MATHS

BOOKS - NCERT EXEMPLAR

VISUALISING SOLID SHAPES

Solved Example

1. A prism is a polyhedron whose lateral faces are

A. Circles

B. Triangles

C. Parallelograms

D. Rhombuses or Rhombi

Answer: C

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2. A pyramid is a polyhedron whose lateral faces are

A. Rectangles

B. Triangles
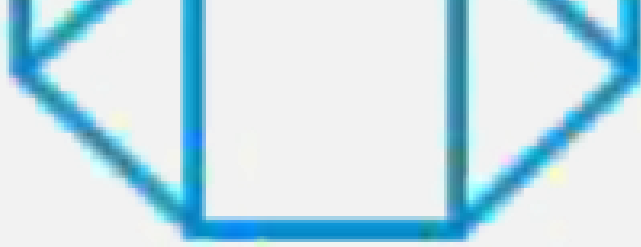
C. Parallelograms

D. Rhombuses or Rhombi

Answer: B

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3. In a regular polyhedron _____ number of faces meet at each vertex.

4. A pentagonal prism has _____ edges.

Pentagonal prism

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5. A sphere is a polyhedron.

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6. In a prism the lateral faces need not be congruent

7. Draw the top, front and side views of the given solid.

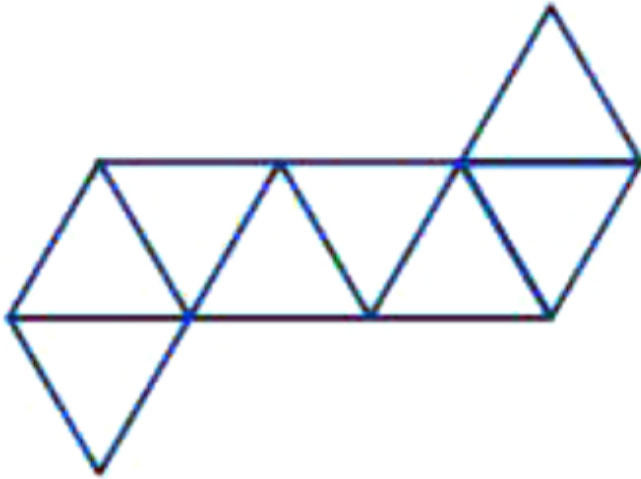**8.** Use isometric dot paper to sketch a rectangular prism with length 4 units, height 2 units and width 3 units.

9. Identify the shape whose net is given below.

10. The solid given below is a rectangular prism or cuboid. Make all the diagonals of this shape.

11. Count the number of cubes in the given shapes.

12. Name the following polyhedrons and verify the Euler's formula for each of them.

(a)　　　　　(b)　　　　　(c)

13. A polyhedron has 7 faces and 10 vertices. How many edges does the polyhedron have?

14. Find the number of vertices in a polyhedron which has 30 edges and 12 faces

15. The distance between City A and City B on a map is given as 6 cm. If the scale represents 1 cm = 200 km, then find the actual distance between City A and City B

16. Height of a building is 9 m and this building is represented by 9 cm on a map. What is the scale used for the map?

17. The scale on a map is 1 mm : 4 m. Find the distance on the map for an actual distance of 52 m.

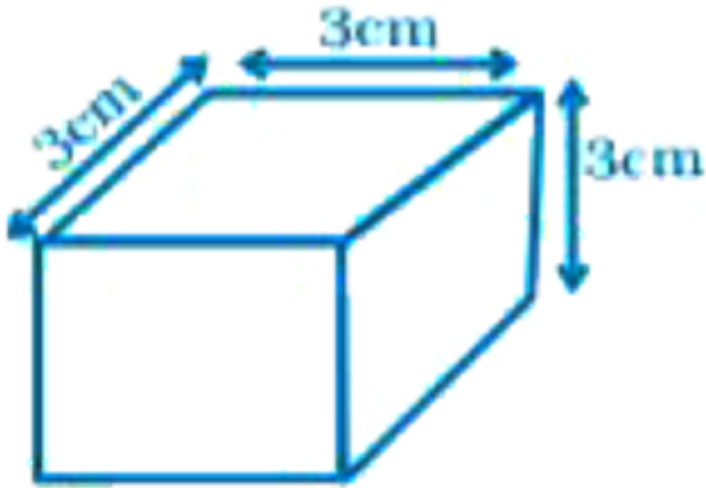▶ Watch Video Solution

18. Application of problem solving strategy
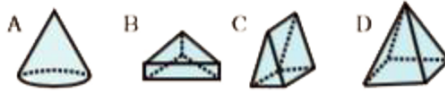
Determine the number of edges, vertices and

in the following figure:

