Chapter - 12
Practical Geometry Symmetry and Visualizing Solid Shapes

Exercise

In each of the Questions 1 to 26, there are four options, out of which one is correct. Choose the correct one.

1. A triangle can be constructed by taking its sides as:
(a) 1.8 cm, 2.6 cm, 4.4 cm (b) 2 cm, 3 cm, 4 cm
(c) 2.4 cm, 2.4 cm, 6.4 cm (d) 3.2 cm, 2.3 cm, 5.5 cm

Solution:
The condition for constructing a triangle is that Sum of two sides should be greater than the third side. And option (b) clearly satisfies this condition as
(2 + 3) cm > 4 cm.

So, option (b) is correct.

2. A triangle can be constructed by taking two of its angles as:
(a) 110°, 40° (b) 70°, 115° (c) 135°, 45° (d) 90°, 90°

Solution:
The condition for constructing a triangle in terms of angle is that sum of all of its angle is equal to 180° so sum of two of its angle should be less than 180° respectively.
In option (a) clearly 110° + 40° = 150° but in rest of the options it is either 180° or greater.

So, option (a) is correct.

3. The number of lines of symmetry in the figure given below is:
(a) 4 (b) 8 (c) 6 (d) Infinitely many

Fig. 12.13

Solution:
As observed in the given figure, number of lines of symmetry are 6.

So, option (c) is correct.

4. The number of lines of symmetry in Fig. 12.14 is
(a) 1 (b) 3 (c) 6 (d) infinitely many

Solution:
As observed in the given figure, number of lines of symmetry are 3.

So, option (b) is correct.

5. The order of rotational symmetry in the Fig. 12.15 given below is
(a) 4 (b) 8 (c) 6 (d) infinitely many

Solution:
Rotational symmetry is defined as the no. of times a figure fits into itself in one complete turn. As observed in the figure, order of rotational symmetry is 6.

So, option (c) is correct.

6. The order of rotational symmetry in the figure 12.16 given below is
(a) 4 (b) 2 (c) 1 (d) Infinitely many

Fig. 12.16

Solution:
Rotational symmetry is defined as the no. of times a figure fits into itself in one complete turn. As observed in the figure, order of rotational symmetry is 2.

So, option (b) is correct.

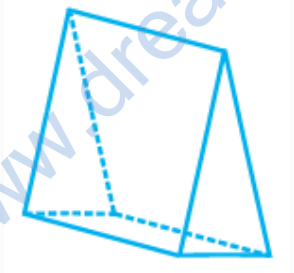
7. The name of the given solid in Fig 12.17 is:
(a) Triangular pyramid (b) rectangular pyramid
(c) Rectangular prism (d) triangular prism

Fig. 12.17

Solution:
The given figure as observed is a combination of a rectangle and a pyramid.

So, option (c) is correct.

8. The name of the solid in Fig. 12.18 is:
(a) triangular pyramid (b) rectangular prism
(c) triangular prism (d) rectangular pyramid

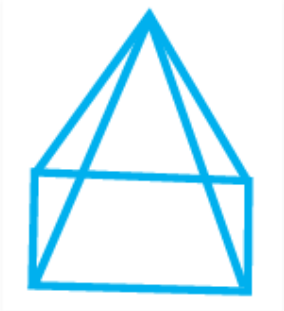


Solution:
The given figure as observed is a combination of a triangle and a prism.

So, option (c) is correct.

9. All faces of a pyramid are always:
(a) Triangular (b) Rectangular (c) Congruent (d) None of these

Solution:

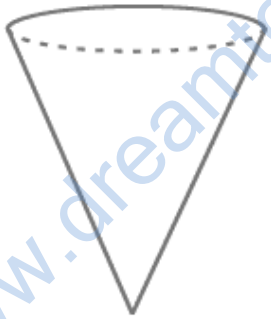


The faces of pyramid can be basically rectangular and triangular.

So, option (d) is correct.

10. A solid that has only one vertex is
(a) Pyramid (b) Cube (c) Cone (d) Cylinder

Solution:
A solid that has only one vertex is cone.



So, option (c) is correct.

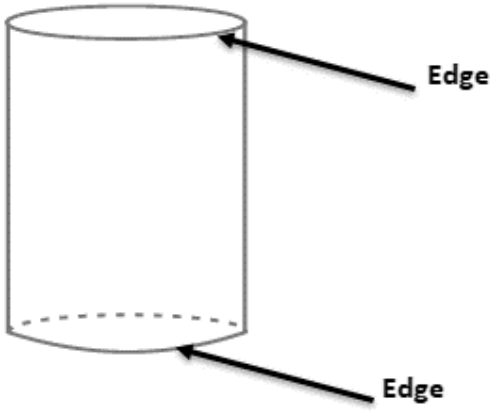
11. Out of the following which is a 3-D figure?
(a) Square (b) Sphere (c) Triangle (d) Circle

Solution:
Out of given figures, only sphere is 3-D figure.

So, option (b) is correct.

12. Total number of edges a cylinder has
(a) 0 (b) 1 (c) 2 (d) 3

Solution:

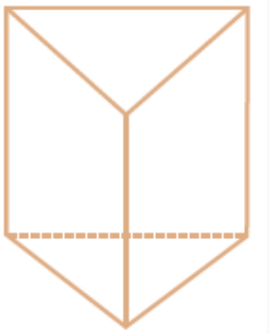


Cylinder possesses only two edges.

So, option (c) is correct.

13. A solid that has two opposite identical faces and other faces as parallelograms is a
(a) prism (b) pyramid (c) cone (d) sphere

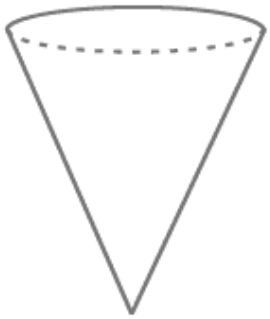
Solution:
A solid that has two opposite identical faces and other faces as parallelograms is a prism.



So, option (a) is correct.

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



So, option (a) is correct.

15. If three cubes each of edge 4 cm are placed end to end, then the dimensions of resulting solid are:
(a) 12 cm × 4 cm × 4 cm (b) 4 cm × 8 cm × 4 cm
(c) 4 cm × 8 cm × 12 cm (d) 4 cm × 6 cm × 8 cm

Solution:
If three cubes each of edge 4 cm are placed end to end, the length of the resulting solid will increase and will become 4 cm + 4 cm + 4 cm = 12 cm.
So, the dimensions of the resulting solid will be 12 cm × 4 cm × 4 cm.

