

Chapter 12: Practical Geometry Symmetry and Visualising Solid Shapes

NCERT Exemplar · Class 7 · Maths

Textbook exercises

Question 1

A triangle can be constructed by taking its sides as:

(a) 1.8cm, 2.6cm, 4.4cm

(b) 2cm, 3cm, 4cm

(c) 2.4cm, 2.4cm, 6.4cm

(d) 3.2cm, 2.3cm, 5.5cm

Solution

Ans: Option (b) is the correct answer.

A triangle is possible, when the sum of two sides is greater than the third side. Use the hit and trial method and check the all options:

For option (a),

$1.8\text{cm} + 2.6\text{cm} = 4.4\text{cm}$, which is equal to third side

For option (b),

$2\text{cm} + 3\text{cm} = 5\text{cm}$, which is greater than third side

For option (c),

$2.4\text{cm} + 2.4\text{cm} = 4.8\text{cm}$, which is less than third side

For option (d),

$3.2\text{cm} + 2.3\text{cm} = 5.5\text{cm}$, which is equal to the third side.

Thus, only option (b) satisfies the condition. Therefore, option (b) is right.

Question 2

A triangle can be constructed by taking two of its angles as:

(a) $110^\circ, 40^\circ$

(b)

$70^\circ, 115^\circ$

(c) $135^\circ, 45^\circ$

(d) $90^\circ, 90^\circ$

Solution

Ans: Option (a) is the correct answer.

A triangle is possible, when the sum of all interior angles is equal to 180° . Use the hit and trial method and check the all options:

For option (a),

$$110^\circ + 40^\circ = 150^\circ \text{ and third angle is } 30^\circ$$

For option (b),

$$70^\circ + 115^\circ = 185^\circ, \text{ is greater than } 180^\circ$$

For option (c),

$$135^\circ + 45^\circ = 180^\circ, \text{ third angle is } 0^\circ$$

For option (d),

$$90^\circ + 90^\circ = 180^\circ, \text{ third angle is } 0^\circ$$

Thus, only option (a) satisfies the condition.

Therefore, option (a) is the correct answer.

Question 3

The number of lines of symmetry in the figure 12.13 given below is:

- (a) 4
- (b) 8
- (c) 6
- (d) infinitely many

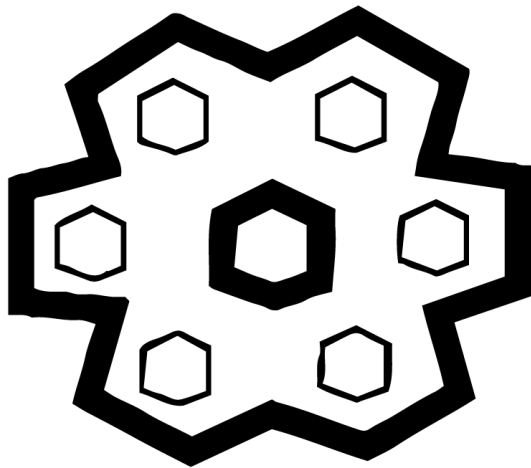


Fig. 12.13

Solution

Solution coming soon.

Question 4

The number of lines of symmetry in figure 12.14 is:

- (a) 1
- (b) 3
- (c) 6

(d) infinitely many

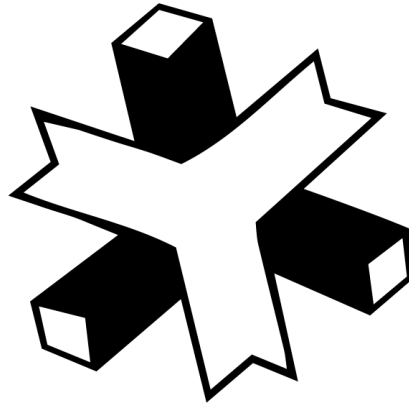
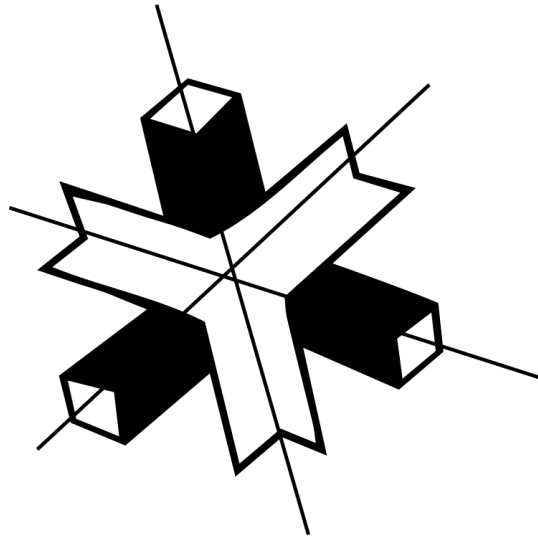


Fig. 12.14

Solution

Ans: Option (b) is the correct answer.

Symmetrical line is the line which divides a figure into two equal parts.



Here, the figure has only a 3 line of symmetry. Therefore, option (b) is the correct answer.

Question 5

The order of rotational symmetry in the Fig. 12.15 given below is

- (a) 4
- (b) 8
- (c) 6
- (d) Infinitely many

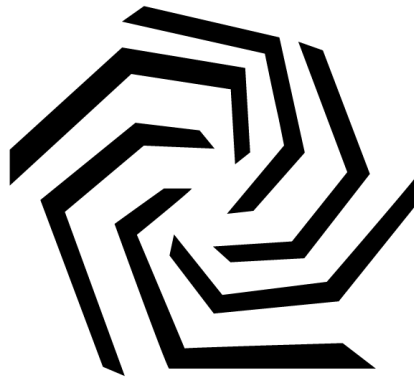


Fig. 12.15

Solution

Ans: Option (c) is the correct answer.

In a complete turn of 360° , the number of times the figure coincides with its original position is called its order of rotational symmetry. Here, the order of rotational symmetry is 6. Therefore, option (c) is the correct answer.

Question 6

The order of rotational symmetry in the Fig. 12.16 given below is

- (a) 4
- (b) 2
- (c) 1
- (d) Infinitely many

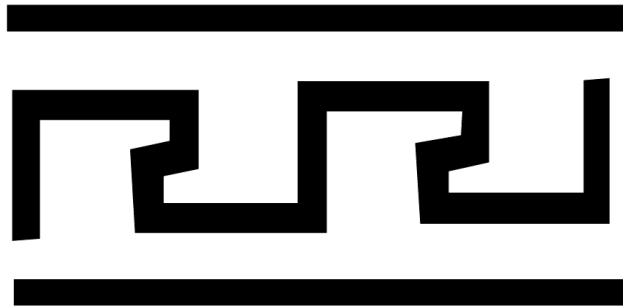


Fig. 12.16

Solution

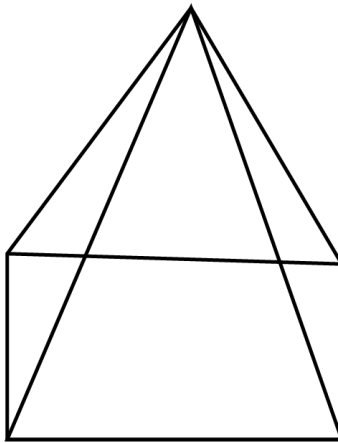
Ans: Option (b) is the correct answer.

In a complete turn of 360° , the number of times the figure coincides with its original position is called its order of rotational symmetry. Here, the order of rotational symmetry is 2. Therefore, option (b) is the correct answer.

Question 7

The name of the given solid in Fig 12.17 is:

- (a) triangular pyramid
- (b) rectangular pyramid
- (c) rectangular prism
- (d) triangular prism

**Fig. 12.17****Solution**

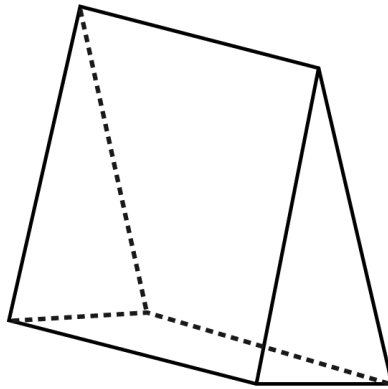
Ans: Option (b) is the correct answer.

A pyramid is a three dimensional polyhedron shaped structure with only one polygonal base and has triangular sides. A prism is a three dimensional polyhedron characterized by two bases which are polygonal in shape and rectangular sides perpendicular to the base. Here, the given figure contains rectangle base and triangle sides. Thus, the given figure is the combination of a rectangle and triangle called a rectangular pyramid. Therefore, option (b) is the correct answer.

Question 8

The name of the given solid in Fig 12.18 is:

- (a) triangular pyramid
- (b) rectangular prism
- (c) triangular prism
- (d) rectangular pyramid

**Fig. 12.18****Solution**

Ans: Option (c) is the correct answer.

A pyramid is a three dimensional polyhedron shaped structure with only one polygonal base and has triangular sides. A prism is a three dimensional polyhedron characterized by two bases which are polygonal in shape and rectangular sides perpendicular to the base. Here, the given figure contains parallelogram faces and triangle sides. Therefore, the given figure is the combination of parallelogram and triangle called triangular prism.

Question 9

All faces of a pyramid are always:

- (a) Triangular
- (b) Rectangular
- (c) Congruent
- (d) None of these

Solution

Ans: Option (d) is the correct answer.

The all faces of a pyramid are triangular except base as it depends on the type of pyramid. Therefore, option (d) is the correct answer.

Question 10

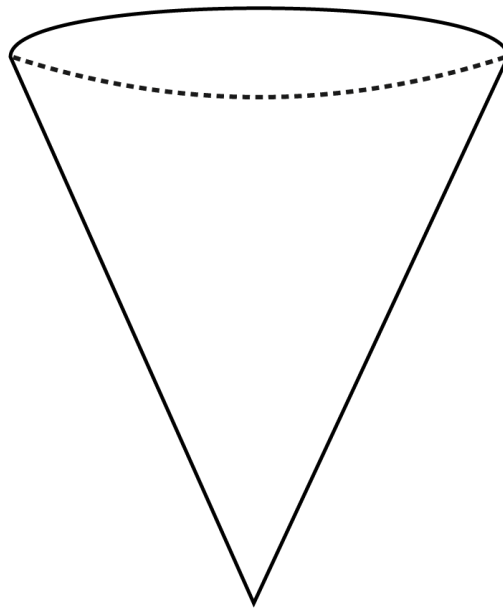
A solid that has only one vertex is

- (a) Pyramid
- (b) Cube
- (c) Cone
- (d) Cylinder

Solution

Ans: Option (c) is the correct answer.

Vertex is defined as the common endpoint of two or more rays or line segments. And it typically means a corner or a point where lines meet. A pyramid is a three dimensional polyhedron shaped structure with only one polygonal base and has triangular sides and it has five vertices. A cube is a regular hexahedron and it has eight vertices. A cylinder has no vertex, since its faces never meet. A solid that has only one vertex is called a cone.



Therefore, option (c) is the correct answer.

Question 11

Out of the following which is a 3-D figure?

- (a) Square
- (b) Sphere
- (c) Triangle
- (d) Circle

Solution

Ans: Option (b) is the correct answer.

The 3 - D figure is defined as the figure which has three dimensions, that is, length, width and height. Square, Triangle and Circle have only two dimensions. So, they are two dimensional figures. Therefore, option (b) is the correct answer.

Question 12

Total number of edges a cylinder has

- (a) 0
- (b) 1
- (c) 2
- (d) 3

Solution

Ans: Option (c) is the correct answer.

A cylinder has 2 edges, 3 faces and 0 vertices.

Question 13

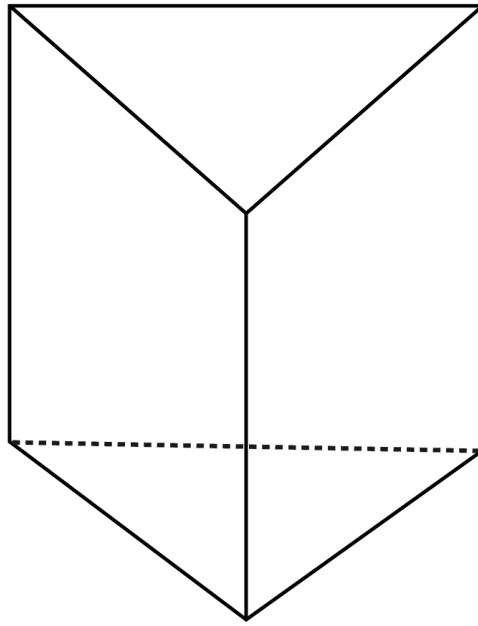
A solid that has two opposite identical faces and other faces as parallelograms is a

- (a) prism
- (b) pyramid
- (c) cone
- (d) sphere

Solution

Ans: Option (a) is the correct answer.

A solid that has two opposite identical faces and other faces as parallelograms is a Prism.



Therefore, option (a) is the correct answer.

Question 14

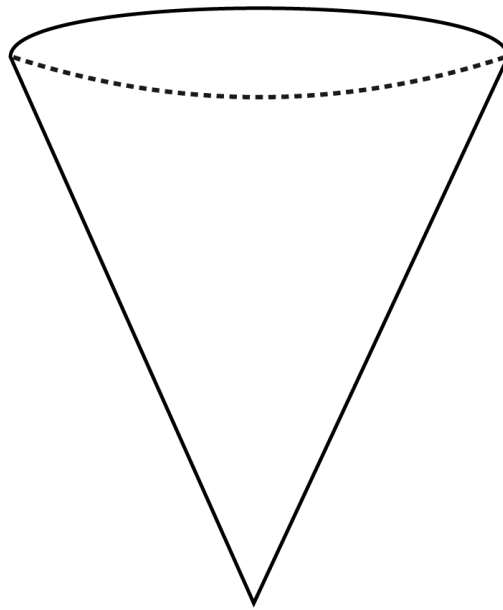
The solid with one circular face, one curved surface and one vertex is known as:

- (a) cone
- (b) sphere
- (c) cylinder
- (d) prism

Solution

Ans: Option (a) is the correct answer.

The solid with one circular face, one curved surface and one vertex is known as Cone.



Therefore, option (a) is the correct answer.

Question 15

If three cubes each of edge **4cm** are placed end to end, then the dimensions of resulting solid are:

- (a) **12cm × 4cm × 4cm**
- (b) **4cm × 8cm × 4cm**
- (c) **4cm × 8cm × 12cm**
- (d) **4cm × 6cm × 8cm**

Solution

Ans: Option (a) is the correct answer.

If three cubes each of edge **4cm** are placed end to end, then the dimensions of the resulting solid are **12cm × 4cm × 4cm**. Therefore, option (a) is the correct answer.

Question 16

When we cut a corner of a cube as shown in the figure 12.19, we get the cutout piece as:

- (a) square pyramid
- (b) trapezium prism
- (c) triangular pyramid
- (d) a triangle

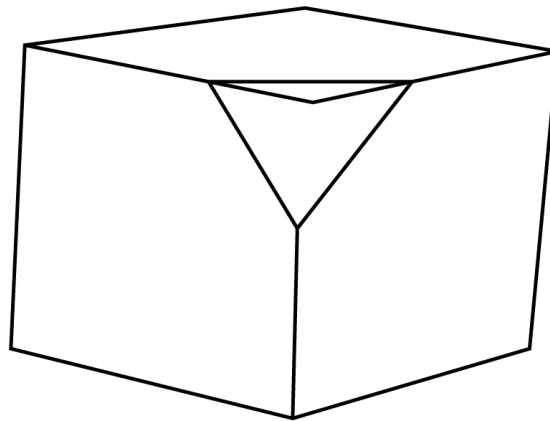


Fig. 12.19

Solution

Ans: Option (c) is the correct answer.

When we cut a corner of a cube as shown in the figure, we get the cutout piece as a triangular pyramid. Therefore, option (c) is the correct answer.

Question 17

If we rotate a right-angled triangle of height 5cm and base 3cm about its height a full turn, we get

- (a) cone of height 5cm, base 3cm

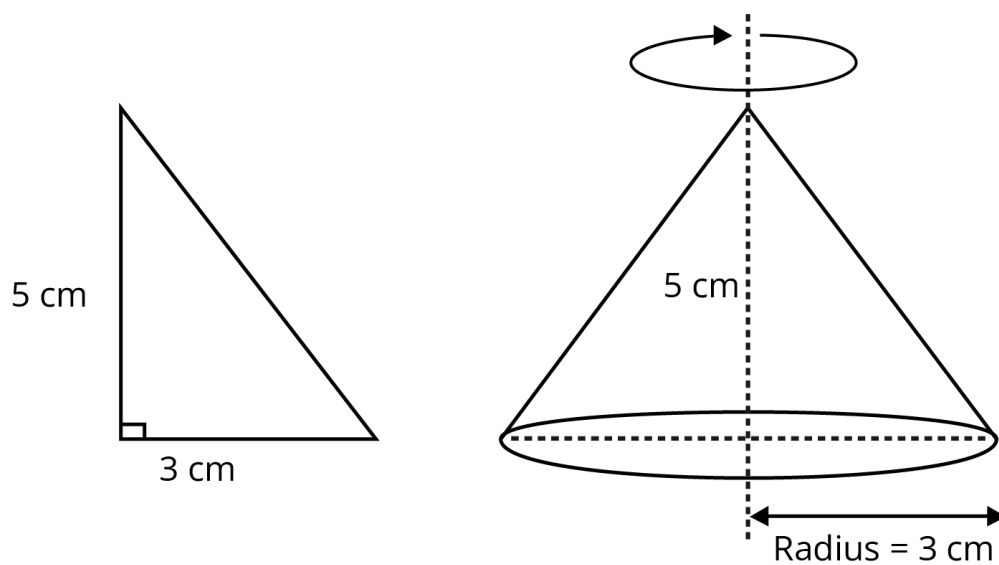
(b) triangle of height 5cm, base 3cm

(c) cone of height 5cm, base 6cm

(d) triangle of height 5cm, base 6cm

Solution

Ans: Option (a) is the correct answer.



So, if we rotate a right-angled triangle of height 5cm and base 3cm about its height a full turn, we get cone of height 5cm, base 3cm. Therefore, option (a) is the correct answer.