Try This

1. Complete the table for the number of vartices V, for edges E and for faces F each of the polyhedrons you made.

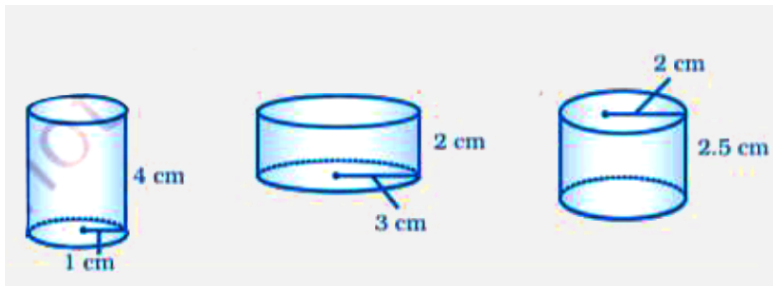
Front Top Side

A B C D

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2. Make a conjuecture What do you think is true about the relationship between the number of vertices, edges and faces of a polyhedron ?

3. Find the volume of each cylinder.

Use for π round to the nearest tenth.

4. The maximum length of a pencil that can be

kept in a rectangular box of dimensions

$8cm \times 6cm \times 2cm$, is

5. The length of a rectangle is 2 cm more than its breadth. If the perimeter of the rectangle is 36 cm , find its length.

Think And Discuss

1. How you would find the surface area of an open-top box that is shaped like a rectangular prism.

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2. The shapes in a net used to cover a cylinder

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3. If the edge lengths of a cubical block are 2 cm, what is the block's surface area?

4. The perimeter of the base of a right circular cylinder is 'a' unit. If the volume of the cylinder is V cubic unit, then the height of the cylinder is

5. What do all the prisms have in common?

6. STATEMENT - 1 : The while light incident on a prism, after emerging from the prism will form a spectrum of rays.

and

STATEMENT - 2 : For different colours, a prism has different refractive indices.

7. Explain how spectrum is formed by a prism with the help of a diagram.

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8. Compare and contrast scalars and vectors

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9. Compare and contrast scalars and vectors

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10. Find the sum of cubes of first 10 natural number .

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11. Suppose you know the area of the base of a prism and the height of the prism. How can you find the prism's volume?

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12. Let the area of the base of a prism be B and the height of the prism be h. Write a formula for the prism's volume V.

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13. Suppose you know the area of the base of a cylinder and the height of the cylinder. How can you find the cylinder's volume?

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14. Let the area of the base of a cylinder be B and the height of the cylinder be h. Write a formula for the cylinder's volume V.

15. The base of a cylinder is a circle with radius r. How can you find the area of the base? How can you use this in your formula for the volume of a cylinder?

16. Tell whether a figure's surface area has increased or decreased if each dimension of the figure is changed by a factor of $\frac{1}{3}$.

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17. Explain how the surface area of a box is changed if each dimension is multiplied by a factor of 3.

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18. Explain how the volume of a figure is changed if each dimension is multiplied by a factor of 2.

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Exercise

1. Which amongst the following is not a polyhedron?

A.

B.

C.

D.

Answer:

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2. Which of the following will not form a polyhedron?

A. 3 triangles

B. 2 triangles and 3 parallelogram

C. 8 triangles

D. 1 pentagon and 5 triangles

Answer:

3. Which of the following is a regular polyhedron?

A. Cuboid

B. Triangular prism

C. Cube

D. Square prism

Answer:

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4. Which of the following is a two Dimensional figure?

A. Rectangle

B. Rectangular Prism

C. Square Pyramid

D. Square Prism

Answer:

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5. Which of the following can be the base of a pyramid?

A. Line segment

B. Circle

C. Octagon

D. Oval

Answer:

6. Which of the following 3D shapes does not have a vertex?

A. Pyramid

B. Prism

C. Cone

D. Sphere

Answer: D

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7. Solid having only line segments as its edges

is a

A. Polyhedron

B. Cone

C. Cylinder

D. Polygon

Answer:

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8. In a solid if F = V = 5, then the number of edges in this shape is

A. 6

B. 4

C. 8

D. 2

Answer: C

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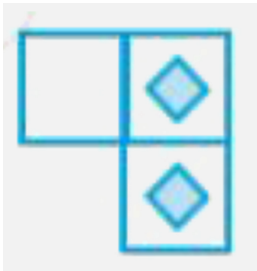**9.** Which of the following is the top view of the given shape?