So, option (a) is correct.

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

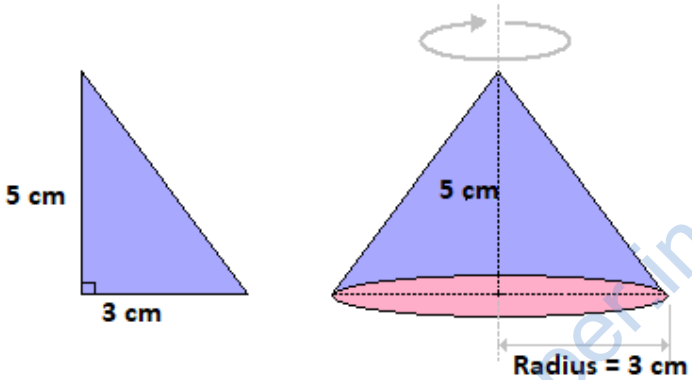
Solution:
If we cut a corner of a cube as shown in the figure 12.19, we get the cutout piece as triangular pyramid.

So, option (c) is correct.

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

(a) cone of height 5 cm, base 3 cm
(b) triangle of height 5 cm, base 3 cm
(c) cone of height 5 cm, base 6 cm
(d) triangle of height 5 cm, base 6 cm

Solution:

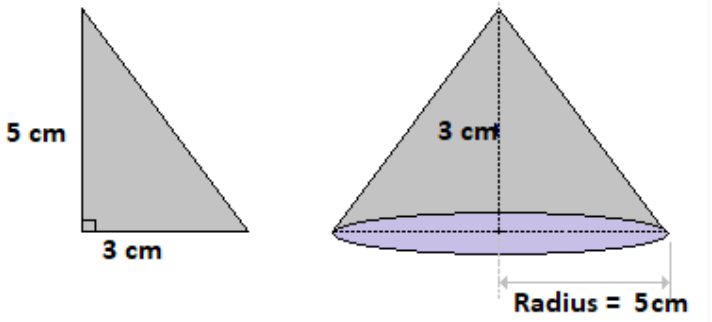


If we rotate a right-angled triangle of height 5 cm and base 3 cm about its height a full turn, then we obtain a cone of height 5 cm and base 3 cm respectively.

So, option (a) is correct.

18. If we rotate a right-angled triangle of height 5 cm and base 3 cm about its base, we get: (a) cone of height 3 cm and base 3 cm
(b) cone of height 5 cm and base 5 cm
(c) cone of height 5 cm and base 3 cm
(d) cone of height 3 cm and base 5 cm

Solution:
If we rotate a right-angled triangle of height 5 cm and base 3 cm about its base, we obtain a cone of height 3 cm and base 5 cm respectively.



So, option (d) is correct.

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:
When a torch is pointed towards one of the vertical edges of a cube, you get a shadow of cube in the shape of rectangle but not a square.

So, option (b) is correct.

20. Which of the following sets of triangles could be the lengths of the sides of a right-angled triangle:
(a) 3 cm, 4 cm, 6 cm (b) 9 cm, 16 cm, 26 cm
(c) 1.5 cm, 3.6 cm, 3.9 cm (d) 7 cm, 24 cm, 26 cm

Solution:
For being the lengths of the sides of a right-angled triangle, Pythagoras theorem should be satisfied, according to which:
$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$ in which hypotenuse is the largest among all.
Out of given conditions, only (c) satisfies the condition as:
$(3.9)^2 = (1.5)^2 + (3.6)^2$
$15.21 = 15.21$

So, option (c) is correct.

21. In which of the following cases, a unique triangle can be drawn
(a) AB = 4 cm, BC = 8 cm and CA = 2 cm
(b) BC = 5.2 cm, ∠B = 90° and ∠C = 110°
(c) XY = 5 cm, ∠X = 45° and ∠Y = 60°
(d) An isosceles triangle with the length of each equal side 6.2 cm.

Solution:
As given options are observed, unique triangle can be drawn only in the case of option (c), no other option represents a triangle.

So, option (c) is correct.

22. Which of the following has a line of symmetry?

Solution:
As given figures are observed, only option (c) has a line of symmetry.

So, option (c) is correct.

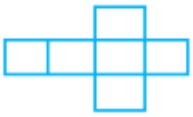
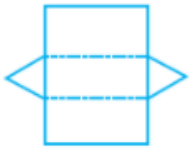
23. Which of the following are reflections of each other?

(a)  (b)  (c)  (d) 

Solution:
In option (a) we can see that the two figures are identical and reflections of each other as compared to other figures.

So, option (a) is correct.

24. Which of these nets is a net of a cube?

(a)  (b)  (c)  (d) 

Solution:
Option (b) represents the net of a cube.

So, option (b) is correct.

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

(a)  (b)  (c)  (d) 

Solution:
Option (c) represents the net of a cylinder.

So, option (c) is correct.

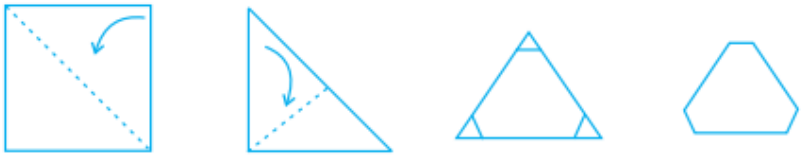
26. Which of the following letters of English alphabets have more than 2 lines of symmetry?

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

Solution:
Letter O has innumerable number of lines of symmetry.

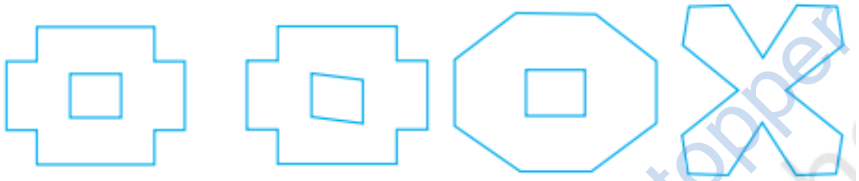
So, option (b) is correct.

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 of 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?



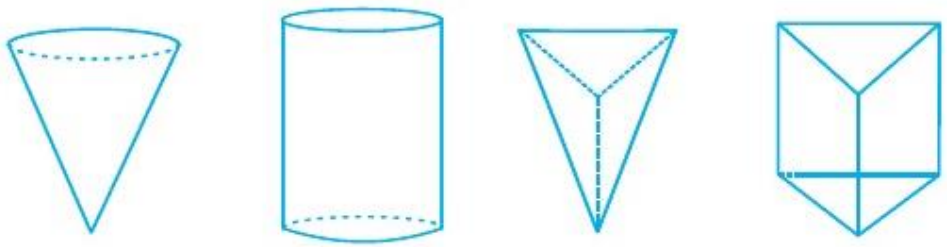
(a) (b) (c) (d)

Solution:

According to given condition, on opening the piece of paper we will get the shape represented by option (a).