Question 18

If we rotate a right-angled triangle of height 5cm and base 3cm about its base, we get:

(a) cone of height 3cm and base 3cm

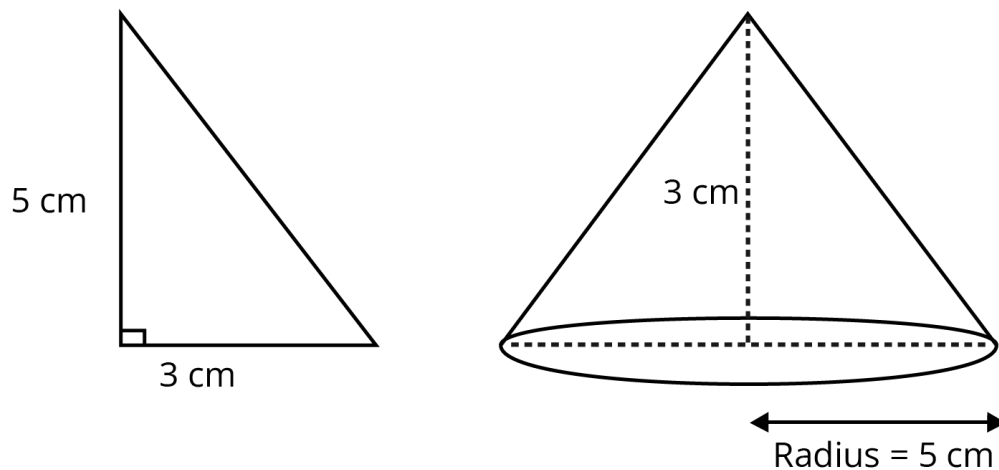
(b) cone of height 5cm and base 5cm

(c) cone of height 5cm and base 3cm

(d) cone of height 3cm and base 5cm

Solution

Ans: Option (d) is the correct answer.



So, if we rotate a right-angled triangle of height 5cm and base 3cm about its base, we get cone of height 3cm and base 5cm. Therefore, option (d) is the correct answer.

Question 19

When a torch is pointed towards one of the vertical edges of a cube, you get a shadow of cube in the shape of

- (a) square
- (b) rectangle but not a square
- (c) circle
- (d) triangle

Solution

Ans: Option (b) is the correct answer.

The cube can cast a shadow in the form of a rectangle. So, when a torch is pointed towards one of the vertical edges of a cube, you get a shadow of the cube in the shape of a rectangle. Therefore, option (b) is the correct answer.

Question 20

Which of the following sets of triangles could be the lengths of the sides of a right-angled triangle:

(a) 3cm, 4cm, 6cm

(b) 9cm, 16cm, 26cm

(c) 1.5cm, 3.6cm, 3.9cm

(d) 7cm, 24cm, 26cm

Solution

Ans: Option (c) is the correct answer.

From the Pythagoras theorem,

$$\text{Hypotenuse}^2 = \text{base}^2 + \text{height}^2$$

Consider 3.9cm is the length of the hypotenuse.

$$\text{Then, } (3.9)^2 = (1.5)^2 + (3.6)^2$$

$$15.21 = 2.25 + 12.96$$

Add the numbers,

$$15.21 = 15.21$$

For option (a),

From the Pythagoras theorem,

$$\text{Hypotenuse}^2 = \text{base}^2 + \text{height}^2$$

Consider 6cm is the length of the hypotenuse.

$$\text{Then, } (6)^2 = (4)^2 + (3)^2$$

$$36 = 16 + 9$$

$$36 \neq 25$$

For option (b),

From the Pythagoras theorem,

$$\text{Hypotenuse}^2 = \text{base}^2 + \text{height}^2$$

Consider 26cm is the length of the hypotenuse.

$$\text{Then, } (26)^2 = (16)^2 + (9)^2$$

$$676 = 256 + 81$$

$$676 \neq 337$$

For option (d),

From the Pythagoras theorem,

$$\text{Hypotenuse}^2 = \text{base}^2 + \text{height}^2$$

Consider 26cm is the length of the hypotenuse.

$$\text{Then, } (26)^2 = (24)^2 + (7)^2$$

$$676 = 576 + 49$$

$$676 \neq 625$$

Therefore, option (c) is the correct answer.

Question 21

In which of the following cases, a unique triangle can be drawn

(a) $AB = 4\text{cm}$, $BC = 8\text{cm}$ and $CA = 2\text{cm}$

(b) $BC = 5.2\text{cm}$ $\angle B = 90^\circ$ and $\angle C = 110^\circ$

(c) $XY = 5\text{cm}$ $\angle X = 45^\circ$ and $\angle Y = 60^\circ$

(d) An isosceles triangle with the length of each equal side 6.2cm.

Solution

Ans: Option (c) is the correct answer.

A triangle is possible if:

- (i) Sum of any two sides must be greater than the third side of the triangle.
- (ii) Sum of all angles must be equal to 180° .

So, options (a) and (b) triangles are not possible because of the above points (i) and (ii) respectively.

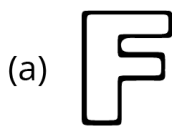
In option (d) we can draw more than one isosceles triangle with side length 6.2 cm. So, triangles are not unique.

Thus, a unique triangle can be drawn only in option (c).

Question 22

Which of the following has a line of symmetry?

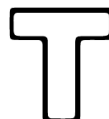
(a)



(b)



(c)



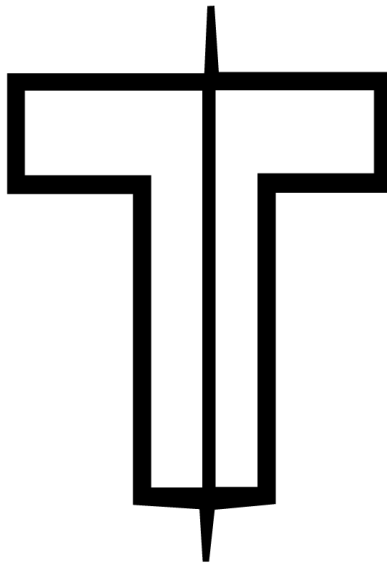
(d)



Solution

Ans: Figure (c) has a line of symmetry.

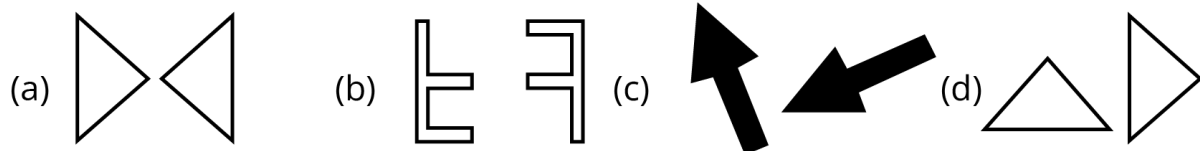
A figure has line symmetry, if there is a line about which the figure may be folded so that the two parts of the figure will coincide with each other.



Therefore, figure (c) has a line of symmetry.

Question 23

Which of the following are reflections of each other?



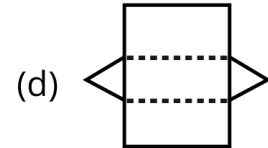
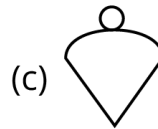
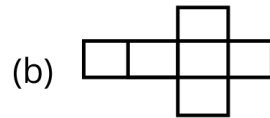
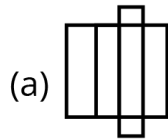
Solution

Ans: Figures in (a) are reflections of each other.

Mirror reflection leads to symmetry, under which the left-right orientation has to be taken care of. Therefore, option (a) is the correct answer.

Question 24

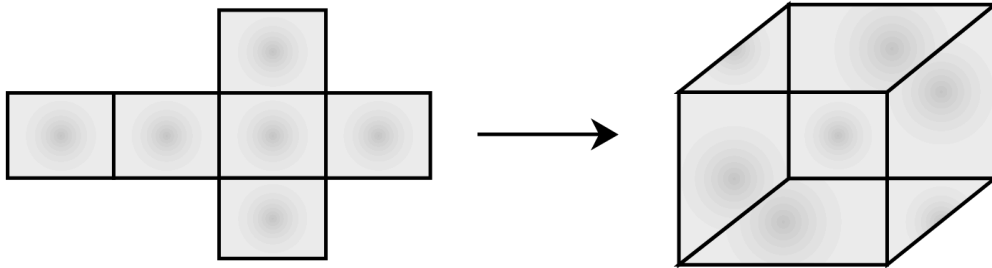
Which of these nets is a net of a cube?



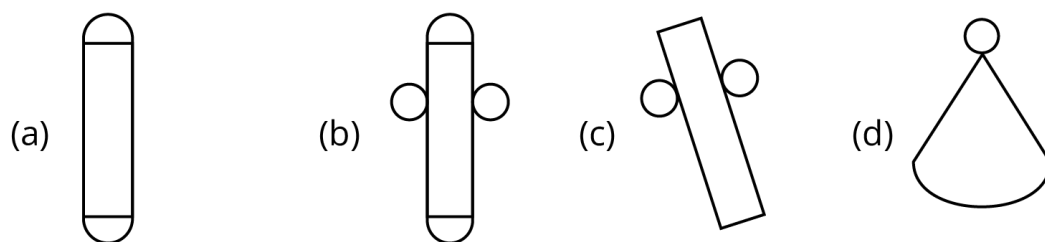
Solution

Ans: Option (b) is the correct answer.

Figure (b) is a net of cube.

**Question 25**

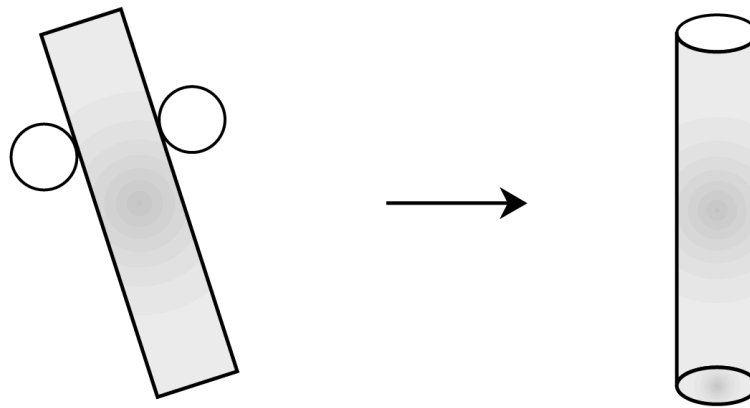
Which of the following nets is a net of a cylinder?



Solution

Ans: Option (b) is the correct answer.

Figure (c) is a net of a cylinder.

**Question 26**

Which of the following letters of English alphabets have more than 2 lines of symmetry?

- (a) Z
- (b) O
- (c) E
- (d) H

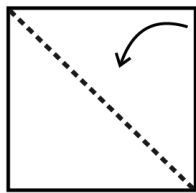
Solution

Ans: Option (b) is the correct answer.

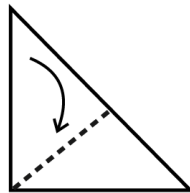
Figure (b) 'O' has more than 2 lines of symmetry.

Question 27

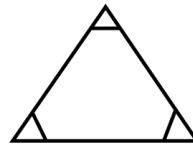
Take a square piece of paper as shown in figure (1). Fold it along its diagonals as shown in figure (2). Again fold it as shown in figure (3). Imagine that you have cut off 3 pieces in the form of congruent isosceles right-angled triangles out of it as shown in figure 4.



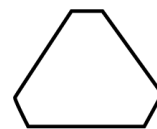
(1)



(2)

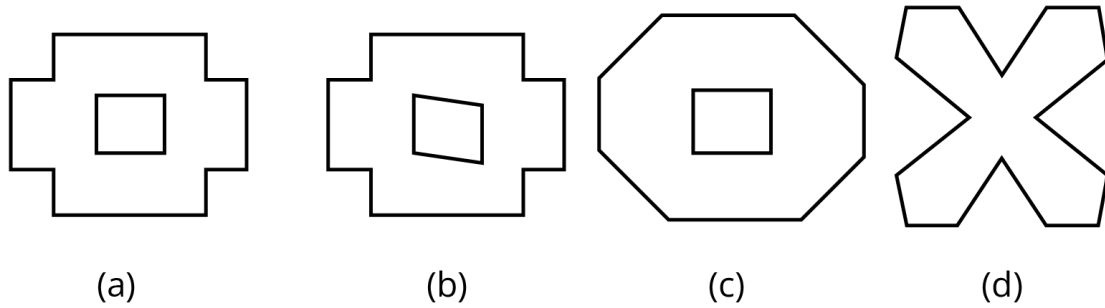


(3)



(4)

On opening the piece of paper which of the following shapes will you get?



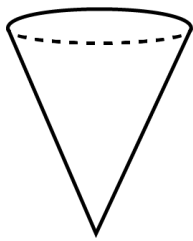
Solution

Ans: Option (a) is the correct answer.

On opening the piece of paper shapes, we get a shape like figure (a).

Question 28

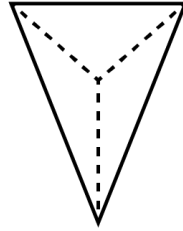
Which of the following 3-dimensional figures has the top, side and front as triangles?



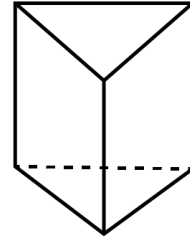
(a)



(b)



(c)



(d)

Solution

Ans: Figure (c) has a top, side and a front as triangles.

Therefore, option (c) is the correct answer.

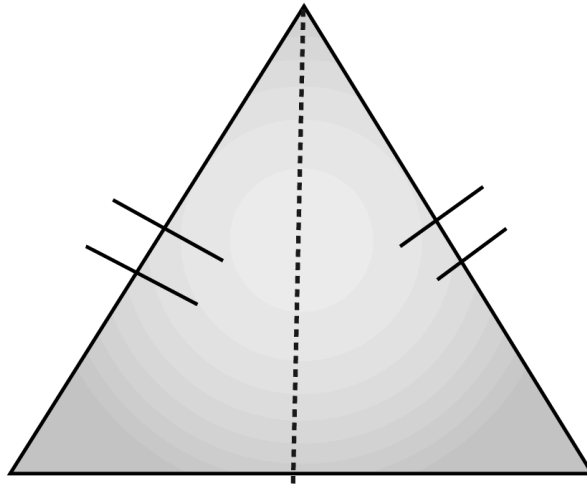
In Questions 29 to 58, fill in the blanks to make the statements true.

Question 29

In an isosceles right triangle, the number of lines of symmetry is _____.

Solution

Ans: The isosceles right triangle is given by,



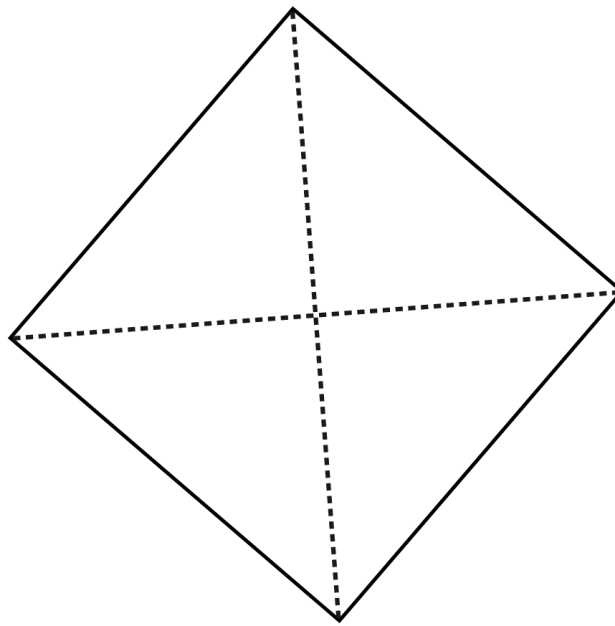
From the figure, it is clear that it has one line of symmetry. Therefore, In an isosceles right triangle, the number of lines of symmetry is one.

Question 30

Rhombus is a figure that has _____ lines of symmetry and has a rotational symmetry of order _____.

Solution

Ans: Rhombus is a figure that has two lines of symmetry and has a rotational symmetry of order two.



Question 31

_____ triangle is a figure that has a line of symmetry but lacks rotational symmetry.

Solution

Ans: The triangle which has only one line of symmetry and no rotational symmetry is the isosceles triangle. Therefore, the Isosceles triangle is a figure that has a line of symmetry but lacks rotational symmetry.

Question 32

_____ is a figure that has neither a line of symmetry nor a rotational symmetry.

Solution

Ans: The angles of a scalene triangle have different measures. Therefore, the Scalene triangle is a figure that has neither a line of symmetry nor a rotational symmetry.

Question 33

_____ and _____ are the capital letters of English alphabets that have one line of symmetry but they interchange to each other when rotated through 180° .

Solution

Ans: M and W are the capital letters of English alphabets that have one line of symmetry but they interchange to each other when rotated through 180° .

Question 34

The common portion of two adjacent faces of a cuboid is called _____.

Solution

Ans: Any two adjacent faces of a cuboid meet in a line segment, which is called an edge of the cuboid. Therefore, the common portion of two adjacent faces of a cuboid is called edge.

Question 35

A plane surface of a solid enclosed by edges is called _____.

Solution

Ans: A face is any of the individual flat surfaces of a solid object. Therefore, a plane surface of a solid enclosed by edges is called face.

Question 36

The corners of solid shapes are called its _____.

Solution

Ans: Solid shapes have attributes like face, vertices, edges that describe them. Therefore, the corners of solid shapes are called its vertices.

Question 37

A solid with no vertex is _____.

Solution

Ans: Sphere is the only solid figure with zero vertex, zero edge and one curved surface.

Therefore, a solid with no vertex is a sphere.

Question 38

A triangular prism has _____ faces, _____ edges and _____ vertices.

Solution

Ans: A triangular prism is polyhedron and a three-dimensional shape.

A triangular prism has 5 faces, 9 edges and 6 vertices.

Question 39

A triangular pyramid has _____ faces, _____ edges and _____ vertices.

Solution

Ans: A triangular pyramid is a pyramid having a triangular base. A triangular pyramid has 4 faces, 6 edges and 4 vertices.

Question 40

A square pyramid has _____ faces, _____ edges and _____ vertices.

Solution

Ans: A square pyramid is a pyramid having a square base. A square pyramid has 5 faces, 8 edges and 5 vertices.

Question 41

Out of _____ faces of a triangular prism, _____ are rectangles and _____ are triangles.

Solution

Ans: A triangular prism has five faces. Out of 5 faces of a triangular prism, 3 are rectangles and 2 are triangles.