Top

Side

Front

A.

B.

C.

D.
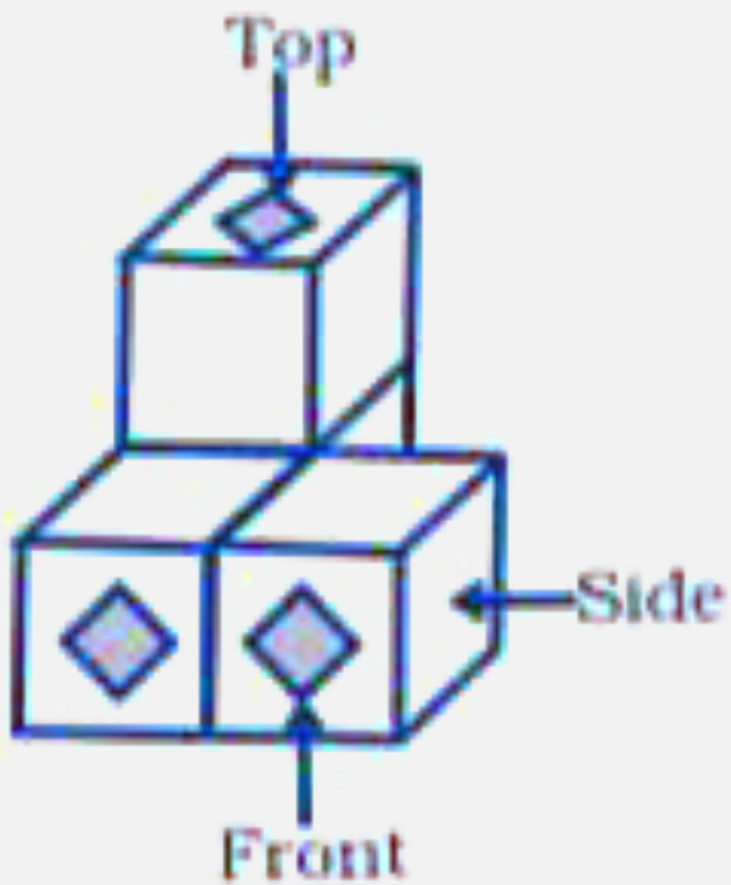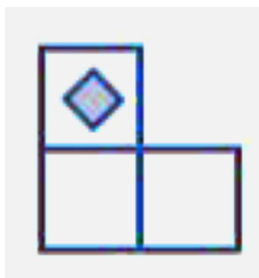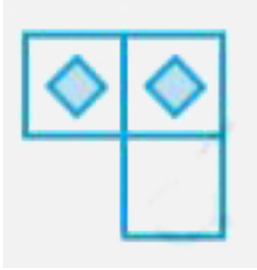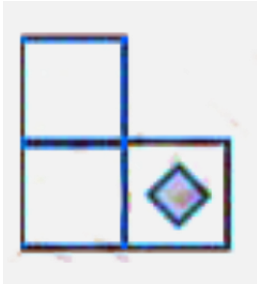
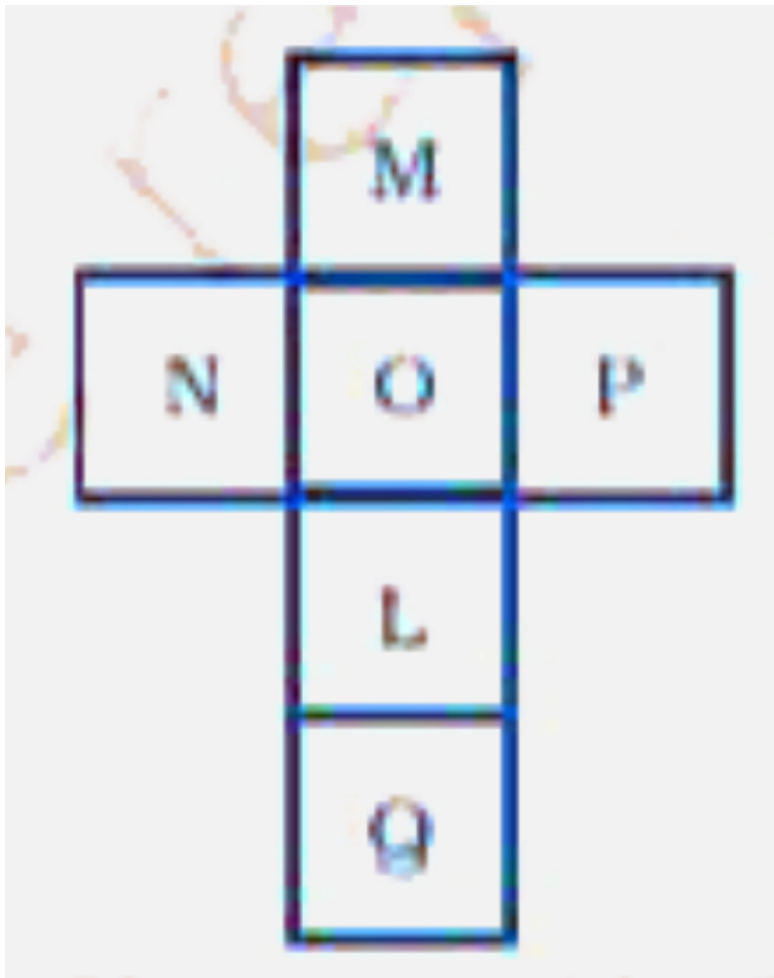**Answer:**