So, option (a) is correct.

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



(a) (b) (c) (d)

Solution:

Figure given in option (c) represents 3-dimensional figures which has the top, side and front as triangles.

So, option (c) is correct.

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

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

Solution:
Only one line of symmetry presents in isosceles triangle and it is along the median through the vertex.

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

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

Solution:
Two lines of symmetry presents in rhombus and possesses rotational symmetry of order two.

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

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

Solution:
Isosceles triangle possesses line of symmetry but lacks rotational symmetry.

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

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

Solution:
Quadrilateral does not possess either a line of symmetry or a rotational symmetry.

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

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:
In English alphabets letters M and W both have one line of symmetry and are interchangeable when rotated through 180°.

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°.

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

Solution:
Edge is the common portion of two adjacent faces of a cuboid.

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

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

Solution:
Face is the plane surface of a solid enclosed by edges.

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

36. The corners of solid shapes are called its _____.

Solution:
Vertices are basically the corners of solid shapes.

The corners of solid shapes are called its vertices.

37. A solid with no vertex is _____.

Solution:
Sphere is a solid which has zero vertex.

A solid with no vertex is sphere.

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

Solution:
There are in total five faces, nine edges and six vertices present in the triangular prism.

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

39. A triangular pyramid has _____ faces, _____ edges and _____vertices.

Solution:
There are in total four faces, six edges and four vertices present in the triangular prism.

A triangular pyramid has 4 faces, 6 edges and 4 vertices.

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

Solution:
There are in total five faces, eight edges and five vertices present in the triangular prism.

A square pyramid has 5 faces, 8 edges and 5 vertices.

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

Solution:
There are in total five faces in triangular prism and out of which three are rectangles and 2 are triangles.

Out of 5 faces of a triangular prism, 3 are rectangles and 2 are triangles.

42. The base of a triangular pyramid is a _____.

Solution:
In triangular pyramid, base is triangle.

The base of a triangular pyramid is a triangle.

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

Solution:
There are in total five faces in square pyramid and out of which four are triangles and one is square.

Out of 5 faces of a square pyramid, 4 are triangles and 1 is/are squares.

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

Solution:
There are in total five faces in rectangular pyramid and out of which four are triangles and base is rectangle.

Out of 5 faces of a rectangular pyramid 4 are triangles and base is rectangle.

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

Solution:
Letter H, N, S and Z of English alphabet has a rotational symmetry of order 2.

Each of the letters H, N, S and Z has a rotational symmetry of order 2.

46. Order of rotational symmetry of a rectangle is _____.

Solution:
Rectangle possesses rotational symmetry of order 2.

Order of rotational symmetry of a rectangle is 2.

47. Order of rotational symmetry of a circle is _____.

Solution:
Circle possesses rotational symmetry of order 2.

Order of rotational symmetry of a circle is 2.

48. Each face of a cuboid is a _____.

Solution:
Cuboid is a solid body which is bounded by rectangular faces.

Each face of a cuboid is a rectangle.

49. Line of symmetry for an angle is its _____.

Solution:
Bisector divides the angle into two identical parts.

Line of symmetry for an angle is its bisector.

50. A parallelogram has _____ line of symmetry.

Solution:

No line of symmetry presents in parallelogram.

A parallelogram has zero line of symmetry.

51. Order of rotational symmetry of  **is _____.**

Solution:
Octagon possesses eight order of rotational symmetry.

Order of rotational symmetry of  is 8.

52. A _____ triangle has no lines of symmetry.

Solution:
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.

53. Cuboid is a rectangular_____ .

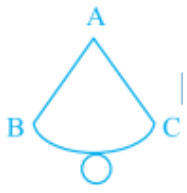
Solution:
Rectangular prism and cuboid refers to the same solid body.

Cuboid is a rectangular prism.

54. A sphere has _____vertex, _____edge and _____curved surface.

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

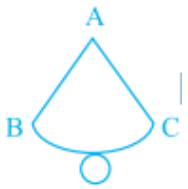
A sphere has 0 vertex, 0 edge and 1 curved surface.

55. 

is a net of a _____.

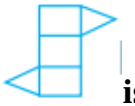
→ **Circumference of circle = _____.**

Solution:
On observing the given figure it represents cone.



is a net of a cone.

→ Circumference of circle = $2\pi R$.

56.  **is a net of a _____.**

Solution:
On observing the given figure it represents triangular prism.


is a net of a triangular prism.

57. Order of rotational symmetry of 

is _____.

Solution:
Isosceles triangle possesses one order of rotational symmetry.

Order of rotational symmetry of 

is one.

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

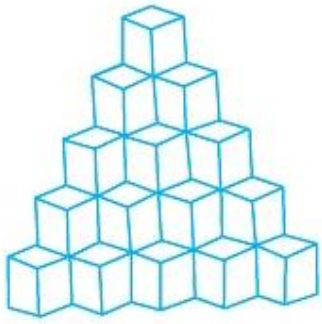


Fig. 12.20

Solution:
There are 20 such cubes which are not possible.

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.

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

Solution:
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.

So, given statement is **False**.

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

Solution:
Yes, the distance between the two parallel lines is the same everywhere always.

So, given statement is **True**.

61. A circle has two lines of symmetry.

Solution:
No, circle can have infinite number of symmetries not two.

So, given statement is **False**.

62. An angle has two lines of symmetry.

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

So, given statement is **False**.

63. A regular hexagon has six lines of symmetry.

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

So, given statement is **True**.

64. An isosceles trapezium has one line of symmetry.

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

So, given statement is **True**.

65. A parallelogram has two lines of symmetry.

Solution:
Parallelogram possesses zero line of symmetry.

So, given statement is **False**.

66. Order of rotational symmetry of a rhombus is four.

Solution:
No, order of rotational symmetry of a rhombus is only two not four.

So, given statement is **False.**

67. An equilateral triangle has six lines of symmetry.

Solution:
No, equilateral triangle has three lines of symmetry along the median of the triangle.

So, given statement is **False**.

68. Order of rotational symmetry of a semi circle is two.

Solution:
No, order rotational symmetry of a semi circle is only one.

So, given statement is **False**.