Question 42

The base of a triangular pyramid is a _____.

Solution

Ans: A triangular pyramid is a geometric shape that has a triangular base and three triangular faces, having a common vertex. The base of a triangular pyramid is a triangle.

Question 43

Out of _____ faces of a square pyramid, _____ are triangles and _____ is/are squares.

Solution

Ans: A square pyramid is a pyramid having a square base. It has 5 faces, 8 edges and 5 vertices. Out of 5 faces of a square pyramid, 4 are triangles and 1 is square.

Question 44

Out of _____ faces of a rectangular pyramid _____ are triangles and base is _____.

Solution

Ans: It is known that if the base of a pyramid is rectangular, then it is called a rectangular pyramid. Out of 5 faces of a rectangular pyramid, 4 are triangles and base is rectangle.

Question 45

Each of the letters **H**, **N**, **S** and **Z** has a rotational symmetry of order _____.

Solution

Ans: A shape has Rotational Symmetry when it still looks the same after some rotation. Each of the letters **H**, **N**, **S** and **Z** has a rotational symmetry of order two.

Question 46

Order of rotational symmetry of a rectangle is _____.

Solution

Ans: In a complete turn (of 360°), the number of times the figure coincides with its original position is called its order of rotational symmetry. Order of rotational symmetry of a rectangle is two.

Question 47

Order of rotational symmetry of a circle is _____.

Solution

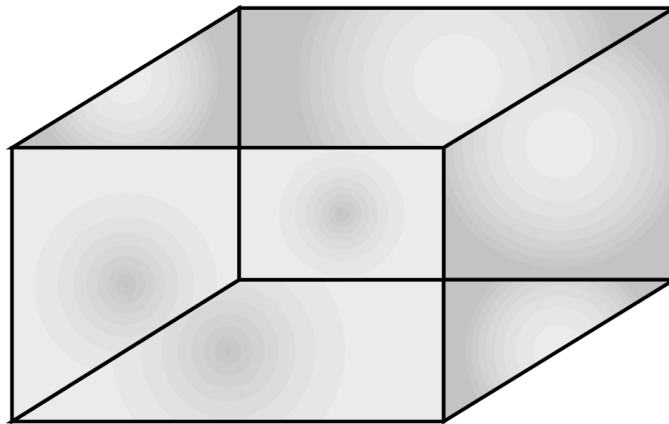
Ans: In a complete turn (of 360°), the number of times the figure coincides with its original position is called its order of rotational symmetry. Order of rotational symmetry of a circle is infinite.

Question 48

Each face of a cuboid is a _____.

Solution

Ans:



From the picture of cuboid, it is clear that,

Each face of a cuboid is a rectangle.

Question 49

Line of symmetry for an angle is its _____.

Solution

Ans: Line of symmetry is an imaginary line that divides the figure in two equal halves. Therefore, the line of symmetry for an angle is its bisector.

Question 50

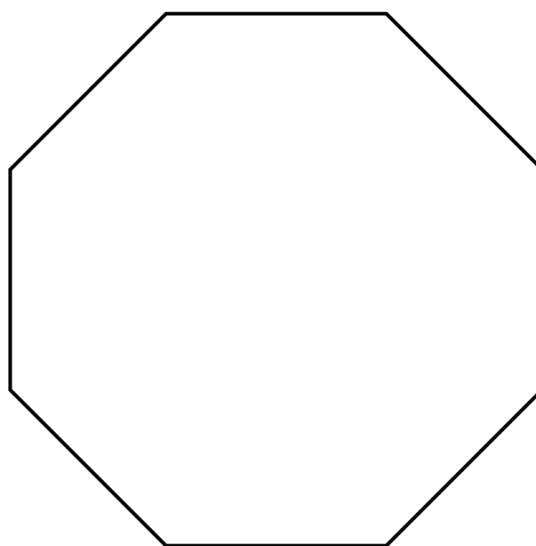
A parallelogram has _____ line of symmetry.

Solution

Ans: There is no line of symmetry of a parallelogram along its length, breadth. There is no superimposition of one half on the other when folded along its half. The diagonals are not symmetrical. Therefore, a parallelogram has no line of symmetry.

Question 51

Order of rotational symmetry of the following figure is_____.



Solution

Ans: Octagon possesses eight orders of rotational symmetry.

Order of rotational symmetry is 8.

Question 52

A _____ triangle has no lines of symmetry.

Solution

Ans: In scalene triangle all sides and angles are unequal and so there is no line of symmetry.

A Scalene triangle has no lines of symmetry.

Question 53

Cuboid is a rectangular _____ .

Solution

Ans: Rectangular prism and cuboid refers to the same solid body.

Cuboid is a rectangular prism.

Question 54

A sphere has _____ vertex, _____ edge and _____ curved surface.

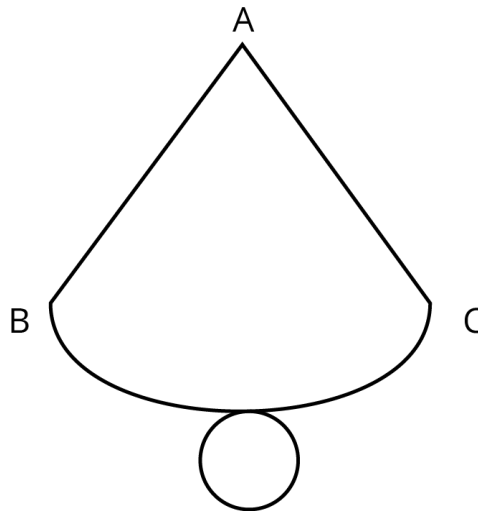
Solution

Ans: Sphere is a solid body with zero vertex, zero edge and one curved surface.

A sphere has 0 vertex, 0 edge and 1 curved surface.

Question 55

The following figure is a net of a _____.



→ Circumference of circle = _____.

Solution

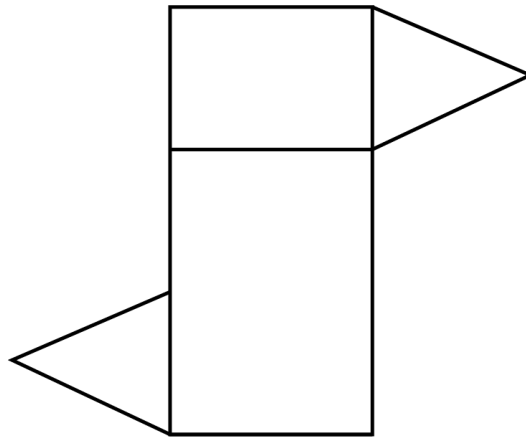
Ans: On observing the given figure, it represents a cone.

Therefore It is the net of a cone.

→ Circumference of circle = $2\pi r$.

Question 56

The following is a net of a _____.

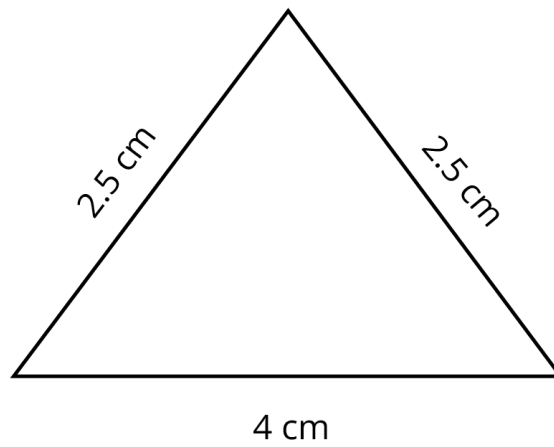
**Solution**

Ans: On observing the given figure, it represents a triangular prism.

Therefore it is a net of a triangular prism.

Question 57

Order of rotational symmetry of the following figure is _____.

**Solution**

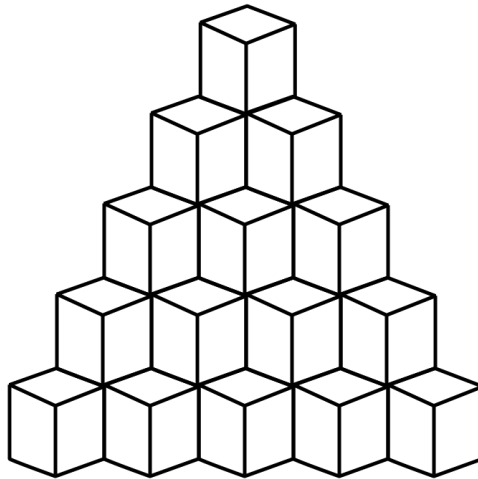
Ans: Given figure represents an isosceles triangle.

Isosceles triangle possesses one order of rotational symmetry.

Order of rotational symmetry is one.

Question 58

Identical cubes are stacked in the corner of a room as shown below. The number of cubes that are not visible are _____.

**Fig. 12.20****Solution**

Ans: There are 20 such cubes which are not visible.

Identical cubes are stacked in the corner of a room as shown below. The number of cubes that are not visible are 20.

In Questions from 59 to 92, state whether the statements are True or False.

Question 59

We can draw exactly one triangle whose angles are 70° , 30° and 80° .

Solution

Ans: This is not true exactly as there can be infinite number of triangles with angles 70° , 30° and 80° with various different combinations of sides.

Therefore, the given statement is False.

Question 60

The distance between the two parallel lines is the same everywhere.

Solution

Ans: The distance between the two parallel lines is always the same everywhere.

Therefore, the given statement is True.

Question 61

A circle has two lines of symmetry.

Solution

Ans: Circle can have an infinite number of symmetries, not two.

Therefore, the given statement is False.

Question 62

An angle has two lines of symmetry.

Solution

Ans: Bisector is only the line of symmetry of an angle.

Therefore, the given statement is False.

Question 63

A regular hexagon has six lines of symmetry.

Solution

Ans: The number of lines of symmetry in a polygon is equal to its number of sides.

Therefore, the given statement is True.

Question 64

An isosceles trapezium has one line of symmetry.

Solution

Ans: An isosceles trapezium has only one line of symmetry which is along the line joining the mid-points of the two opposite sides.

Therefore, the given statement is True.

Question 65

A parallelogram has two lines of symmetry.

Solution

Ans: Parallelogram possesses zero line of symmetry.

Therefore, the given statement is False.

Question 66

Order of rotational symmetry of a rhombus is four.

Solution

Ans: The order of rotational symmetry of a rhombus is only two not four.

Therefore, the given statement is False.

Question 67

An equilateral triangle has six lines of symmetry.

Solution

Ans: An equilateral triangle has three lines of symmetry along the median of the triangle.

Therefore, the given statement is False.

Question 68

Order of rotational symmetry of a semi circle is two.

Solution

Ans: The order of rotational symmetry of a semicircle is only one.

Therefore, the given statement is False.

Question 69

In an oblique sketch of the solid, the measurements are kept proportional.

Solution

Ans: The measurements are not kept proportional in the oblique sketch of the solid.

Therefore, the given statement is False.

Question 70

An isometric sketch does not have proportional length.

Solution

Ans: An isometric sketch always possesses a proportional length.

Therefore, the given statement is False.

Question 71

A cylinder has no vertex.

Solution

Ans: No vertex is present in the cylinder.

Therefore, the given statement is True.

Question 72

All the faces, except the base of a square pyramid are triangular.

Solution

Ans: The base of a square pyramid is square and the rest of the faces are triangular.

A square pyramid has 4 triangular faces and one square base.

Therefore, the given statement is True.

Question 73

A pyramid has only one vertex.

Solution

Ans: There are at least four vertices in a pyramid.

Therefore, the given statement is False.

Question 74

A triangular prism has 5 faces, 9 edges and 6 vertices.

Solution

Ans: A triangular prism is a prism that has two triangular bases and three rectangular sides. It has 6 vertices, 9 edges, and 5 faces.

Therefore, the given statement is True.

Question 75

If the base of a pyramid is a square, it is called a square pyramid.

Solution

Ans: The name of a pyramid is based on the base of the pyramid.

Thus, if the base of a pyramid is a square, then it is called a square pyramid.

Therefore, the given statement is True.

Question 76

A rectangular pyramid has 5 rectangular faces.

Solution

Ans: A rectangular pyramid has in total 5 faces, out of which 1 is rectangular.

Therefore, the given statement is False.

Question 77

Rectangular prisms and cuboids refer to the same solid.

Solution

Ans: A rectangular prism is also known as a cuboid.

So, a rectangular prism and cuboid represents the same solid.

Therefore, the given statement is True.

Question 78

A tetrahedron has 3 triangular faces and 1 rectangular faces.

Solution

Ans: A tetrahedron has 4 triangular faces.

Therefore, the given statement is False.

Question 79

While a rectangle is a 2 — D figure, a cuboid is a 3 — D figure.

Solution

Ans: 2 - D shapes including rectangles, squares, circles and triangles. 3 - D shapes including cubes, cuboids, spheres etc.

Therefore, the given statement is True.

Question 80

While the sphere is a 2 — D figure, the circle is a 3 — D figure.

Solution

Ans: 2 - D shapes including rectangles, squares, circles and triangles. 3 - D shapes including cubes, cuboids, spheres etc.

Therefore, the given statement is False.

Question 81

Two dimensional figures are also called plane figures.

Solution

Ans: Two-dimensional figure is a figure that lies completely in one plane.

So, two dimensional figures are also known as plane figures.

Therefore, the given statement is True.

Question 82

A cone is a polyhedron.

Solution

Ans: Polyhedrons are 3 - D figures with rectangular bases.

So, a cone is not a polyhedron.

Therefore, the given statement is False.

Question 83

A prism has four bases.

Solution

Ans: A prism has only one base.

Therefore, the given statement is False.

Question 84

The number of lines of symmetry of a regular polygon is equal to the vertices of the polygon.

Solution

Ans: It is true that the number of lines of symmetry of a regular polygon is equal to the vertices of the polygon.

Therefore, the given statement is True.

Question 85

The order of rotational symmetry of a figure is 4 and the angle of rotation is 180° only.

Solution

Ans: If the order of rotational symmetry of a figure is 4 then the angle of rotation must be 90° only.

Therefore, the given statement is False.

Question 86

After rotating a figure by 120° about its center, the figure coincides with its original position. This will happen again if the figure is rotated at an angle of 240° .

Solution

Ans: It is true that after rotating a figure by 120° about its center, the figure coincides with its original position. This will happen again if the figure is rotated at an angle of 240° .

Therefore, the given statement is True.

Question 87

Mirror reflection leads to symmetry always.

Solution

Ans: Mirror reflection does not always lead to symmetry.

Therefore, the given statement is False.

Question 88

Rotation turns an object about a fixed point which is known as the center of rotation.

Solution

Ans: The fixed point is the center of rotation. And the angle by which the object rotates is the angle of rotation.

Therefore, the given statement is True.

Question 89

Isometric sheet divides the paper into small isosceles triangles made up of dots or lines.

Solution

Ans: Isometric sheet divides the paper into small equilateral triangles made up of dots or lines.

Therefore, the given statement is False.

Question 90

The circle, the square, the rectangle and the triangle are examples of plane figures.

Solution

Ans: A plane figure is a flat figure with closed lines that stays in a single plane. The lines of the figure can be straight, curved or a combination. Some examples of plane figures are triangles, rectangles, squares, rhombuses, parallelograms, circles, ovals, hearts, pentagons and hexagons.

Therefore, the given statement is True.

Question 91

The solid shapes are two-dimensional.

Solution

Ans: The solid shapes are three-dimensional.

Examples of solid shapes are cone, cube etc.

Therefore, the given statement is False.

Question 92

Triangle with length of sides as 5cm, 6cm and 11cm can be constructed.

Solution

Ans: Condition for constructing a triangle is that Sum of any two sides of a triangle should be greater than the third side.

But here, $6\text{cm} + 5\text{cm} = 11\text{cm}$ and the condition is not satisfied.

Therefore, the given statement is False.

