $V = 8,\ E = 12,\ F = 6$ 	**8)** $x = 2$
	9) $V = 8,\ E = 14,\ F = 8$ 	**9)** $x = 2$
	10) $V = 16,\ E = 24,\ F = 10$ 	**10)** $x = 2$
	11) $V = 0,\ E = 2,\ F = 3$ 	**11)** $x = 1$
	12) $V = 0,\ E = 2,\ F = 3$ 	**12)** $x = 1$

3D Shape Names and Vertices, Edges and Faces - Answers

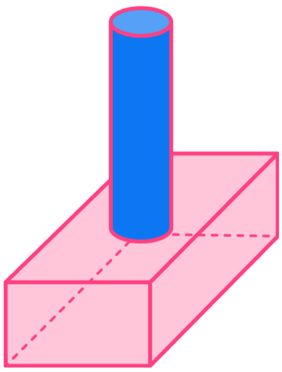
	Question	Answer
	Applied Questions	
1)	**a)** Which of the following nets does **not** make a cube?  **b)** How many vertices does a cube have?	**a)** C **b)** 8
2)	**a)** Below is a sketch of an L-shaped prism. Calculate the number of faces of the prism.  **b)** The base of the prism in part a) is a square with an area of $64cm^2$. If the vertical height of the prism is $8cm$, will the volume of the L-shape prism be greater than or less than the volume of a cube with width $8cm$? Explain your answer.	**a)** 8 **b)** Cube volume = $8 \times 8 \times 8 = 512cm^3$ If the vertical height of the L-shape prism is $8cm$ then the volume must be $64 \times 8 - 8xy = (512 - 8xy)\ cm^3$ which is less than the volume of the cube if both x and y are greater than 0 .

THIRD SPACE LEARNING

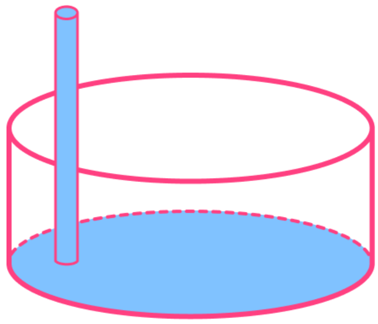
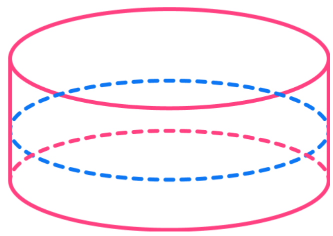
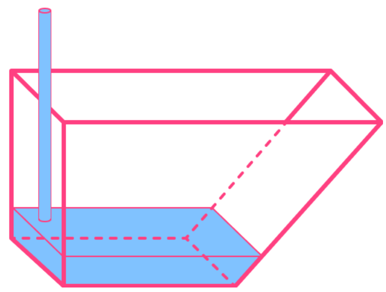
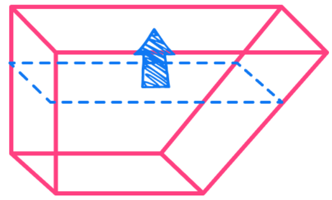
3D Shape Names and Vertices, Edges and Faces - Answers

3)	**a)** Below is the diagram of a show jumping wing. The wing is made from 4 planks of wood; two are vertical, one is horizontal and one is fixed at an angle between the two verticals. What is the name of the 3D shape labelled A? 	**a)** Parallelepiped
	b) If the edges of each plank of wood are completely flush with one another, determine the Euler Characteristic of the 3D shape.	**b)** $V = 32,\ E = 48,\ F = 18$ $V - E + F = x$ $32 - 48 + 18 = 2$
4)	**a)** The Möbius Strip has one face, one edge and no vertices. Determine the Euler Characteristic of the 3D shape. 	**a)** $V - E + F = x$ $0 - 1 + 1 = 0$
	b) What 3D shape also has one face but no vertices and no edges?	**b)** Sphere

3D Shape Names and Vertices, Edges and Faces - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	A cylinder is joined to a cuboid to make a new 3D shape. How many faces does the new 3D shape have? 	**(a)** 8 faces	**(1)**
(b)	The volume of the cylinder is $\frac{1}{3}$ of the volume of the cuboid. The cuboid has the following dimensions: $8(H) \times 6(W) \times 3(D)$. What is the volume of the cylinder?	**(b)** $8 \times 6 \times 3 = 144$ $144 \div 3 = 48cm^3$	**(1)** **(1)**
2) (a)	A Platonic Solid is a 3D shape which has faces which are regular polygons. The faces are congruent and the same number of faces meet at each vertex. Which of these solid is a Platonic Solid? Circle your answer. Sphere Cuboid Cube Square-based pyramid	**(a)** Cube	**(1)**
(b)	Name a Platonic Solid which has all their faces being equilateral triangles?	**(b)** Tetrahedron **or** Octahedron **or** Icosahedron	**(1)**

3D Shape Names and Vertices, Edges and Faces - Mark Scheme

3)	**(a)**	The cross sectional area of a 3D shape is made up of similar squares. The 3D shape has 5 vertices. What is the name of the 3D shape?	**(a)** Square based pyramid	**(1)**
	(b)	Which two 3D shapes have 3 faces, 2 edges and no vertices?	**(b)** Cylinder Frustum	**(1)** **(1)**
4)	**(a)**	Tank A is a cylinder. The cross sectional area of the cylinder is a circle. The tank is starting to fill with water. Sketch a line marking where the tank would be half full. 	**(a)** Line must be half way up the vertical height of the prism with an attempt at being oval/not a straight line e.g. 	**(1)**
	(b)	Tank B is a trapezoidal prism. It is filled with water. Sketch a line marking where the tank would be half full. 	**(b)** Line must be clearly above half way up the vertical height of the prism e.g. 	**(1)**

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