10. The net shown below can be folded into the shape of a cube. The face marked with the letter L is opposite to the face marked with which letter?

A. M

B. N

C. Q

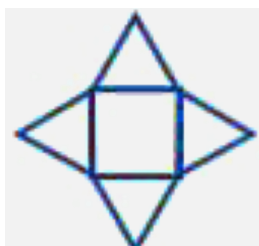D. O

Answer:

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11. Which of the nets given below will generate

a cone?

A.

B.

C.

D.

Answer:

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12. Which of the following is not a prism?

A.

B.

C.

D.

Answer:

13. We have 4 congruent equilateral triangles.

What do we need more to make a pyramid?

A. An equilateral triangle

B. A square with same side length as of

triangle.

C. 2 equilateral triangles with side length

same as triangle.

D. 2 squares with side length same as

triangle.

Answer:

14. Side of a square garden is 30 m. If the scale used to draw its picture is 1cm: 5m, the perimeter of the square in the picture is

A. 20 cm

B. 24 cm

C. 28 cm

D. 30 cm

Answer:

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15. Which of the following shapes has a vertex.

A.

B.

C.

D.

Answer:

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16. Which of the following cannot be true for a polyhedron?

A. $V = 4, F = 4, E = 6$

B. $V = 6, F = 8, E = 12$

C. $V = 20, F = 12, E = 30$

D. $V = 4, F = 6, E = 6$

Answer:

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17. In a blueprint of a room, an architect has shown the height of the room as 33 cm. If the actual height of the room is 330 cm, then the scale used by her is
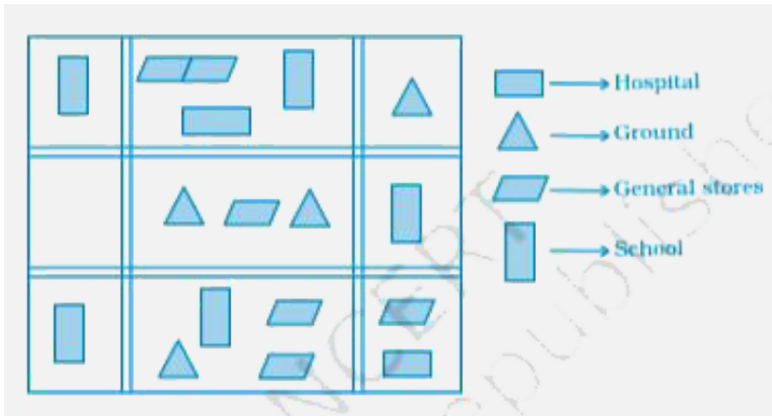
A. $1:11$

B. $1:10$

C. $1:100$

D. $1:3$

Answer:

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18. The following is the map of a town. Based on it answer question 19-21.