Question 93

Draw the top, side and front views of the solids given below in Figures 12.21 and 12.22:

(i)

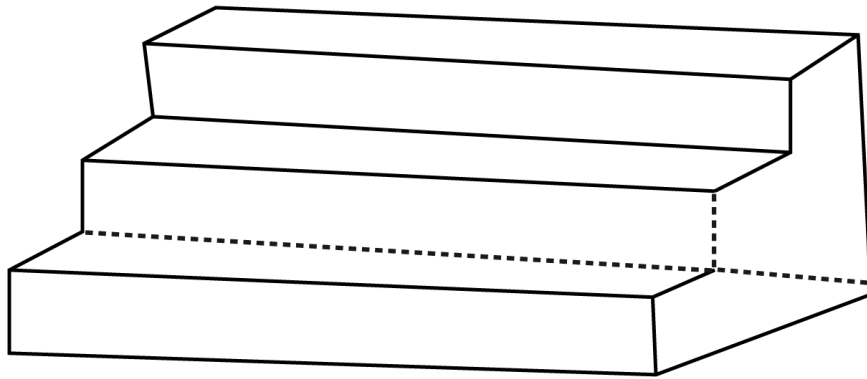


Fig. 12.21

(ii)

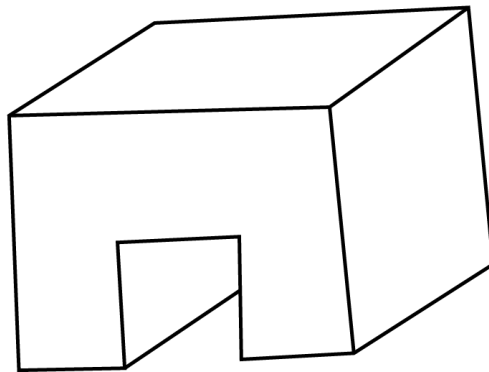


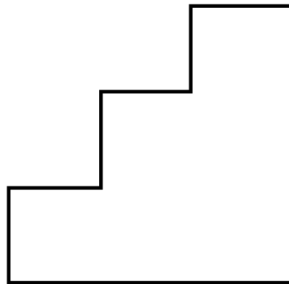
Fig. 12.22

Solution

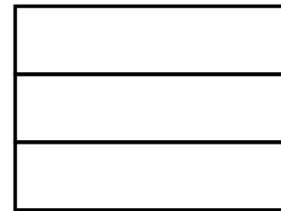
Ans: For the given figure,



Top view



Side view

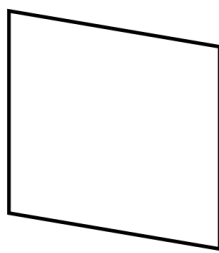


Front view

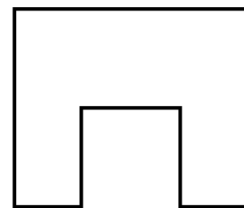
Ans:



Top view



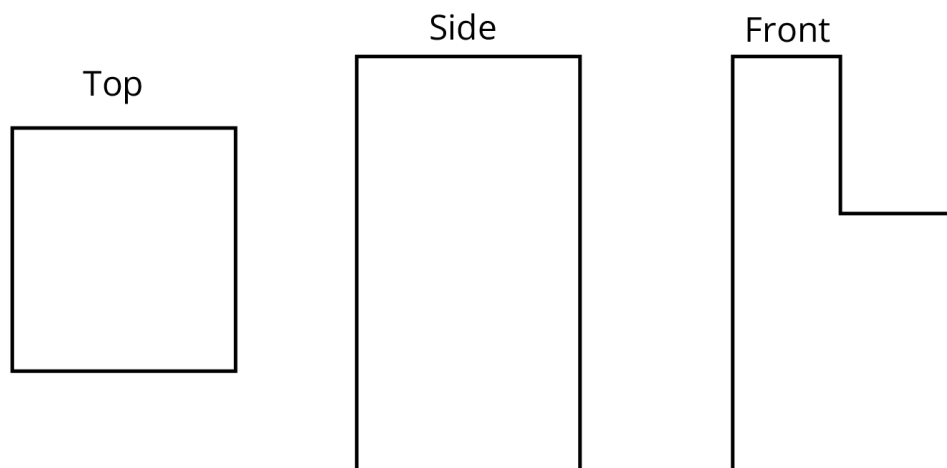
Side view



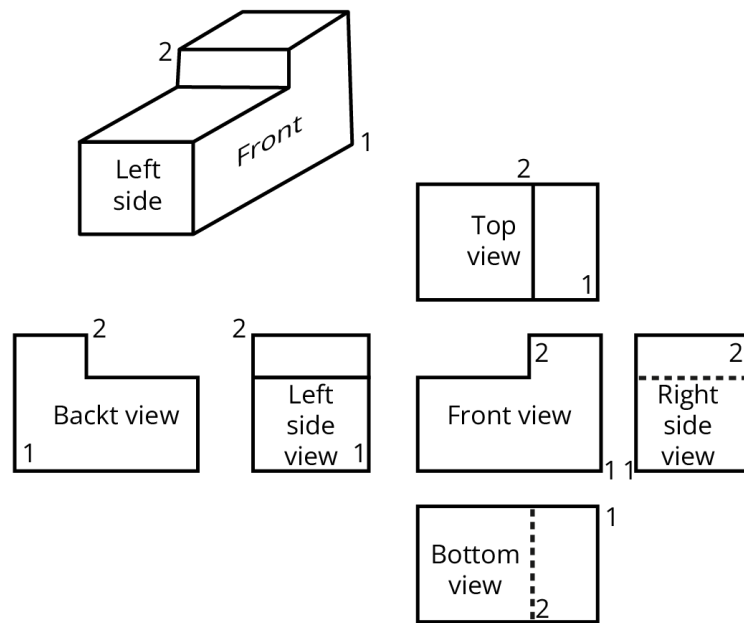
Front view

Question 94

Draw a solid using the top, side and front views as shown below. {Use Isometric dot paper}.

**Solution**

Ans:



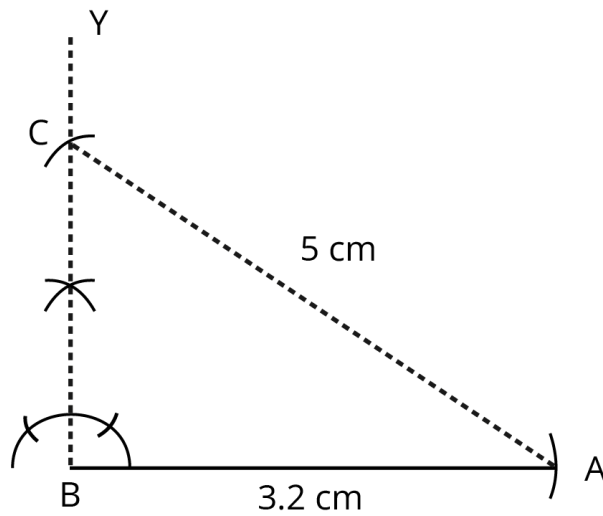
Question 95

Construct a right-angled triangle whose hypotenuse measures 5cm and one of the other sides measures 3.2cm.

Solution

Ans: Steps of construction:

- (1) Draw a line $AB = 3.2$ cm.
- (2) Construct a right angle 90° at point B, that is $\angle ABY = 90^\circ$.
- (3) From point A, cut an arc 5 cm on BY at C
- (4) Join AC.



Therefore $\triangle ABC$ is the required triangle, having hypotenuse $AC = 5\text{ cm}$ and $AB = 3.2\text{ cm}$.

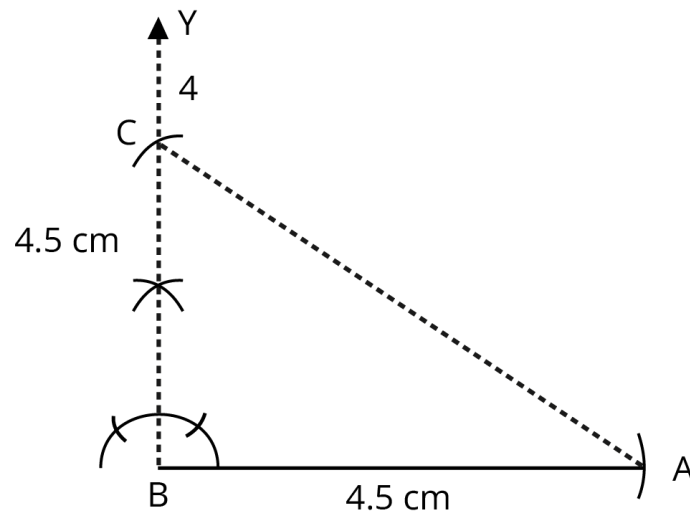
Question 96

Construct a right-angled isosceles triangle with one side (other than hypotenuse) of length 4.5 cm .

Solution

Ans: Steps of construction:

- (1) Draw a line $AB = 4.5\text{ cm}$.
- (2) Construct a right angle (90°) at point B , that is $\angle ABY = 90^\circ$.
- (3) From point B , cut an arc 4.5 cm on BY at C .
- (4) Join AC .



Therefore, $\triangle ABC$ is the required triangle with one side of length 4.5 cm.

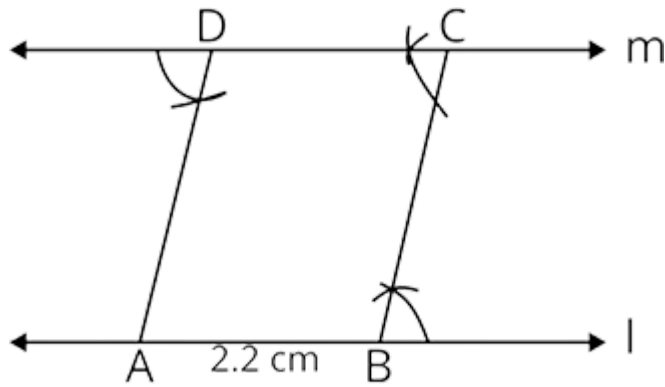
Question 97

Draw two parallel lines at a distance of 2.2cm apart.

Solution

Ans: Steps of construction:

- (1) Draw a line l and mark a point C outside it.
- (2) Take a point B on line l and join BC .
- (3) Draw a line parallel to the line l passing through C .
- (4) Mark a point D on line m , at a distance of 2.2cm from C .
- (5) Mark angle arc at point D which should be equal to angle arc at point C .
- (5) Through D draw a line at the angle arc which will be parallel to the BC line.

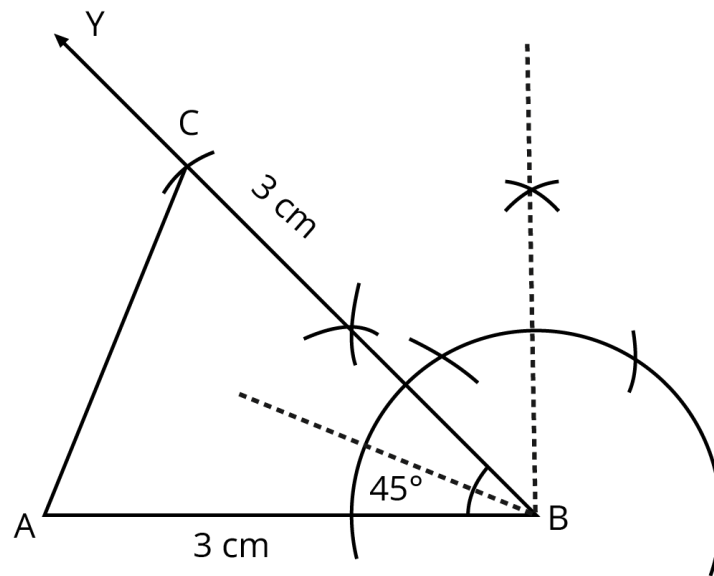
**Question 98**

Draw an isosceles triangle with each of equal sides of length 3cm and the angle between them as 45° .

Solution

Ans: Steps of construction:

- (1) Draw a line segment AB of length 3cm.
- (2) Draw an angle of 45° on point B and produce it to ray Y.
- (3) With B as center, draw an arc of 3cm which intersects ray BY at C.
- (4) Join AC.



Thus, $\triangle ABC$ is the required isosceles triangle.

Question 99

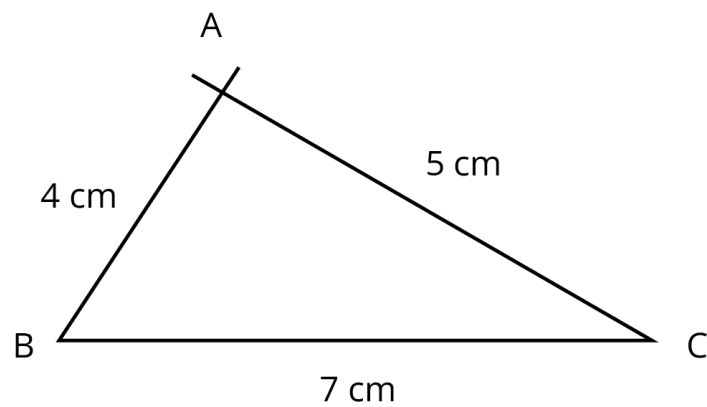
Draw a triangle whose sides are of lengths 4 cm, 5 cm and 7 cm.

Solution

Ans: Let us assume that given sides are $BC = 7$ cm, $AB = 4$ cm and $AC = 5$ cm.

Steps of construction:

- (1) Draw a line $BC = 7$ cm.
- (2) With center B and radius 4 cm draw an arc.
- (3) With center C and radius 5 cm, draw an arc which cuts the previous arc at A .
- (4) Join AB and AC .



Hence, $\triangle ABC$ is the required triangle in which $BC = 7$ cm, $AB = 4$ cm and $AC = 5$ cm.

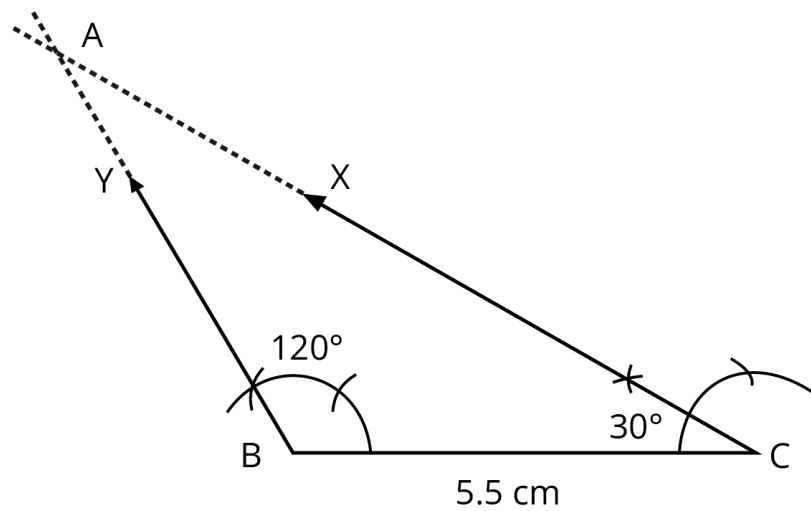
Question 100

Construct an obtuse angled triangle which has a base of 5.5cm and base angles of 30° and 120° .

Solution

Ans: Steps of construction:

- (1) Draw a line segment BC of length 5.5 cm.
- (2) Draw an angle of 120° on point B and produce it to ray Y .
- (3) Draw an angle of 30° on point C and produce it to ray X .
- (4) Extend BY and CX to intersect at point A .



Hence, $\triangle ABC$ is the required triangle.

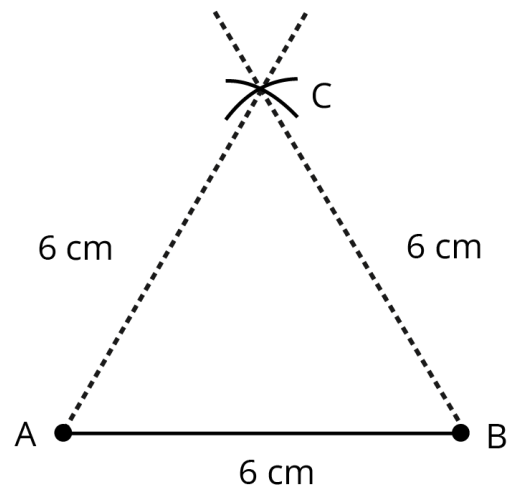
Question 101

Construct an equilateral triangle ABC of side 6 cm.

Solution

Ans: Steps of construction:

- (1) Draw a line segment $AB = 6$ cm
- (2) Draw an arc of radius 6 cm from point A.
- (3) Now, draw another arc of radius 6 cm from point B to cut previous arc at C.
- (4) Join A to C and B to C.



Hence, $\triangle ABC$ is the required triangle of side 6 cm.

Question 102

By what minimum angle does a regular hexagon rotate so as to coincide with its original position for the first time?

Solution

Ans:

A regular hexagon must be rotated through a minimum angle of 60° . So, that it can coincide with its original position for the first time. Because the angle of rotation of hexagon is,

$$\frac{360^\circ}{\text{Number of sides}} = \frac{360^\circ}{6} = 60^\circ$$

Question 103

In each of the following figures, write the number of lines of symmetry and order of rotational symmetry.

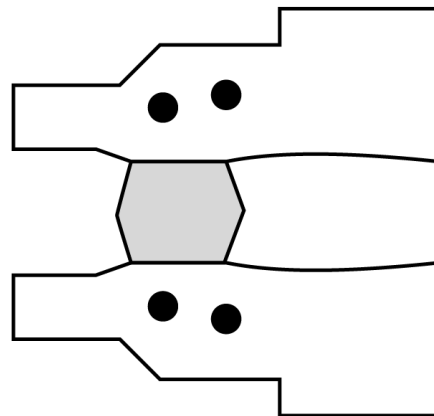
{Hint: Consider these as 2-D figures not as 3-D objects.}

(a)



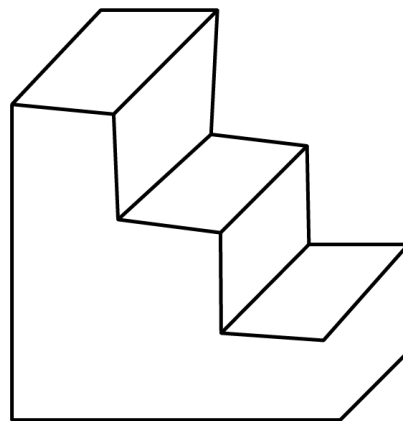
(a)

(b)



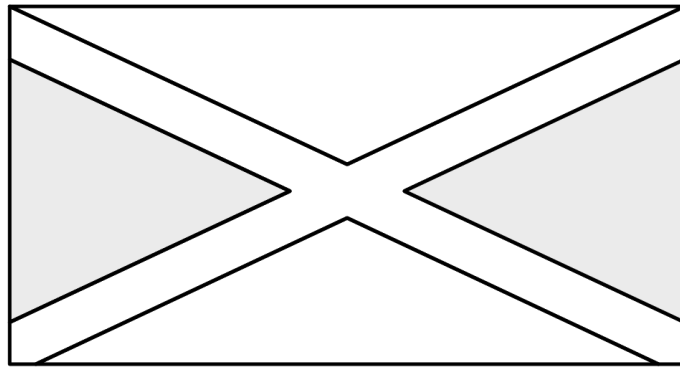
(b)

(c)



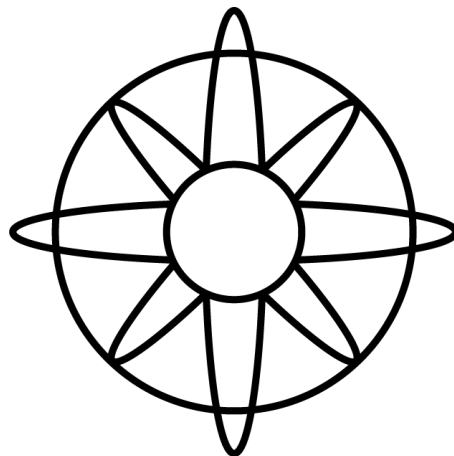
(c)

(d)



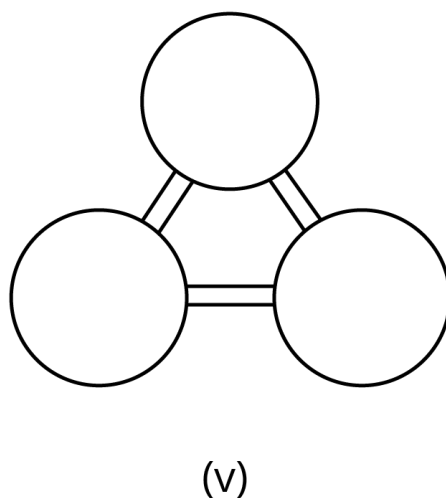
(d)

(i)



(i)

(v)

**Solution**

Ans: The number of lines of symmetry is 1.

The order of rotational symmetry is 1.

Ans: The number of lines of symmetry is 1.

The order of rotational symmetry is 1.