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

Solution:
No, measurements are not kept proportional in oblique sketch of the solid.

So, given statement is **False**.

70. An isometric sketch does not have proportional length.

Solution:
An isometric sketch always possesses a proportional length.

So, given statement is **False**.

71. A cylinder has no vertex.

Solution:
Yes, in cylinder no vertex is present.

So, given statement is **True**.

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

Solution:
Yes, base of a square pyramid is square and rest of the faces are triangular.

So, given statement is **False**.

73. A pyramid has only one vertex.

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

So, given statement is **False**.

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

Solution:
Yes, in triangular prism we have 5 faces, 9 edges and 6 vertices.

So, given statement is **True**.

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

Solution:
Yes exactly, any kind of pyramid is known on the type of its base.

So, given statement is **True**.

76. A rectangular pyramid has 5 rectangular faces.

Solution:
No, a rectangular pyramid has in total 5 faces, out of which 1 is rectangular.

So, given statement is **False**.

77. Rectangular prism and cuboid refer to the same solid.

Solution:
Yes, rectangular prism and cuboid represents the same solid.

So, given statement is **True**.

78. A tetrahedron has 3 triangular faces and 1 rectangular face.

Solution:
No, a tetrahedron has 4 triangular faces.

So, given statement is **False**.

79. While rectangle is a 2-D figure, cuboid is a 3-D figure.

Solution:
Yes, although rectangle is a 2-D figure, cuboid is a 3-D figure.

So, given statement is **True**.

80. While sphere is a 2-D figure, circle is a 3-D figure.

Solution:
No, sphere is a 3-D figure and circle is a 2-D figure.

So, given statement is **False**.

81. Two dimensional figures are also called plane figures.

Solution:
Yes it is true that two dimensional figures are also known as plane figures.

So, given statement is **True**.

82. A cone is a polyhedron.

Solution:
No it is incorrect to say that cone is a polyhedron.

So, given statement is **False**.

83. A prism has four bases.

Solution:
No, only one base presents in a prism.

So, given statement is **False**.

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

Solution:
Yes it is true that number of lines of symmetry of a regular polygon is equal to the vertices of the polygon.

So, given statement is **True**.

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

Solution:
No, if order of rotational symmetry of a figure is 4 then the angle of rotation must be 90° only.

So, given statement is **False**.

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

Solution:

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

So, given statement is **True**.

87. Mirror reflection leads to symmetry always.

Solution:
No it is incorrect to say that mirror reflection leads to symmetry always.

So, given statement is **False**.

88. Rotation turns an object about a fixed point which is known as centre of rotation.

Solution:
Yes it is true that an object rotates about a fixed point which is known as centre of rotation.

So, given statement is **True**.

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

Solution:
No, isometric sheet divides the paper into small equilateral triangles made up of dots or lines.

So, given statement is **False**.

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

Solution:
Yes, circle, the square, the rectangle and the triangle are examples of plane figures.

So, given statement is **True**.

91. The solid shapes are of two-dimensional.

Solution:
No, solid shapes are of three-dimensional.

So, given statement is **True**.

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

Solution:

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

But here, 6cm + 5cm = 11cm and condition is not satisfied.

So, given statement is **False**.

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)

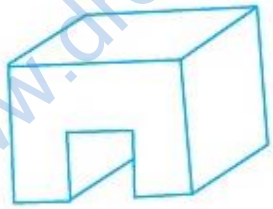
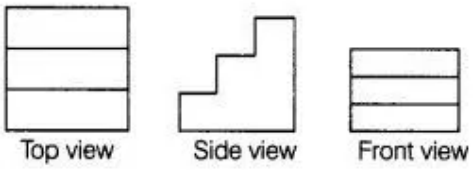


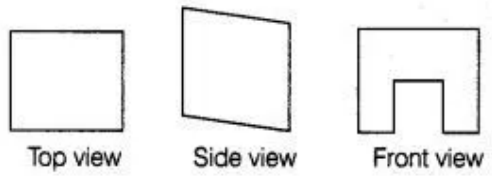
Fig. 12.22

Solution:

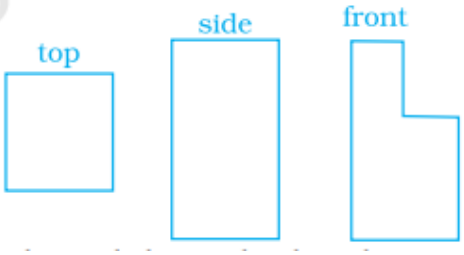
(i) The top, side and front view of the given figure is shown below:



(ii) The top, side and front view of the given figure is shown below:

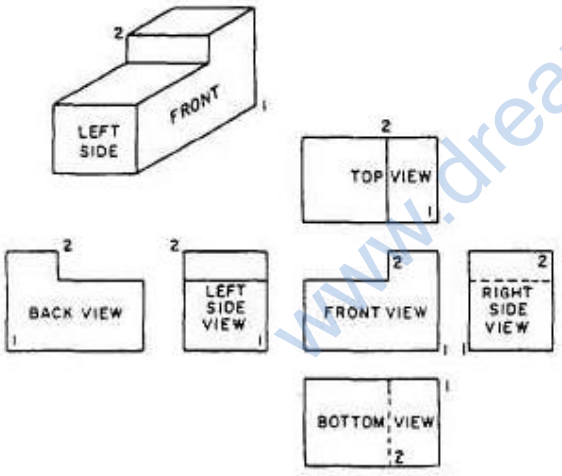


94. Draw a solid using the top. side and front views as shown below. [Use Isometric dot paper].



Solution:

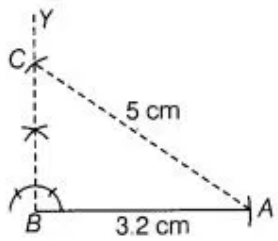
Figure of a solid using the top, side and front views as given is shown below:



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

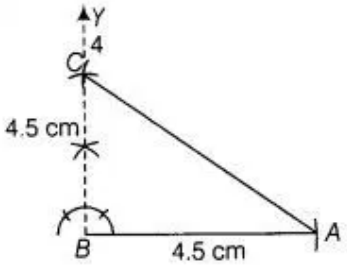
Solution:

The required triangle having hypotenuse measures 5 cm and one of the other sides measures 3.2 cm is shown below:



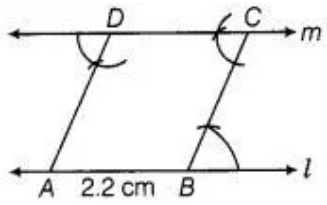
96. Construct a right-angled isosceles triangle with one side (other than hypotenuse) of length 4.5 cm.