The number of hospitals in the town is

A. 1

B. 2

C. 3

D. 4

Answer:

19. The ratio of the number of general stores

and that of the ground is

A. $1 : 2$

B. $2 : 1$

C. $2 : 3$

D. $3 : 2$

Answer:

20. According to the map, the number of schools in the town is

A. 4

B. 3

C. 5

D. 2

Answer:

21. Square prism is also called a _____.

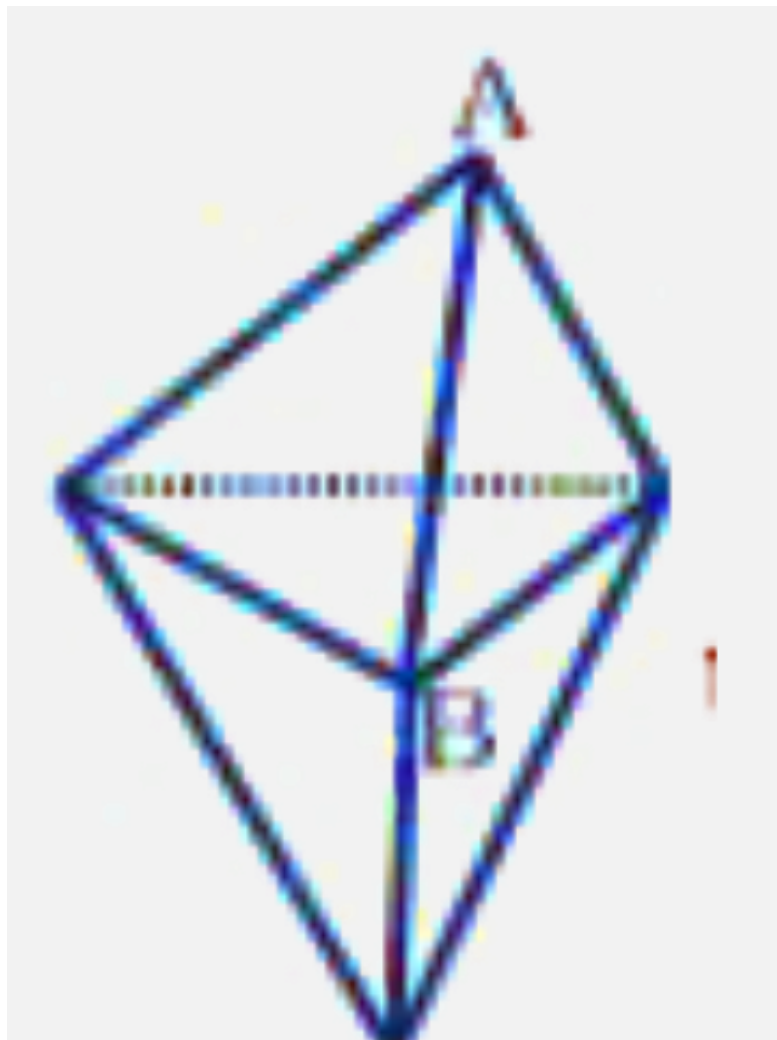**22.** Rectangular prism is also called a _____.

23. In the figure

the number of faces meeting at B is _____.