Ans: The number of lines of symmetry is 1.

The order of rotational symmetry is 1.

Ans: The number of lines of symmetry is 2.

The order of rotational symmetry is 2.

(e)

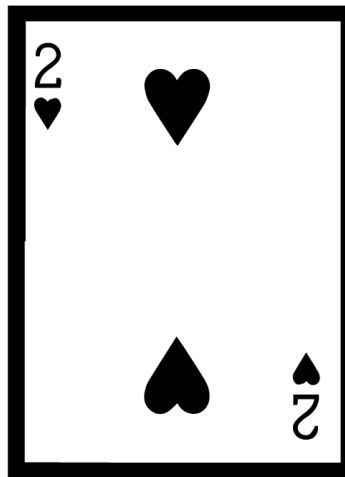


(e)

Ans: The number of lines of symmetry is 1.

The order of rotational symmetry is 1.

(f)

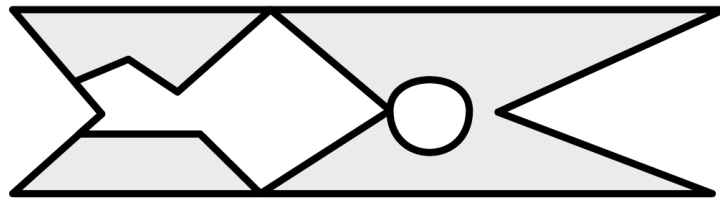


(f)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

(g)

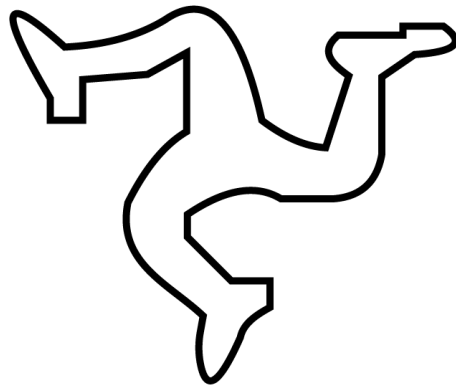


(g)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

(h)



(h)

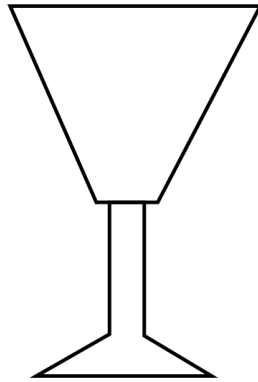
Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 3.

Ans: The number of lines of symmetry is 4.

The order of rotational symmetry is 4.

(j)

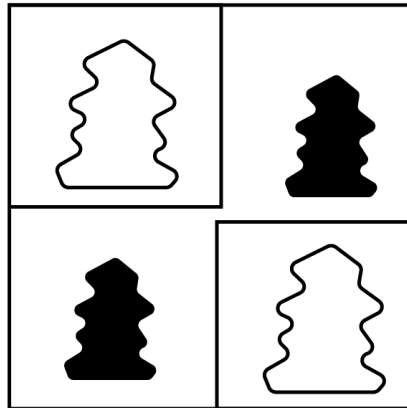


(j)

Ans: The number of lines of symmetry is 1.

The order of rotational symmetry is 1.

(k)

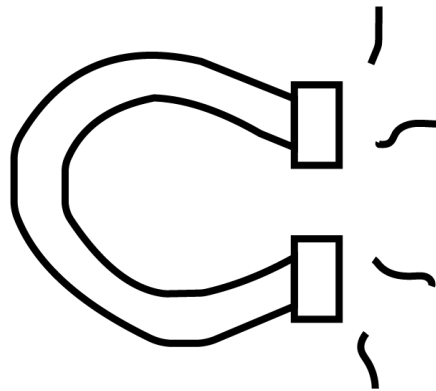


(k)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

(l)

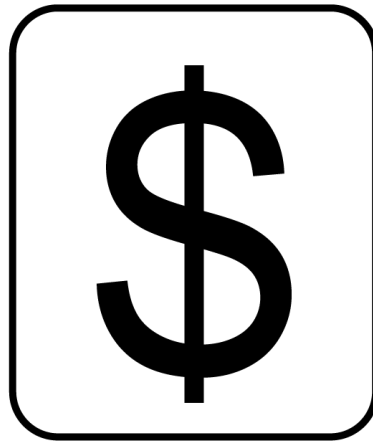


(l)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

(m)

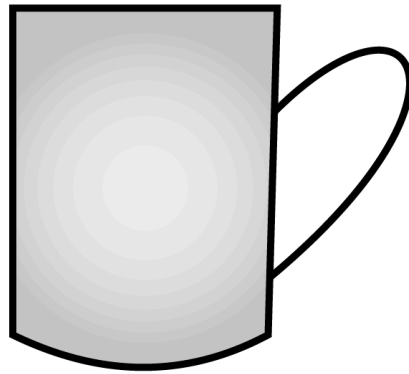


(m)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 2.

(n)

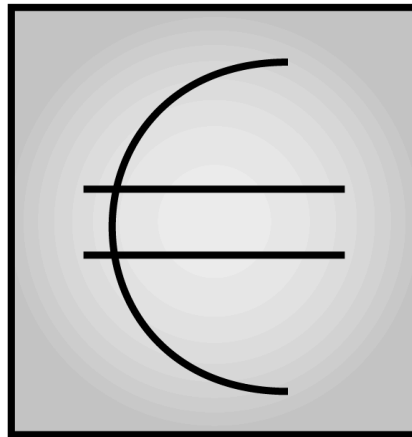


(n)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

(o)

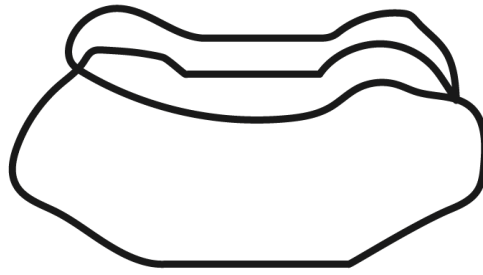


(o)

Ans: The number of lines of symmetry is 1.

The order of rotational symmetry is 1.

(p)

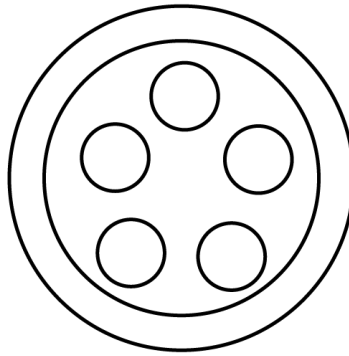


(p)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

(q)

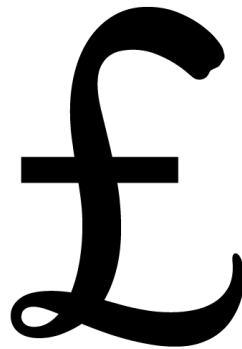


(q)

Ans: The number of lines of symmetry is 5.

The order of rotational symmetry is 5.

(r)

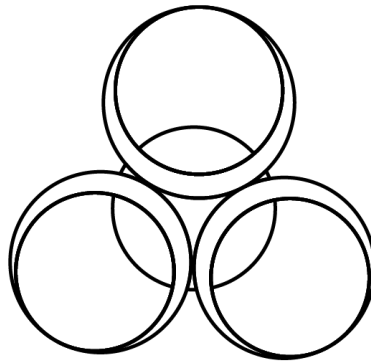


(r)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

(s)



(s)

Ans: The number of lines of symmetry is 3.

The order of rotational symmetry is 3.

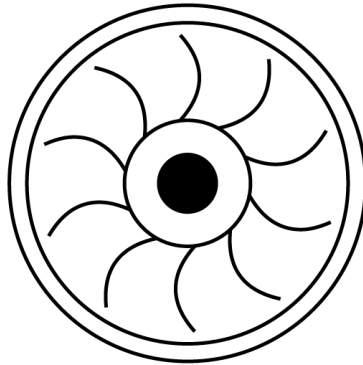


(t)

Ans: The number of lines of symmetry is 1.

The order of rotational symmetry is 1.

(u)



(u)

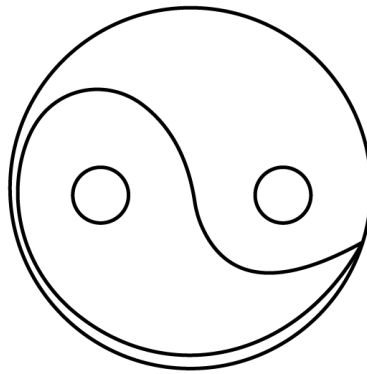
Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 10.

Ans: The number of lines of symmetry is 3.

The order of rotational symmetry is 3.

(w)



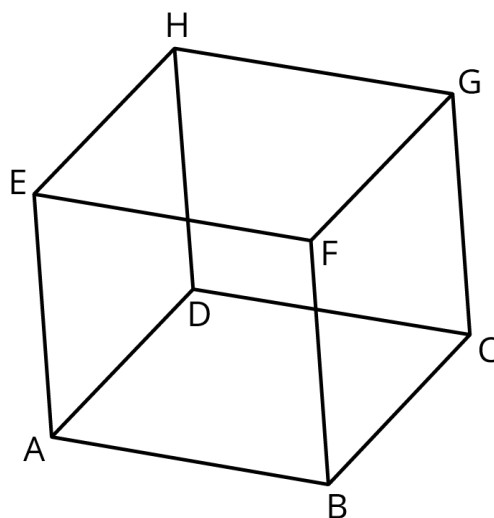
(w)

Ans: The number of lines of symmetry is 0.

The order of rotational symmetry is 1.

Question 104

In the figure 12.24 of a cube,

**Fig. 12.24**

- (i) Which edge is the intersection of faces $EFGH$ and $EFBA$?
- (ii) Which faces intersect at the edge FB ?
- (iii) Which three faces form the vertex A ?
- (iv) Which vertex is formed by the faces $ABCD$, $ADHE$ and $CDHG$?
- (v) Give all the edges that are parallel to edge AB .
- vi) Give the edges that are neither parallel nor perpendicular to edge BC .
- (vii) Give all the edges that are perpendicular to the edge AB .
- (viii) Give four vertices that do not all lie in one plane.

Solution

Ans: From the given figure, we can observe that EF is the intersection of faces $EFGH$ and $EFBA$.

Ans: From the given figure, we can observe that faces $EFBA$ and $FBCG$ intersect at edge FB .

Ans: Faces $ABFE$, $ADHE$ and $ABCD$ form the vertex A .

Ans: Vertex D is formed by the faces ABCD, CDHG and ADHE.

Ans: The edges parallel to edge AB are CD, EF and HG.

Ans: From the given figure, we can observe that edges AE, EF, GH and HD are neither parallel nor perpendicular to edge BC.

Ans: From the given figure, we can observe that edges AE, BF, AD and BC are perpendicular to edge AB.

Ans: Vertices A, B, G and H do not lie in one plane.

Question 105

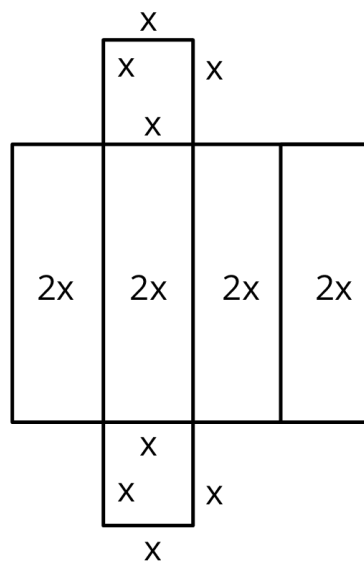
Draw a net of a cuboid having same breadth and height, but length double the breadth.

Solution

Ans: Let x be the breadth and height.

Then, length is $2x$.

Required net of a cuboid will be,

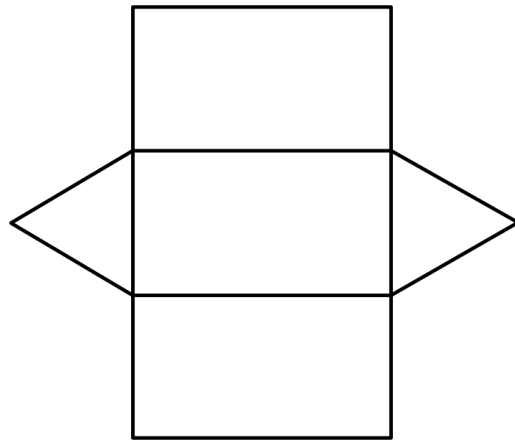
**Question 106**

Draw the nets of the following:

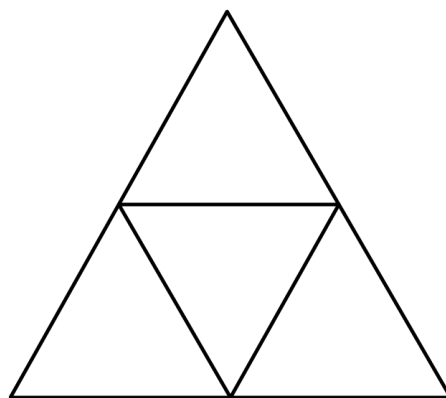
- (i) Triangular prism
- (ii) Tetrahedron
- (iii) Cuboid

Solution

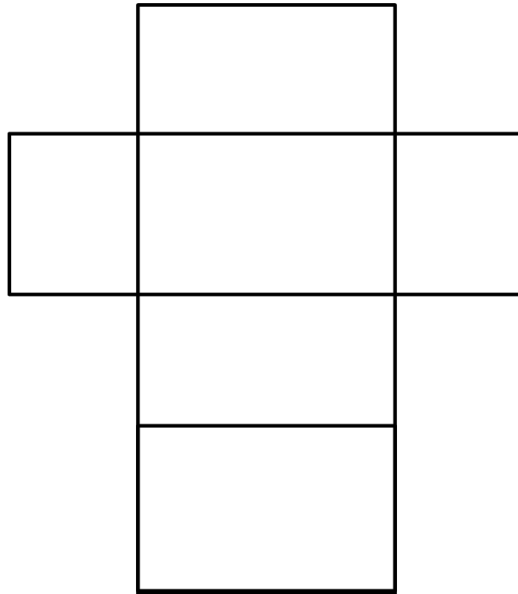
Ans:



Ans:

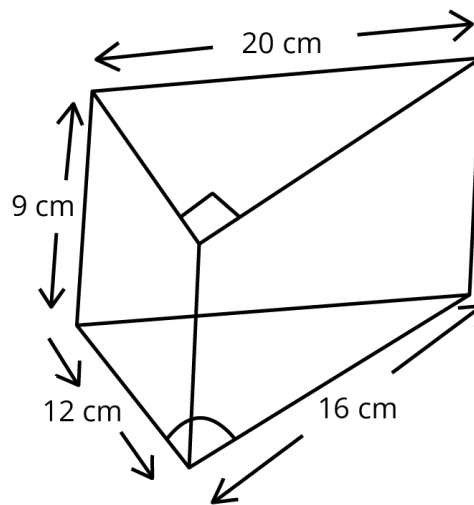


Ans:

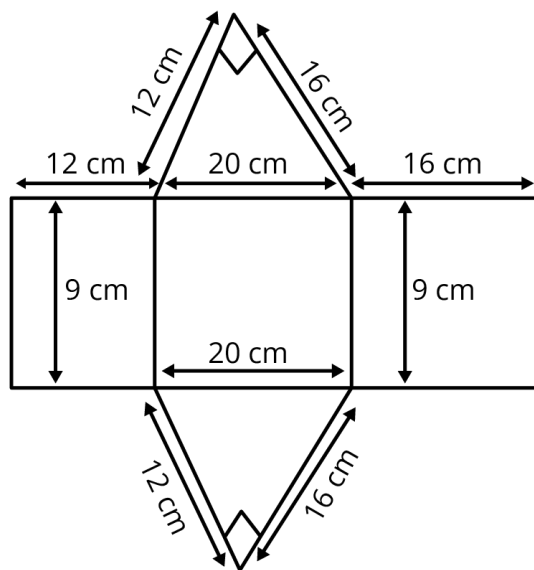


Question 107

Draw a net of the solid given in the figure 12.25:

**Fig. 12.25****Solution**

Ans: The net of the solid given in the figure is,

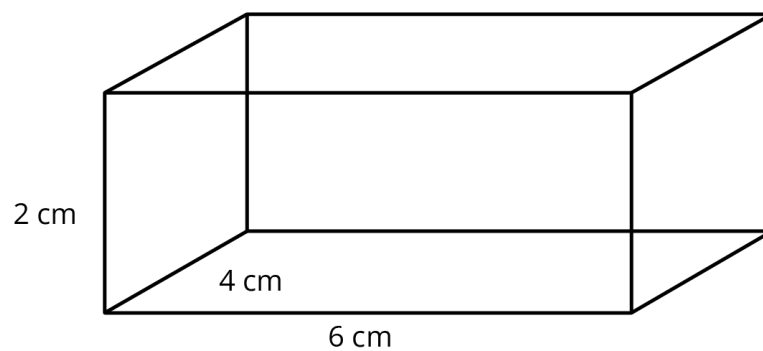


Question 108

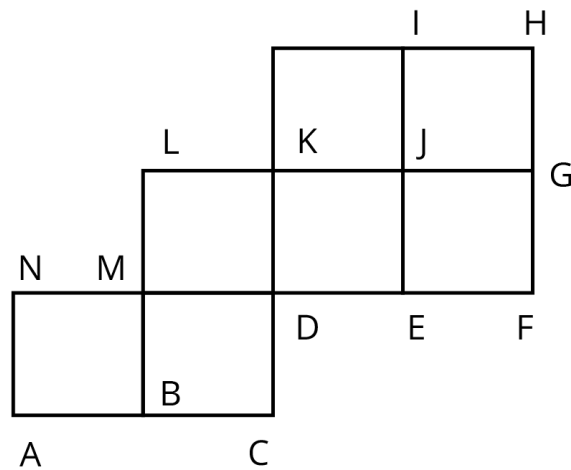
Draw an isometric view of a cuboid $6\text{cm} \times 4\text{cm} \times 2\text{cm}$.

Solution

Ans: The isometric view of a cuboid $6\text{cm} \times 4\text{cm} \times 2\text{cm}$ is,

**Question 109**

The net given below in Fig. can be used to make a cube.

**Fig. 12.26**

(i) Which edge meets **AN**?

(ii) Which edge meets **DE**?

Solution

Ans: The given net of a cube shows that edge **GH** meets edge **AN**.