Solution:
The required isosceles triangle with one side (other than hypotenuse) of length 4.5 cm is shown below:



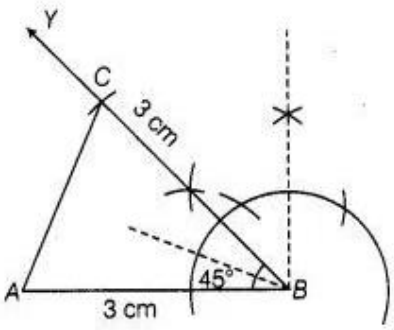
97. Draw two parallel lines at a distance of 2.2 cm apart.

Solution:
Required figure of two parallel lines at a distance of 2.2 cm apart is shown below:



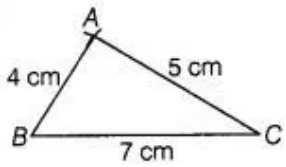
98. Draw an isosceles triangle with each of equal sides of length 3 cm and the angle between them as 45°.

Solution:
The required isosceles triangle with each of equal sides of length 3 cm and the angle between them as 45° is shown below:



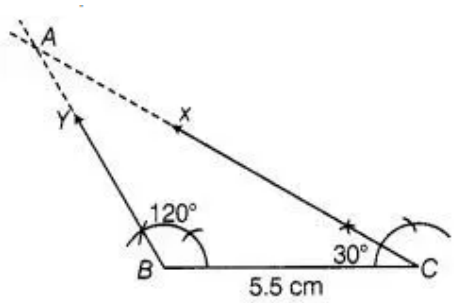
99. Draw a triangle whose sides are of lengths 4 cm, 5 cm and 7 cm.

Solution:
The required triangle whose sides are of lengths 4 cm, 5 cm and 7 cm is shown below:



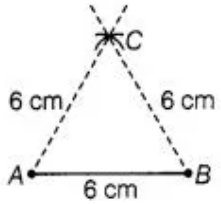
100. Construct an obtuse angled triangle which has a base of 5.5 cm and base angles of 30° and 120°.

Solution:
The required obtuse angled triangle which has a base of 5.5 cm and base angles of 30° and 120° is shown below:



101. Construct an equilateral triangle ABC of side 6 cm.

Solution:
The required equilateral triangle ABC of side 6 cm is shown below:



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

Solution:

The minimum angle by which a regular hexagon rotates so as to coincide with its original position for the first time is 60°.

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

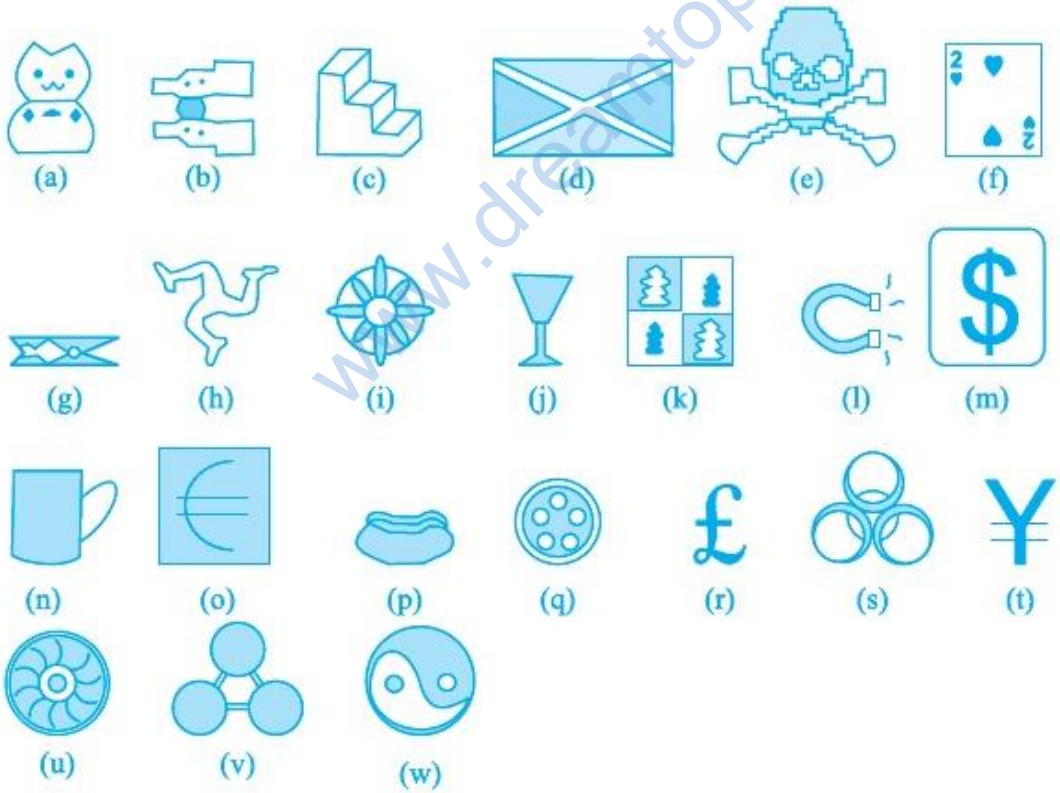


Fig. 12.23

Solution:

The following table below summarises the no. of line of symmetry and order of rotation in each of the given figures.

Figures	Number of lines of symmetry	Order of Rotational symmetry
(a)	1	1
(b)	1	1
(c)	1	1
(d)	2	2
(e)	1	2
(f)	0	1
(g)	1	1
(h)	0	3
(i)	4	4
(j)	1	1
(k)	0	1
(l)	1	1
(m)	0	2
(n)	0	1
(o)	1	1
(p)	0	1
(q)	1	1
(r)	0	1
(s)	3	3
(t)	1	1
(u)	10	10
(v)	3	3
(w)	0	1

104. In the figure 12.24 of a cube,
(i) Which edge is the intersection of faces EFGH and EFBA?
(ii) Which faces intersect at 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 edge AB.
(viii) Give four vertices that do not all lie in one plane.

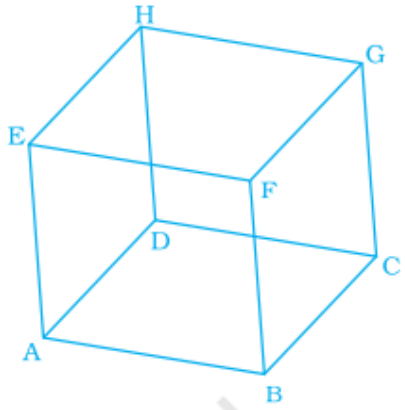


Fig. 12.24

Solution:

(i) As observed from the given figure, EF is the intersection of faces EFGH and EFBA.