24. A pyramid on an n sided polygon has _____ faces.

25. If a solid shape has 12 faces and 20 vertices, then the number of edges in this solid is _____.

26. The given net
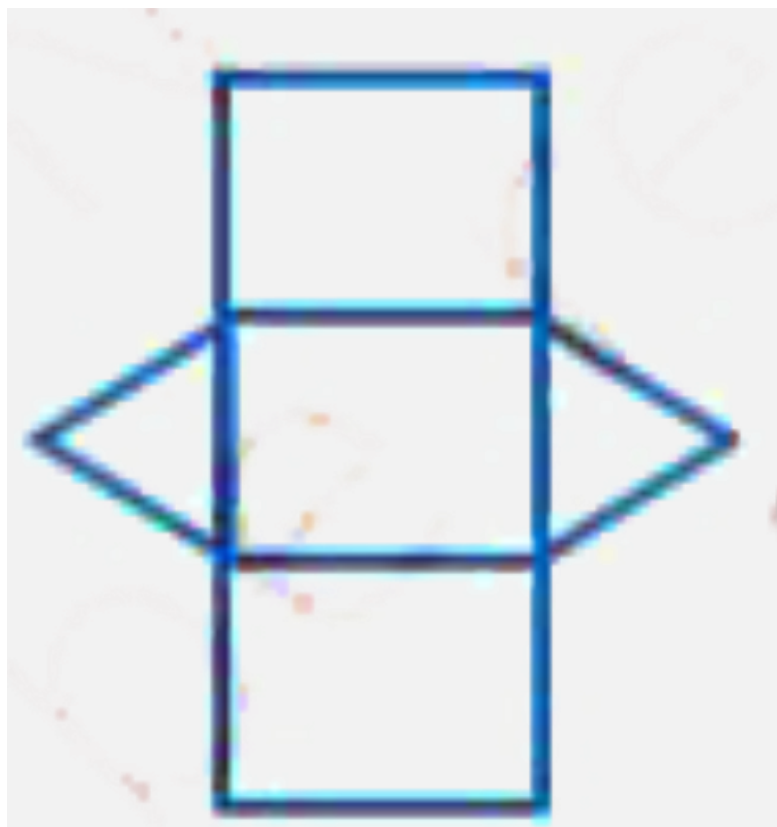
can be folded to make a _____.

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27. A solid figure with only 1 vertex is a _____.

28. Total number of faces in a pyramid which has eight edges is_____.

29. The net of a rectangular prism has _____ rectangles.

30. In a three-dimensional shape, diagonal is a line segment that joins two vertices that do not lie on the _____ face.

31. If 4 km on a map is represented by 1 cm, then 16 km is represented by _____ cm.

32. If actual distance between two places A and B is 110 km and it is represented on a map by 25 mm. Then the scale used is _____.

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33. A pentagonal prism has _____ faces

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34. If a pyramid has a hexagonal base, then the number of vertices is _____.

35. is the _____ view of

36. The number of cubes in

are _____.

37. If the sum of number of vertices and faces in a polyhedron is 14, then the number of

edges in that shape is _____.

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38. Total number of regular polyhedra is _____.

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39. A regular polyhedron is a solid made up of _____ faces.

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40. For each of the following solids, identify the front, side and top views and write it in the space provided
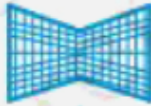
(i)   _____

(ii)   _____

(iii)   _____

(i)   _____

(ii)   _____

(iii)   _____

(i) _____

(ii) _____

(iii) _____

(i) _____

(ii) _____

(iii) _____

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41. The other name of cuboid is tetrahedron.

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42. A polyhedron can have 3 faces.

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43. State whether the following statements are True or False. A polyhedron with least number of faces is known as a triangular pyramid.

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44. Regular octahedron has 8 congruent faces which are isosceles triangles

45. Pentagonal prism has 5 pentagons.

46. Every cylinder has 2 opposite faces as congruent circles, so it is also a prism.
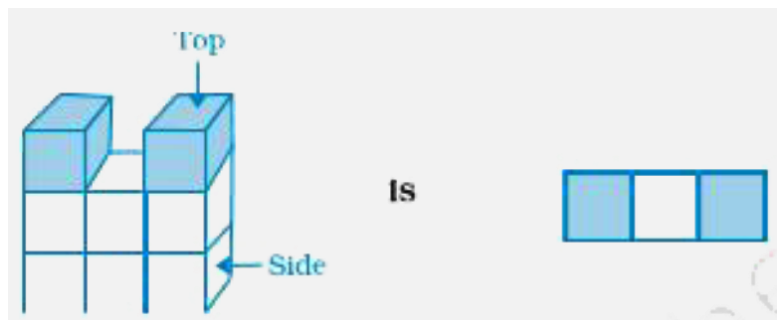
47. Euler's formula is true for all three-dimensional shapes.

48. A polyhedron can have 10 faces, 20 edges and 15 vertices.

49. True (T) or false (F)

The top view of

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50. The number of edges in a parallelogram is

4. (True/False)

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51. Every solid shape has a unique net.