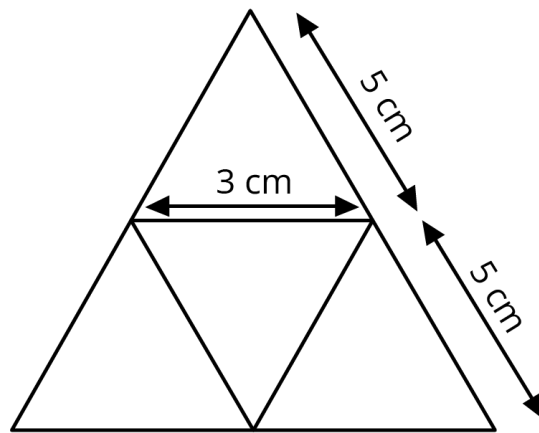
Ans: The given net of a cube shows that edge **DC** meets edge **DE**.

Question 110

Draw the net of a triangular pyramid with base as equilateral triangle of side **3cm** and slant edges **5cm**.

Solution

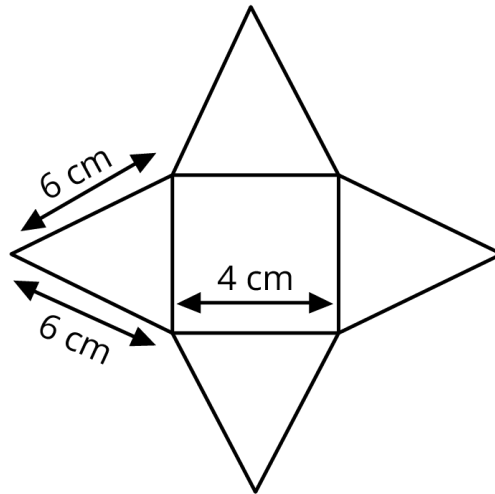
Ans: The net of such triangular pyramid will be,

**Question 111**

Draw the net of a square pyramid with base as square of side 4cm and slant edges 6cm.

Solution

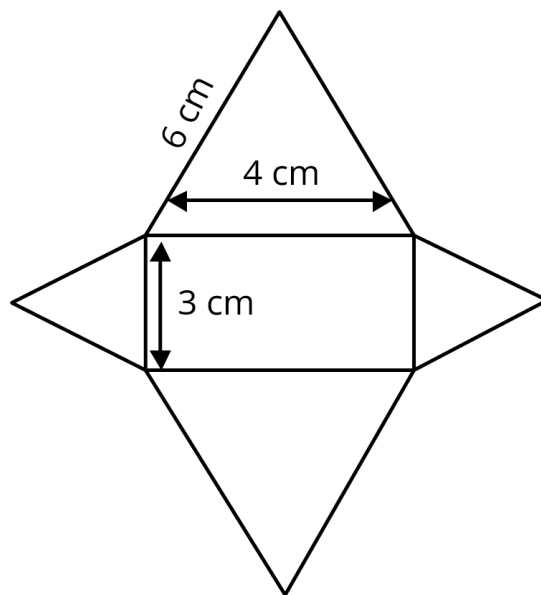
Ans: The net of such square pyramid will be,

**Question 112**

Draw the net of rectangular pyramid with slant edge 6cm and base as rectangle with length 4cm and breadth 3cm.

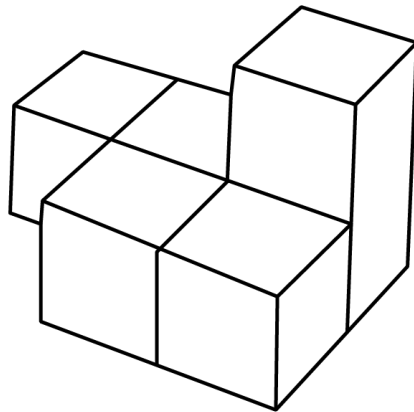
Solution

Ans: The net of such rectangular pyramid will be,

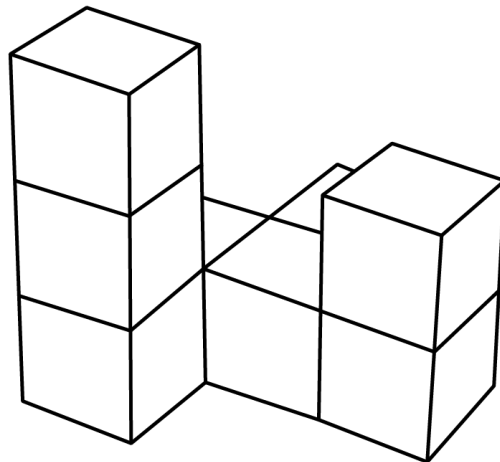
**Question 113**

Find the number of cubes in each of the following figures and in each case give the top, front, left side and right side view (arrow indicating the front view).

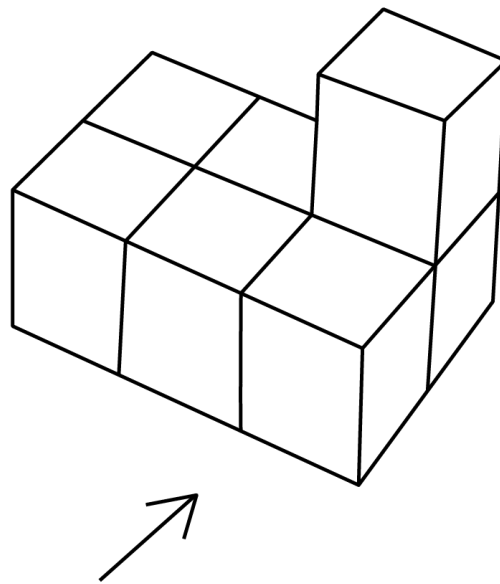
(a)



(b)



(c)

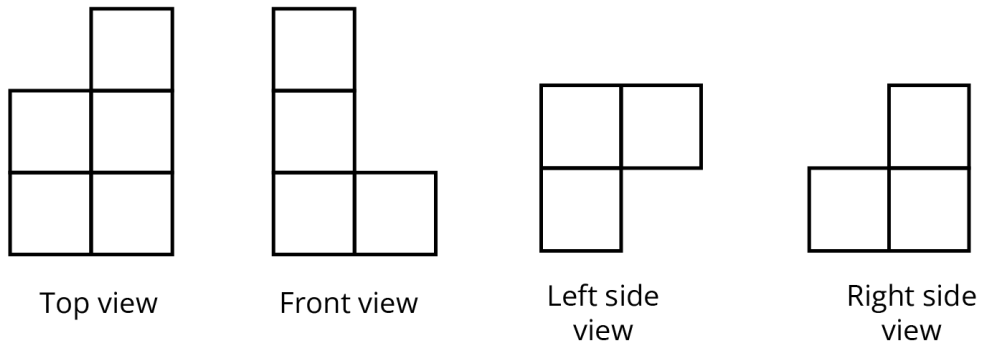


(d)

Solution

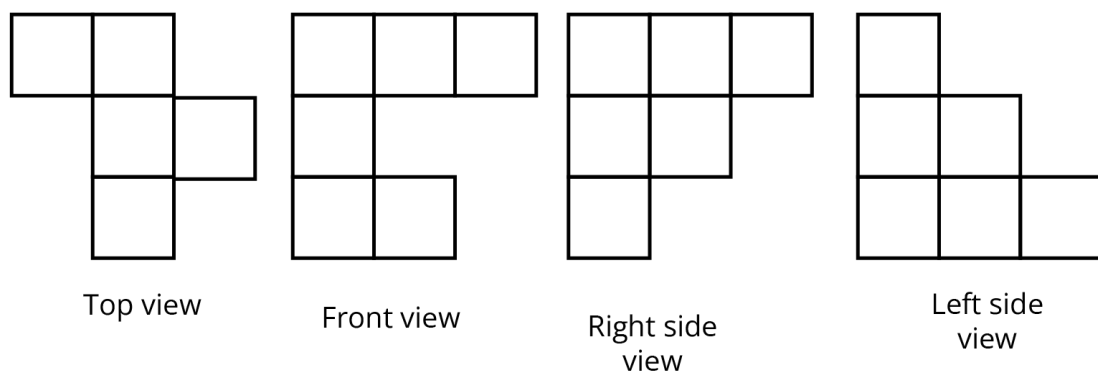
Ans: The number of cubes in given figure is 6.

For the given figure,



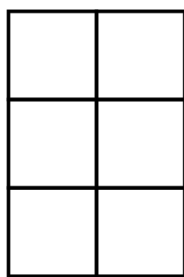
Ans: The number of cubes in given figure is 8.

For the given figure,

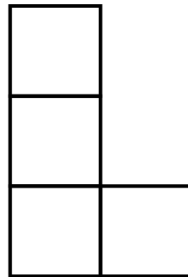


Ans: The number of cubes in given figure is 7.

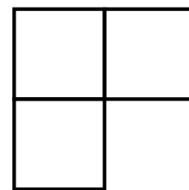
For the given figure,



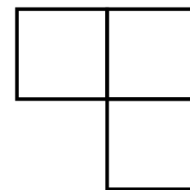
Top view



Front view



Left side
view

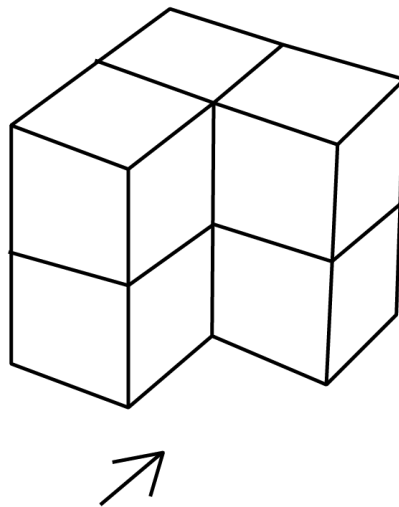


Right side
view

Ans: The number of cubes in given figure is 8.

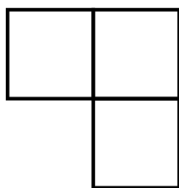
For the given figure,

(e)

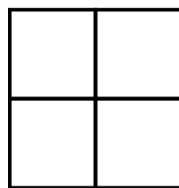


Ans: The number of cubes in given figure is 6.

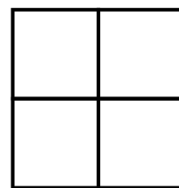
For the given figure,



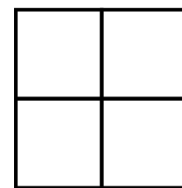
Top view



Front view

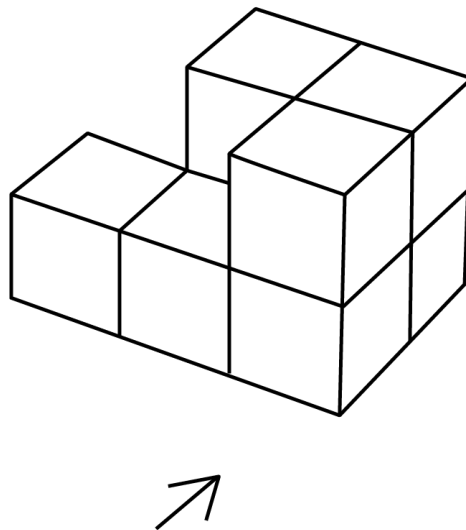


Left side
view



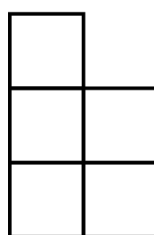
Right side
view

(f)

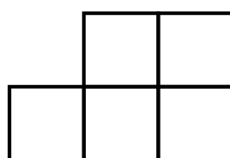


Ans: The number of cubes in given figure is 8.

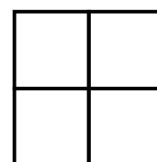
For the given figure,



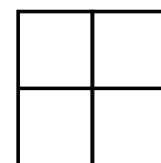
Top view



Front view

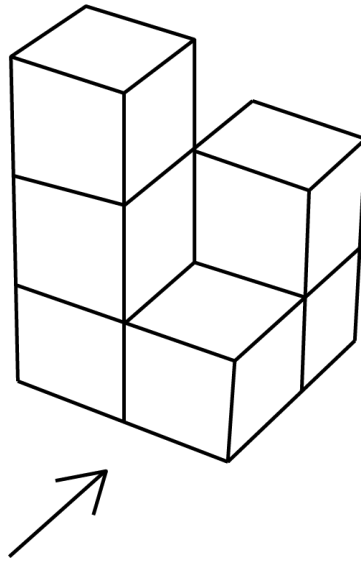


Left side
view



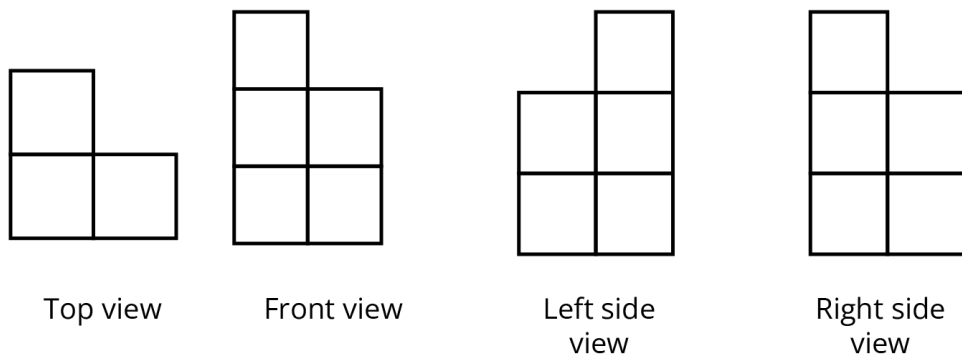
Right side
view

(g)

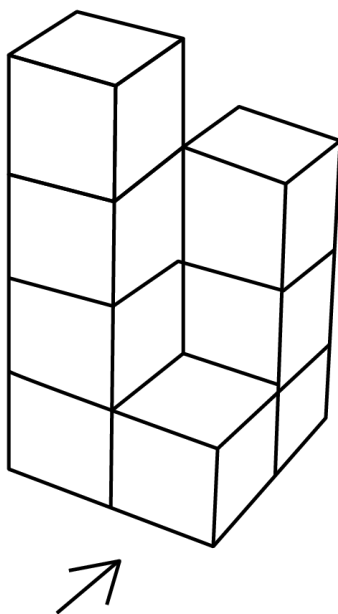


Ans: The number of cubes in given figure is 6.

For the given figure,

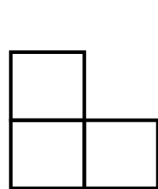


(h)

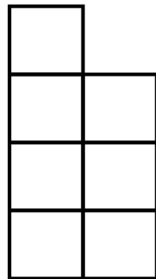


Ans: The number of cubes in given figure is 8.

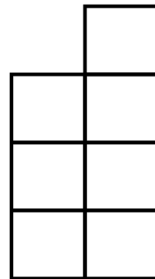
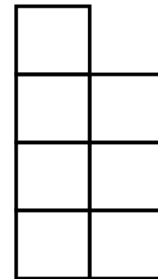
For the given figure,



Top view

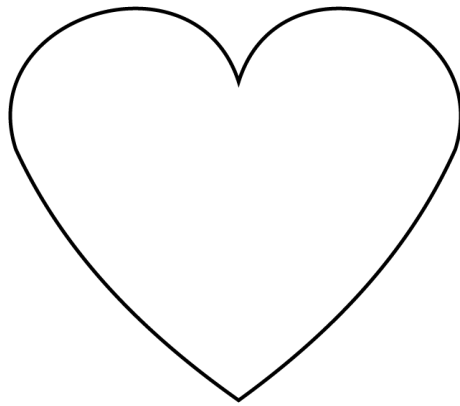


Front view

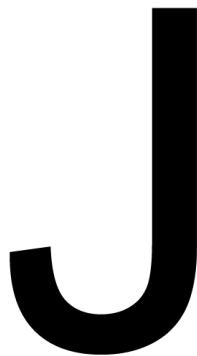
Left side
viewRight side
view**Question 114**

Draw all lines of symmetry for each of the following figures as given below:

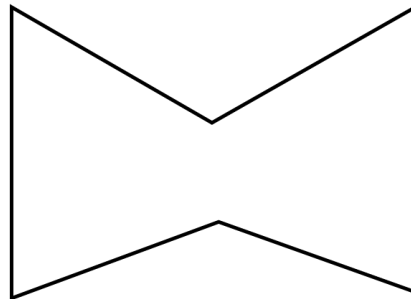
(a)



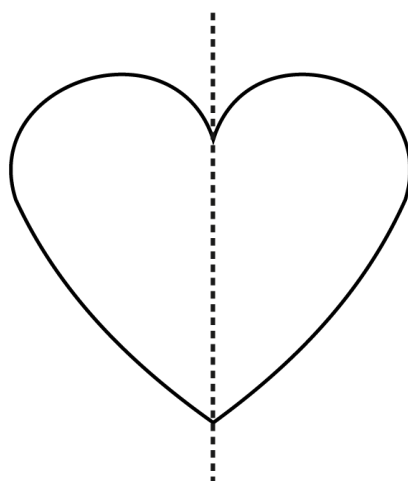
(b)



(c)

**Solution**

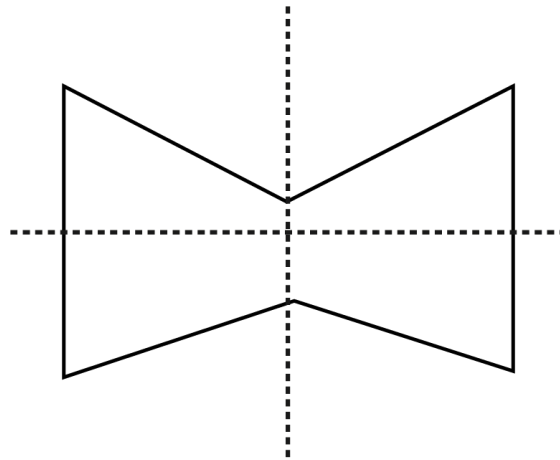
Ans: One line of symmetry.



Ans: It has no line of symmetry.



Ans: It has two lines of symmetry.

**Question 115**

How many faces does Fig. 12.27 have?