(ii) As observed from the given figure, faces EFBA and FBCG intersect at edge FB.

(iii) As observed from the given figure, faces ABFE, ADHE and ABCD form the vertex A.

(iv) As observed from the given figure, vertex D is formed by the faces ABCD, CDHG and ADHE.

(v) As observed from the given figure, edges which are parallel to edge AB are CD, EF and HG.

(vi) As observed from the given figure, edges that are neither parallel nor perpendicular to edge BC are AE, EF, GH and HD.

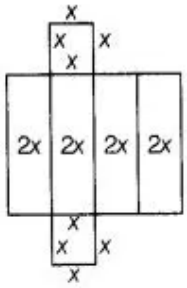
(vii) As observed from the given figure, edges that are perpendicular to edge AB are AE, BF, AD and BC.

(viii) As observed from the given figure, four vertices that do not all lie in one plane are A, B, G and H.

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

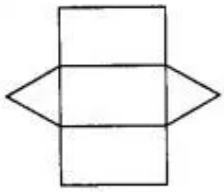
Solution:

Let breadth and height of the cuboid be x units, so length of the cuboid is 2x units.
The required figure of a cuboid having same breadth and height, but length double the breadth is shown below:

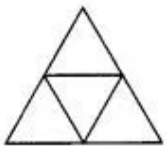


106. Draw the nets of the following:
(i) Triangular prism (ii) Tetrahedron (iii) Cuboid

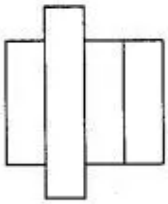
Solution:
(i) The figure for net of Triangular prism is shown below:



(ii) The figure for net of Tetrahedron is shown below:



(iii) The figure for net of Cuboid is shown below:



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

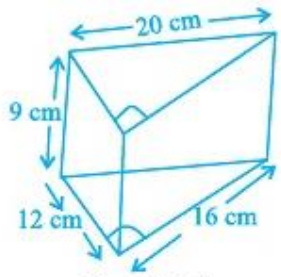
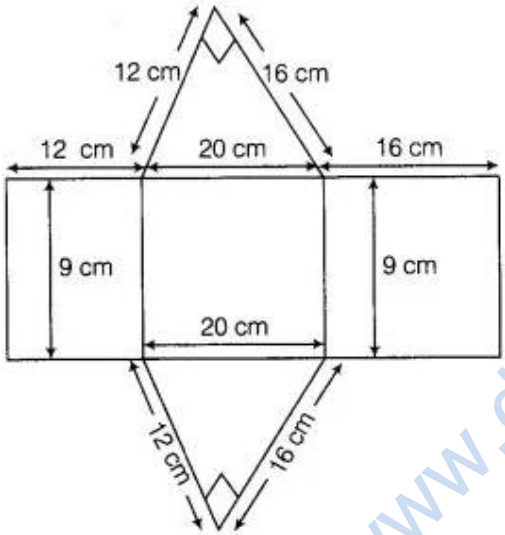


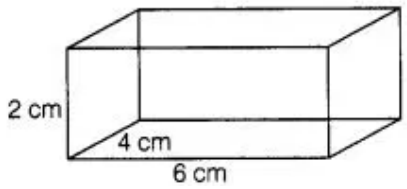
Fig. 12.25

Solution:
The figure of the net of the solid given is shown below:



108. Draw an isometric view of a cuboid 6 cm × 4 cm × 2 cm.

Solution:
The isometric view of a cuboid 6 cm × 4 cm × 2 cm is shown below:



109. The net given below in Fig. 12.26 can be used to make a cube.
(i) Which edge meets AN? (ii) Which edge meets DE?

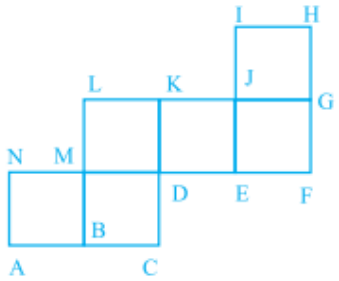


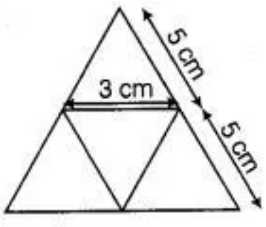
Fig. 12.26

Solution:
(i) As observed from the given net given, edge GN meets edge AN.

(ii) As observed from the given net given, edge DC meets edge DE.

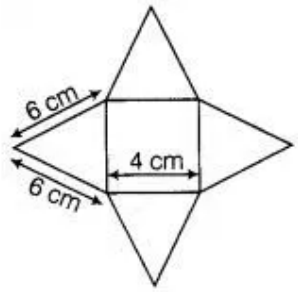
110. Draw the net of triangular pyramid with base as equilateral triangle of side 3 cm and slant edges 5 cm.

Solution:
The net of triangular pyramid with base as equilateral triangle of side 3 cm and slant edges 5 cm is shown below:



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

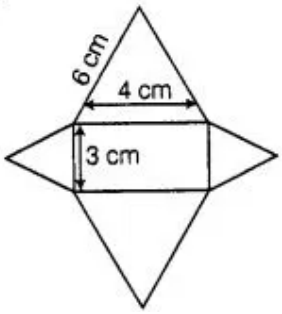
Solution:
The net of a square pyramid with base as square of side 4 cm and slant edges 6 cm is shown below:



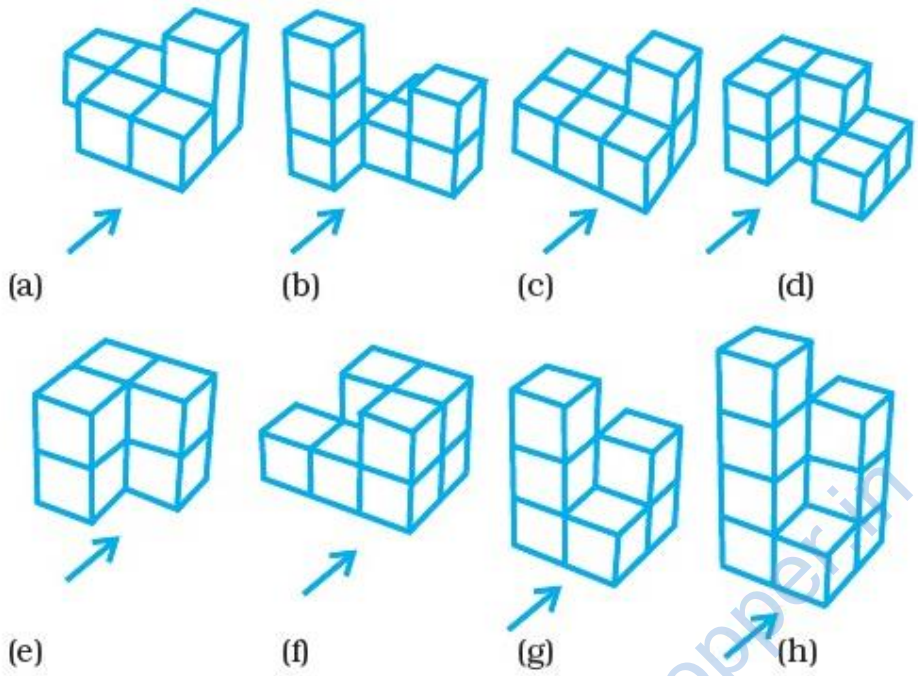
112. Draw the net of rectangular pyramid with slant edge 6 cm and base as rectangle with length 4 cm and breadth 3 cm.

Solution:

The net of rectangular pyramid with slant edge 6 cm and base as rectangle with length 4 cm and breadth 3 cm is shown below:

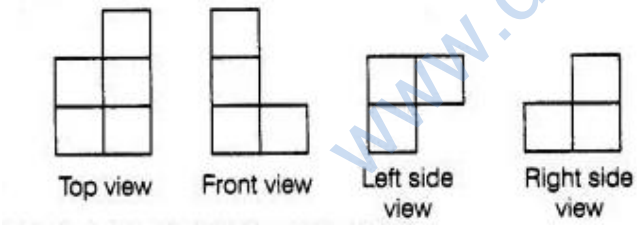


113. Find the number of cubes in each of the following figures and in each case give the top, front, left side and right side view (arrow indicating the front view).

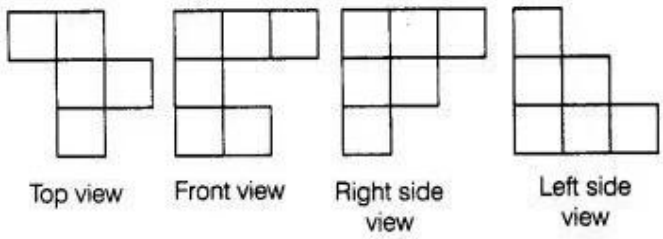


Solution:

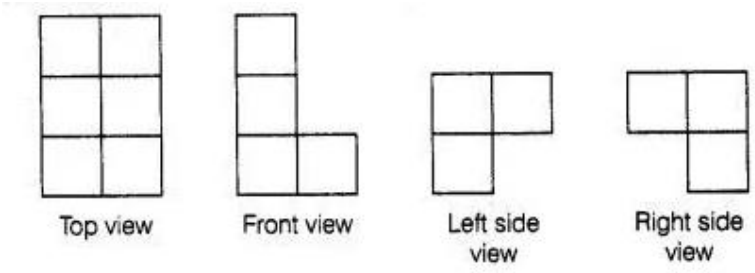
(a) The number of cubes observed in the given figure is 6.
Now, the top, front, left side and right side view of the given figure is given below:



(b) The number of cubes observed in the given figure is 8.
Now, the top, front, left side and right side view of the given figure is given below:



(c) The number of cubes observed in the given figure is 7.
Now, the top, front, left side and right side view of the given figure is given below:

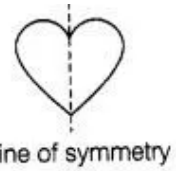


114. Draw all lines of symmetry for each of the following figures as given below:

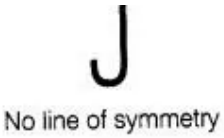
(a)  (b)  (c) 

Solution:

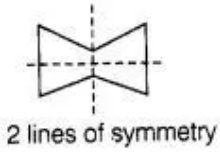
(a) Line of symmetry in the given figure is shown below:



(b) Line of symmetry in the given figure is shown below:



(c) Line of symmetry in the given figure is shown below:



115. How many faces does Fig. 12.27 have?

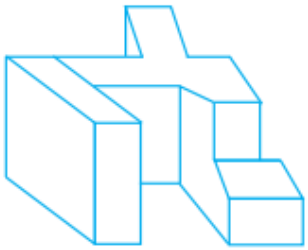


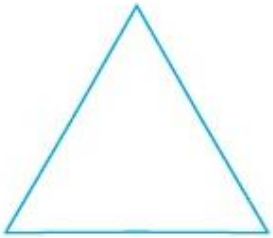
Fig. 12.27

Solution:
As observed in the given figure, there are total 16 faces.

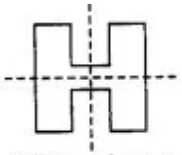
116. Trace each figure. Then draw all lines of symmetry, if it has.

(a) 

(b) 

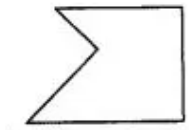
(c) 

Solution:
(a) The given figure along with the line of symmetry is shown below:



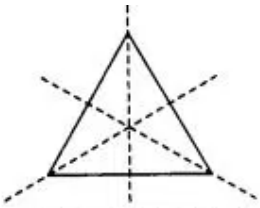
2 lines of symmetry

(b) The given figure along with the line of symmetry is shown below:



No line of symmetry

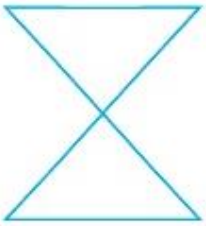
(c) The given figure along with the line of symmetry is shown below:



3 lines of symmetry

117. Tell whether each figure has rotational symmetry or not.

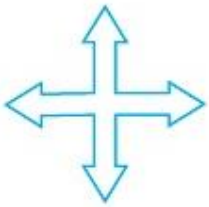
(a)



(b)

(c)

(d)

(e) 

(f) 

Solution:

(a) As observed in the given figure, it possesses rotational symmetry.

(b) As observed in the given figure, it does not possesses rotational symmetry.

(c) As observed in the given figure, it possesses rotational symmetry.

(d) As observed in the given figure, it possesses rotational symmetry.

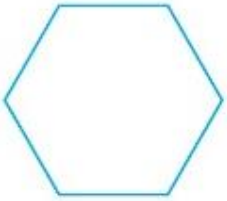
(e) As observed in the given figure, it possesses rotational symmetry.