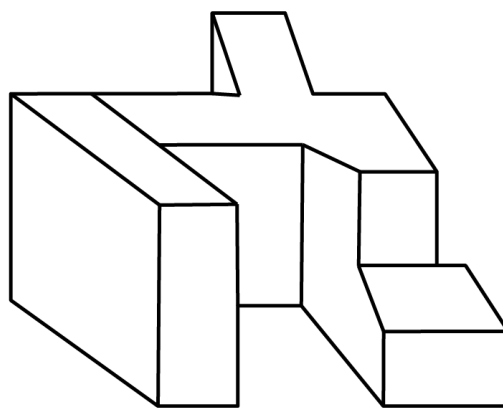


Fig. 12.27

Solution

Ans: There are total

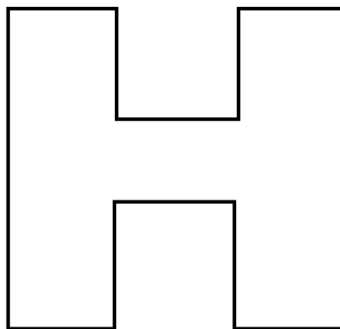
16

faces in the given figure.

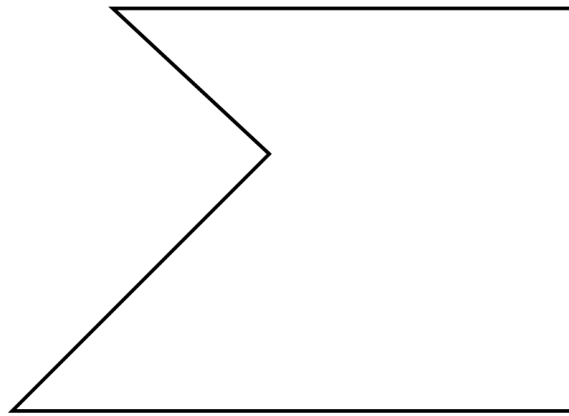
Question 116

Trace each figure. Then draw all lines of symmetry, if it has.

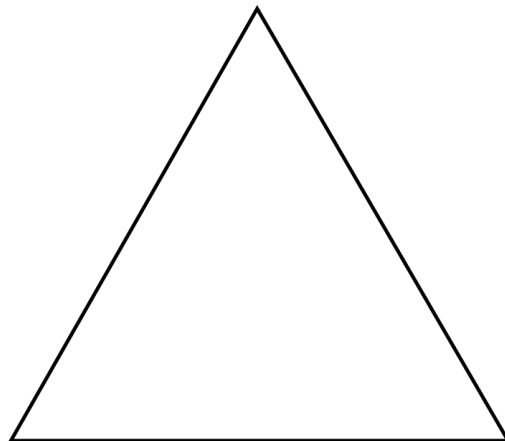
(a)



(b)

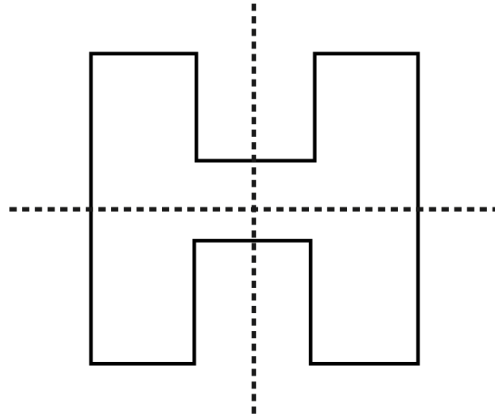


(c)



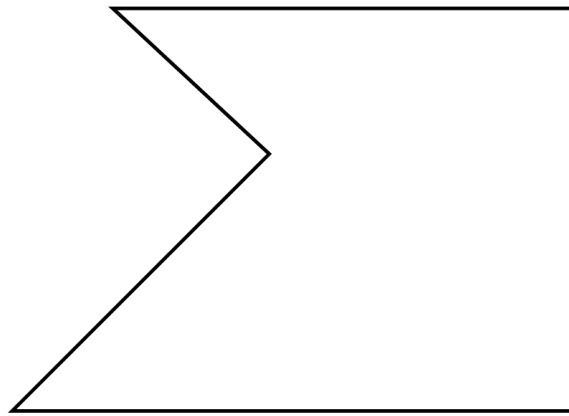
Solution

Ans:



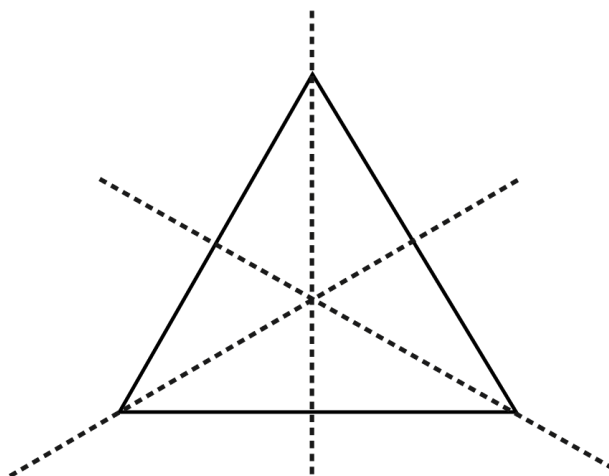
It has two lines of symmetry.

Ans:



It has no line of symmetry.

Ans:

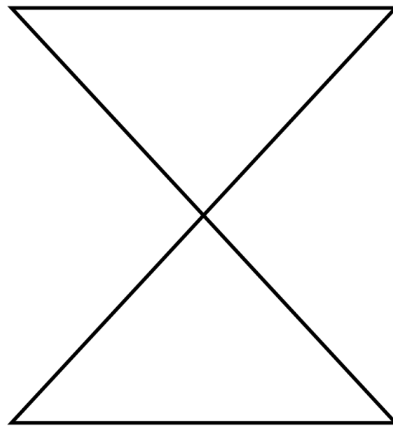


It has three lines of symmetry.

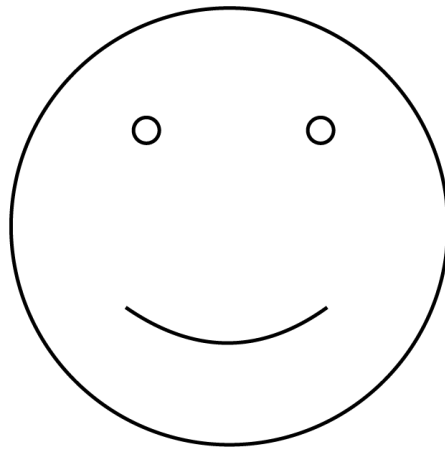
Question 117

Tell whether each figure has rotational symmetry or not.

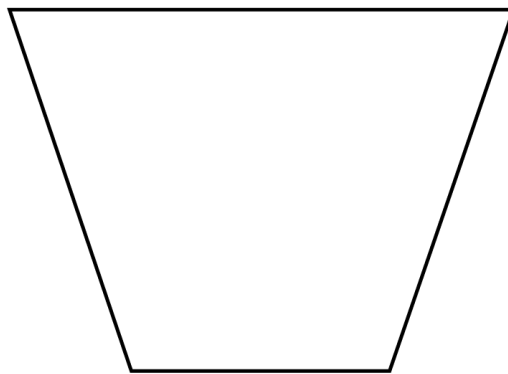
(a)



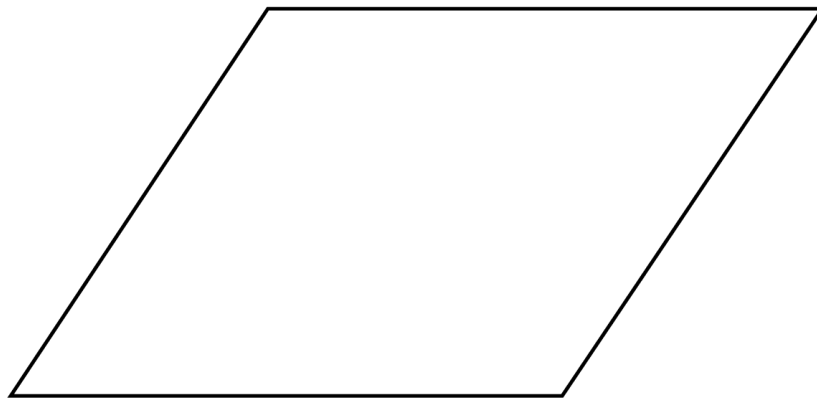
(b)



(c)



(d)

**Solution**

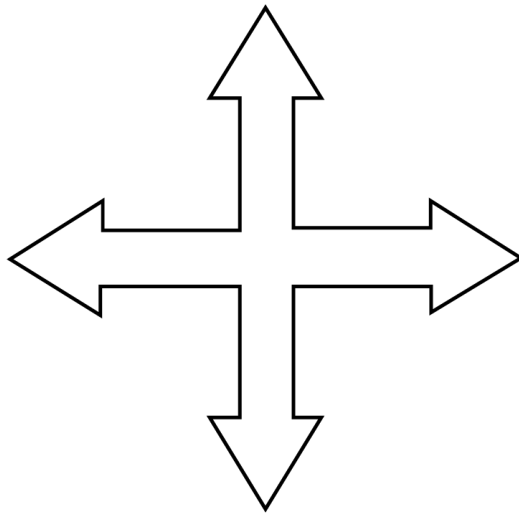
Ans: The given figure has a rotational symmetry.

Ans: The given figure has no rotational symmetry.

Ans: The given figure has no rotational symmetry.

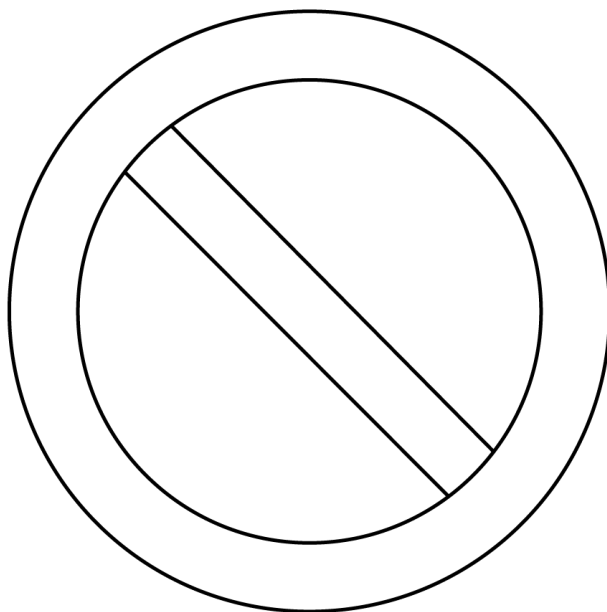
Ans: The given figure has a rotational symmetry.

(e)



Ans: The given figure has a rotational symmetry.

(f)

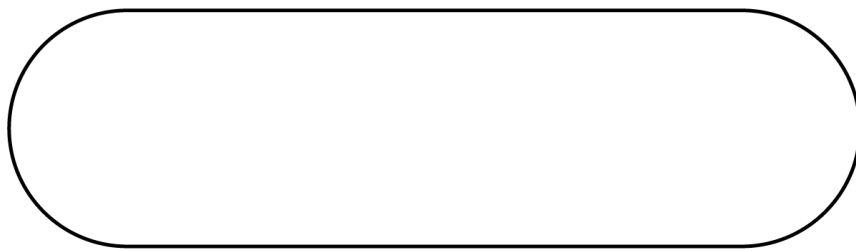


Ans: The given figure has a rotational symmetry.

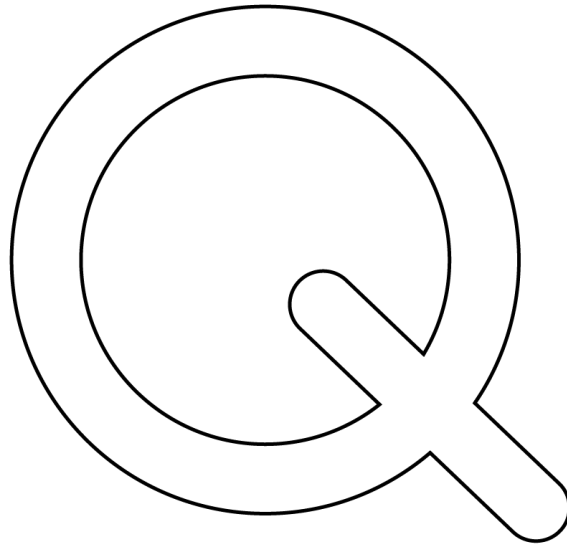
Question 118

Draw all lines of symmetry for each of the following figures.

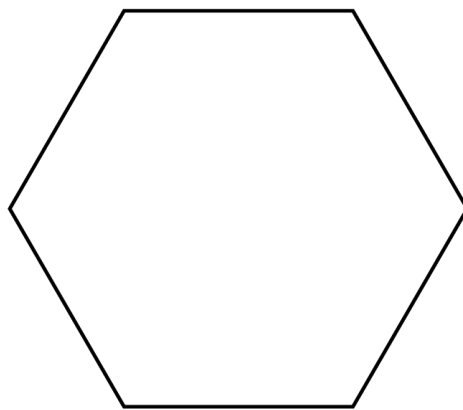
(a)



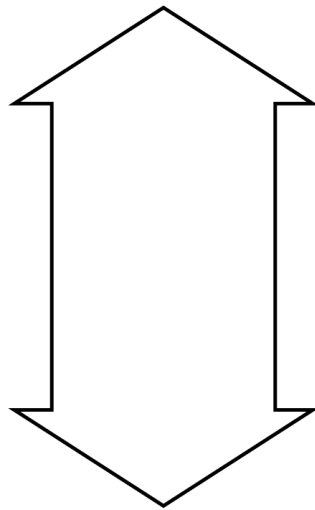
(b)



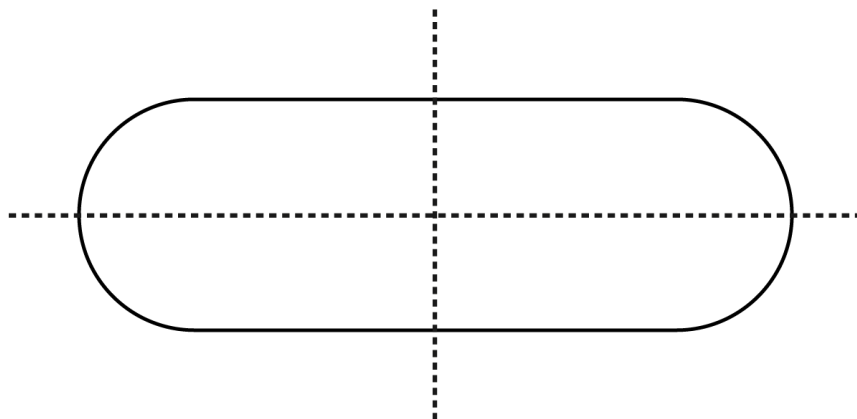
(c)



(d)

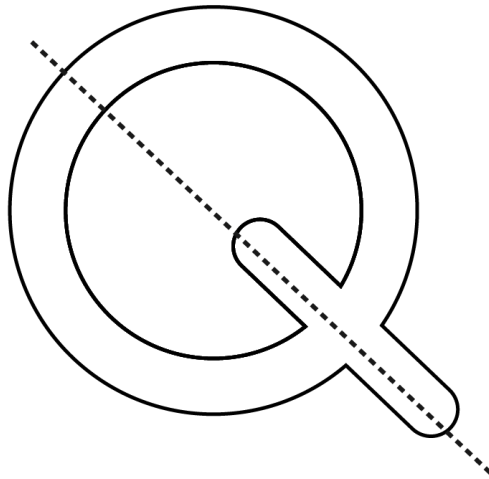
**Solution**

Ans:



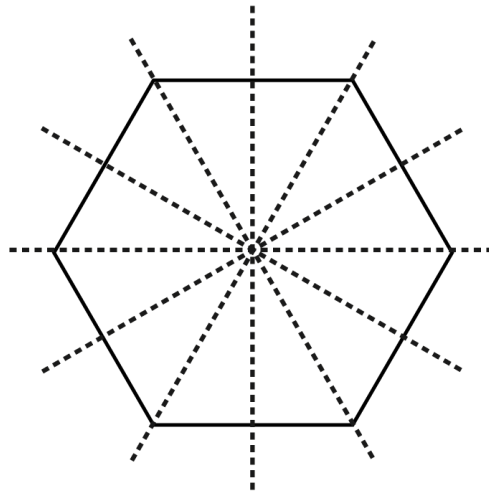
It has two lines of symmetry.

Ans:



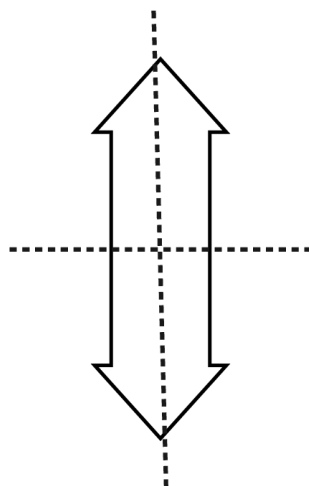
It has one line of symmetry.

Ans:



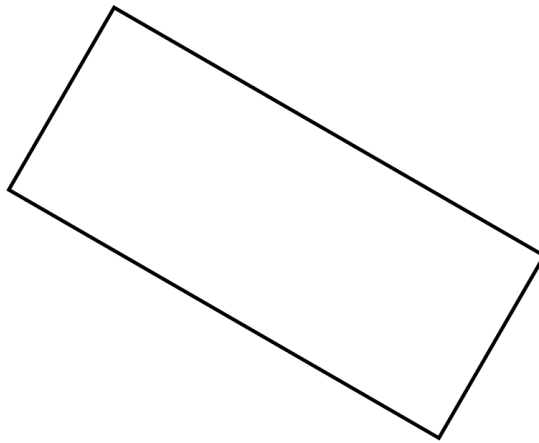
It has six lines of symmetry.

Ans:

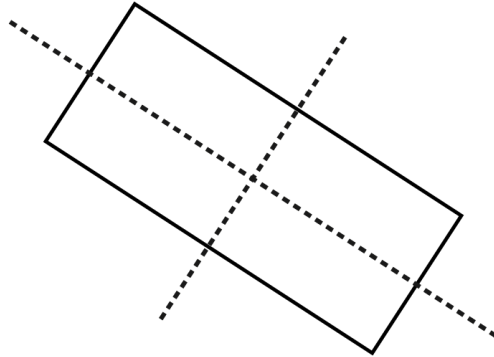


It has two lines of symmetry.

(e)

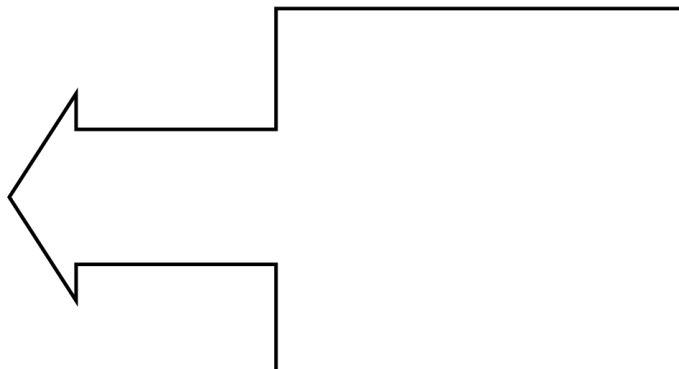


Ans:

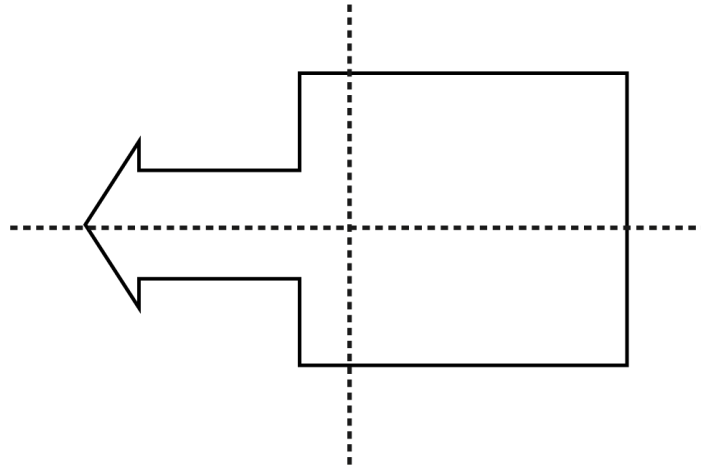


It has two lines of symmetry.

(f)



Ans:

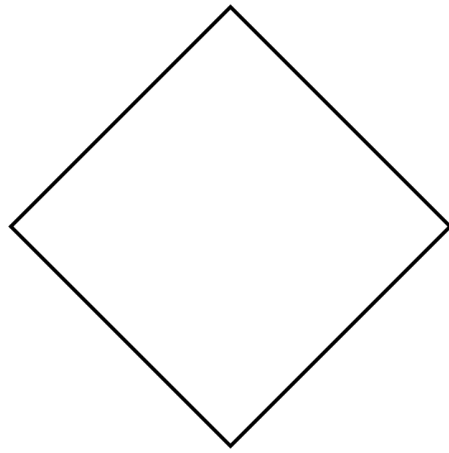


It has one line of symmetry.

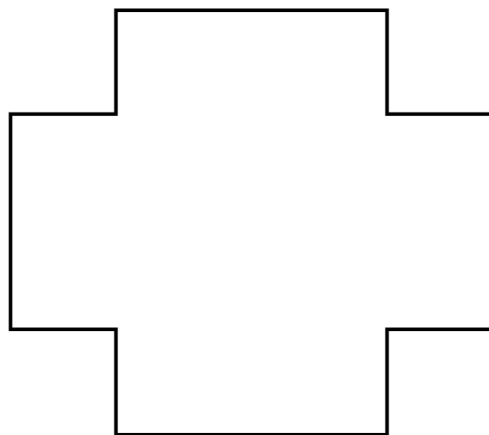
Question 119

Tell whether each figure has rotational symmetry. Write yes or no.

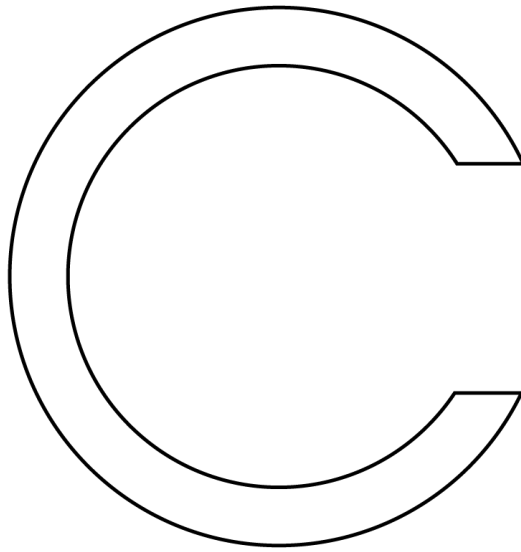
(a)



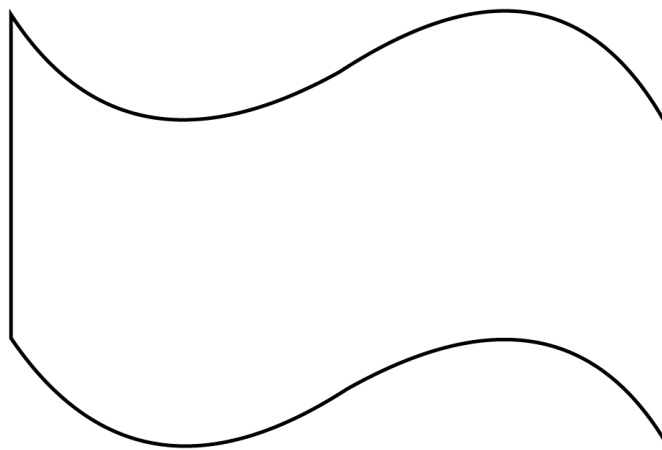
(b)



(c)



(d)



Solution

Ans: The given figure has rotational symmetry.

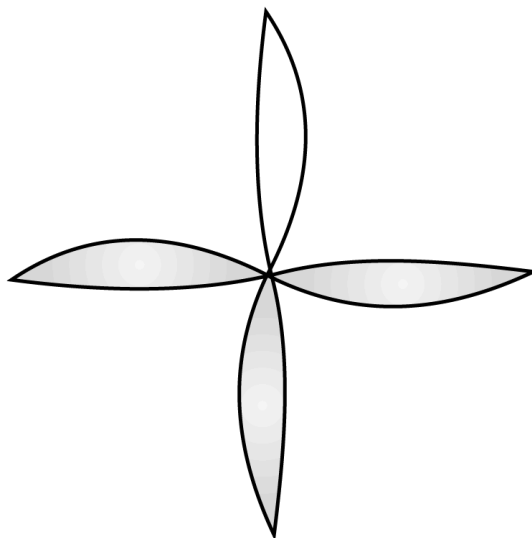
Ans: The given figure has rotational symmetry.

Ans: The given figure has no rotational symmetry.

Ans: The given figure has rotational symmetry.

Question 120

Does the Fig. 12.28 have rotational symmetry?



12.28

Solution

Ans: The given figure does not show rotational symmetry because one part of the design is un-darkened, whereas the other three parts are darkened. Hence, the design does not show symmetry.

Question 121

The flag of Japan is shown below. How many lines of symmetry does the flag have?

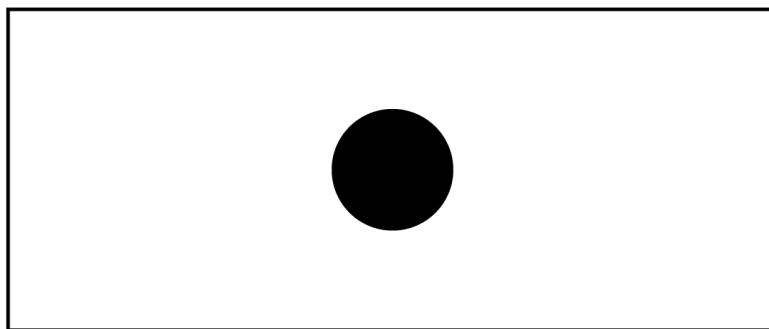


Fig. 12.29

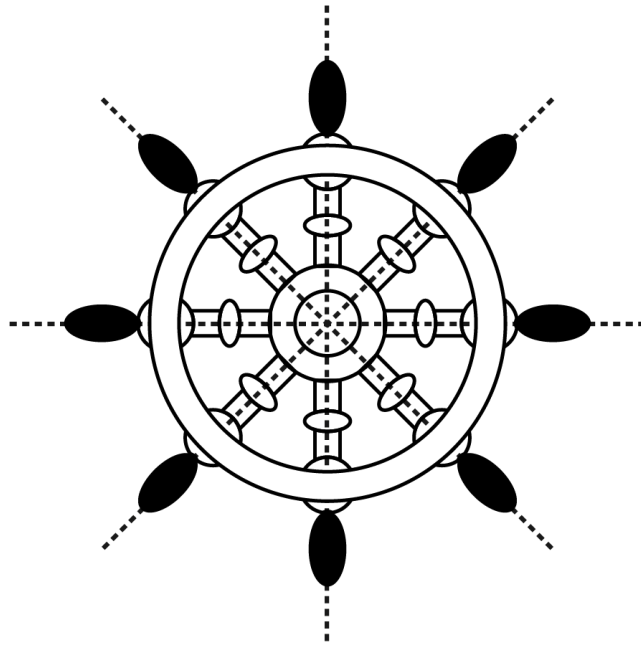
Solution

Ans: The given flag has two lines of symmetry.

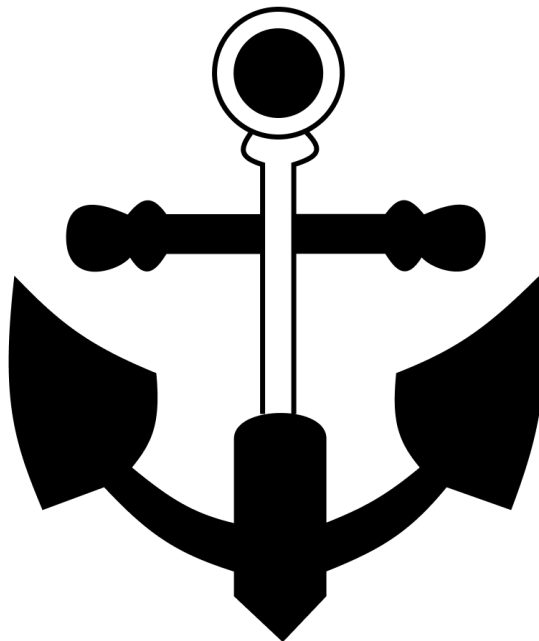
Question 122

Which of the figures given below have both line and rotational symmetry?

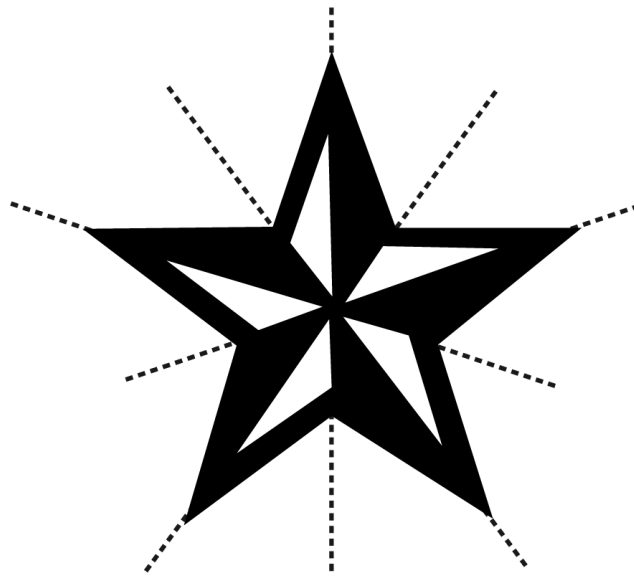
(a)



(b)



(c)

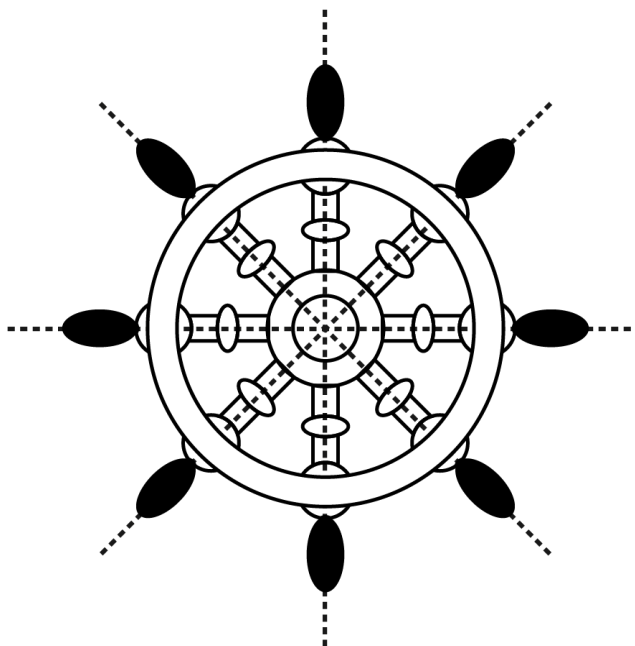


(d)

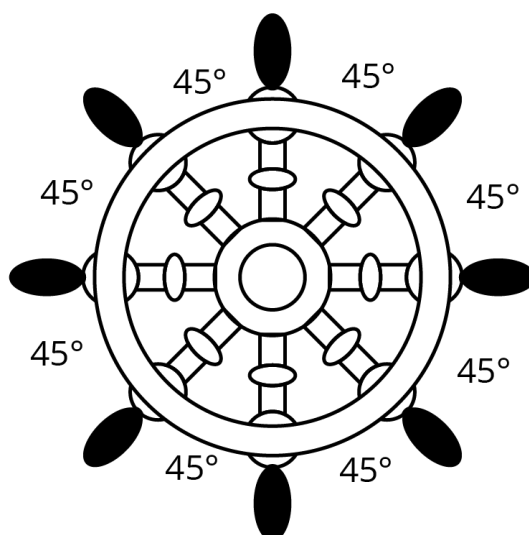


Solution

Ans: Only (a) have both line and rotational symmetry. In the given figure, line of symmetry will be shown as,



Also, rotational symmetry will be shown as,

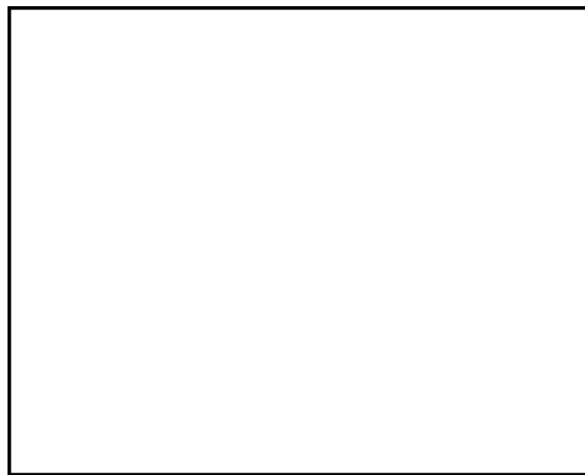


$$\frac{360^\circ}{8} = 45^\circ, \text{ i.e. rotational angle is equal to } 45^\circ.$$

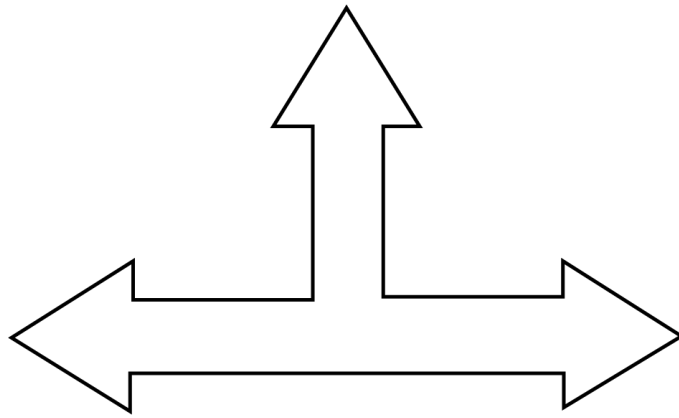
Question 123

Which of the following figures do not have line symmetry?

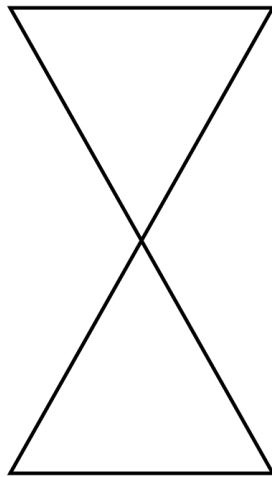
(a)



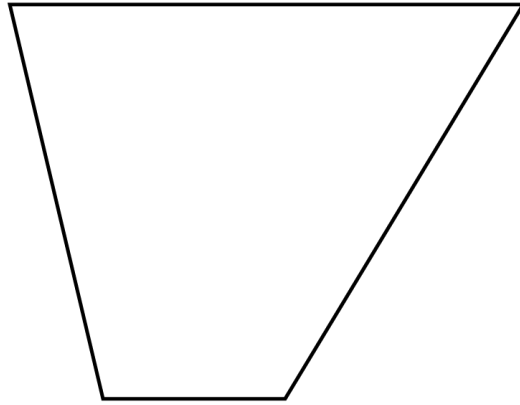
(b)



(c)



(d)



Solution

Solution coming soon.

Question 124

Which capital letters of the English alphabet have no line of symmetry?

Solution

Ans: The letters F, G, J, L, N, R, Q, S and Z have no line of symmetry.

Concepts To Learn From NCERT Exemplar Class 7 Math Solutions Chapter 12 Practical Geometry
Symmetry & Visualizing Solid Shapes

As we all know geometry is all around our environment and can't be ignored, similarly the chapter Practical Geometry Symmetry & Visualizing Solid Shapes cannot be ignored in the Class 7th Math syllabus. Understanding this chapter to its core is very important because it makes students learn how to measure the dimensions of a particular shape, how to recognize a shape to solve a problem, and

more. In this chapter students also learn crucial visualization skills that are necessary to solve different NCERT problems and can be very easily also learned and organized through deep practice.

This chapter includes a wide variety of exercise solutions to help students with all types of concepts that could be related to Practical geometry and visualizing solid shapes. Students might not realize but this chapter is of huge practical importance and it's important to have clarity of it. Class 7th students will learn how to construct parallel lines, different triangles with essential conditions. In addition to that students will also learn about line and rotational symmetry in this chapter. One amazing thing children will learn in this chapter is about different solid shapes, their oblique nature and how they are represented isometrically.