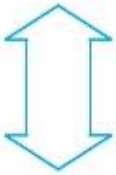
(f) As observed in the given figure, it possesses rotational symmetry.

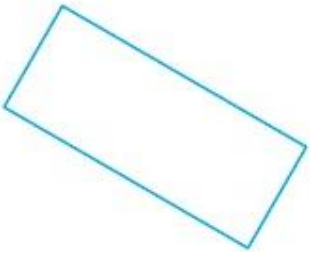
118. Draw all lines of symmetry for each of the following figures.

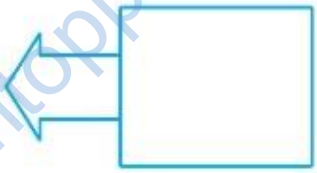
(a) 

(b) 

(c) 

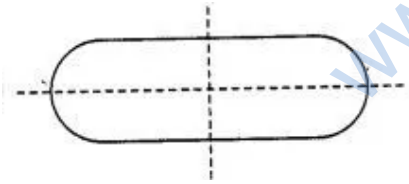
(d) 

(e) 

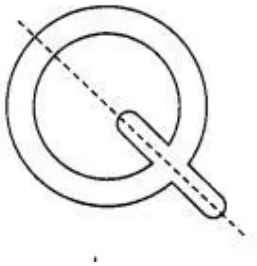
(f) 

Solution:

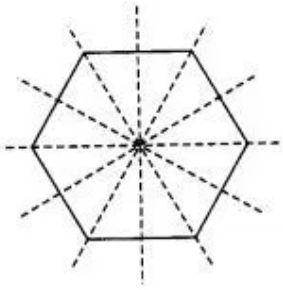
(a) The given figure along with the line of symmetry is shown below:



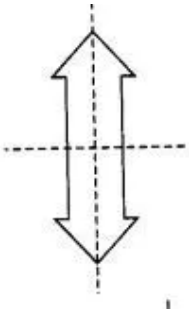
(b) The given figure along with the line of symmetry is shown below:



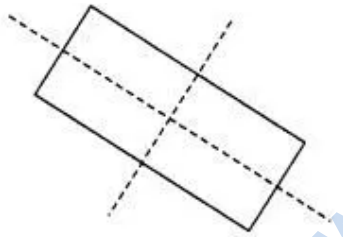
(c) The given figure along with the line of symmetry is shown below:



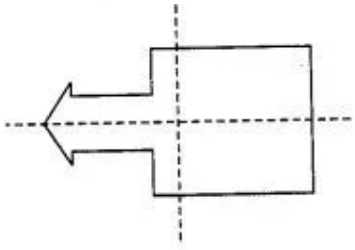
(d) The given figure along with the line of symmetry is shown below:



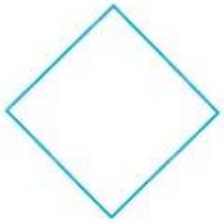
(e) The given figure along with the line of symmetry is shown below:

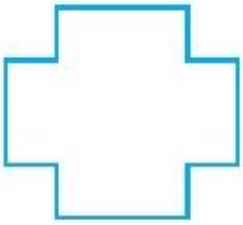


(f) The given figure along with the line of symmetry is shown below:



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

(a) 

(b) 

(c) 

(d) 

Solution:

(a) As observed in the given figure, it possesses rotational symmetry.

(b) As observed in the given figure, it possesses rotational symmetry.

(c) As observed in the given figure, it does not possesses rotational symmetry.

(d) As observed in the given figure, it possesses rotational symmetry.

120. Does the Fig. 12.28 have rotational symmetry?

Fig. 12.28

Solution:

No, the given figure does not display rotational symmetry. This is because there is no symmetry in the figure as one part is undarken and rest of the three parts are darken.

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

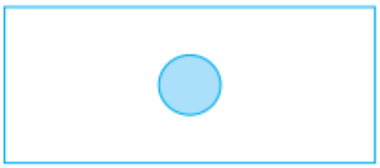
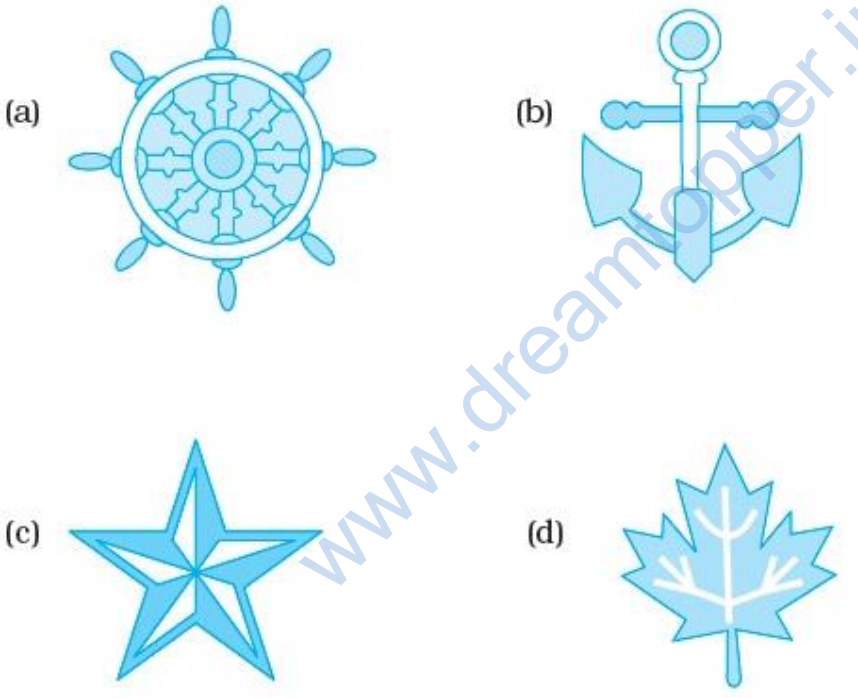


Fig. 12.29

Solution:
As observed, the given figure possesses two lines o symmetry.

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



Solution:
As the given figures are observed, it is concluded that only the figures represented by option (a) and option (c) have both line and rotational symmetry.

123. Which of the following figures do not have line symmetry?

(a) 

(b) 

(c) 

(d) 

Solution:

As the given figures are observed, it is concluded that only the figures represented by option (b) and option (d) does not possesses any line symmetry.

124. Which capital letters of English alphabet have no line of symmetry?

Solution:

Letters F, G, J, L, N, R Q, R, S and Z of English alphabet have no line of symmetry.