52. Pyramids do not have a diagonal.

53. The given shape is a cylinder.

54. A cuboid has atleast 4 diagonals. (True/False)
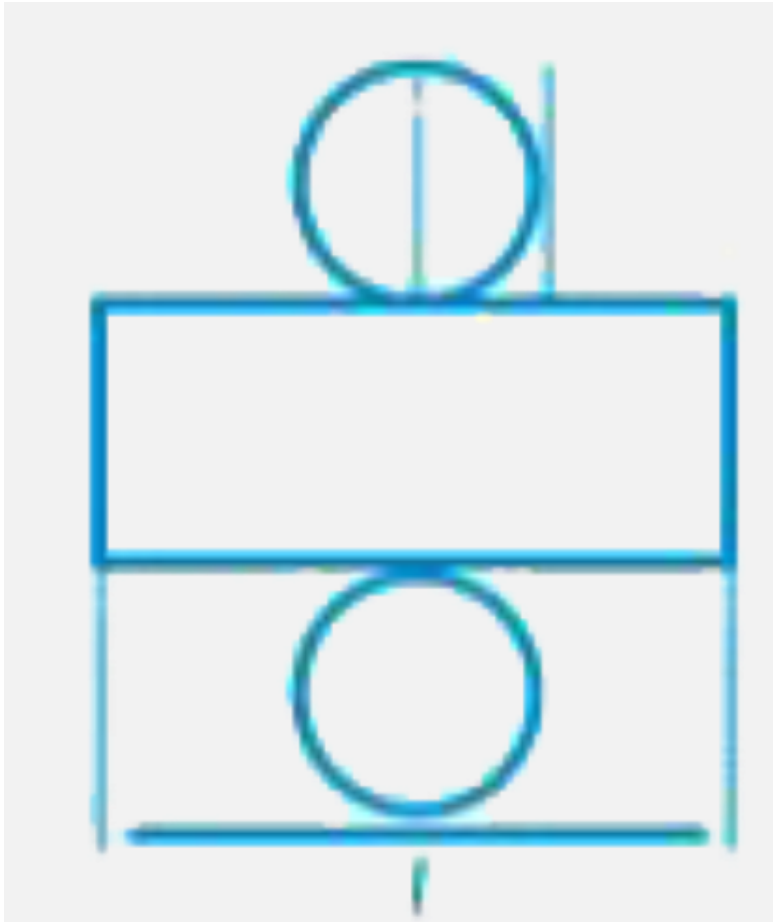
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55. All cubes are prisms.

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56. A cylinder is a 3-D shape having two circular faces of different radii.

57. On the basis of the given figure, the length

of a rectangle in the net of a cylinder is same

as circumference of circles in its net.

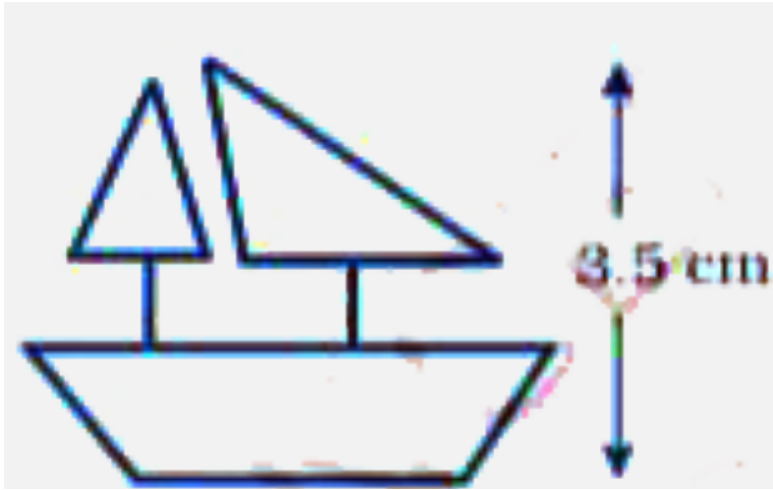**58.** If a length of 100 m is represented on a map by 1 cm, then the actual distance corresponding to 2 cm is _____.

59. The model of a ship shown is of height 3.5 cm. The actual height of the ship is 210 cm if

the scale chosen is 1: 60.

60. The actual width of a store room is 280 cm.

If the scale chosen to make its drawing is 1:7,

then the width of the room in the drawing will

be _____.

61. How many faces does each of the following

solids, have?

Tetrahedron

Hexahedron

Octagonal Pyramid

Octahedron

62. Draw a prism with its base as regular hexagon with one of its face facing you. Now draw the top view, front view and side view of this solid.

63. How many vertices does each of the following solids have?

(a) cone

(b) Cylinder

(c) Sphere

(e) Tetrhedron

(f) Hexagonal Prism

64. How many edges does each of following solids have?

(a) Cone

(b) Cylinder

(c) Sphere

(d) Octagonal Pyramid

(e) Hexagonal Prism (f) Kaleidoscope

65. Using Euler's formula, find the value of unknown x, y, z, p, q, r, in the following table.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Faces	7	y	9	p	6	8
Vertices	10	12	z	6	q	11
Edges	x	18	16	12	12	r

66. Can a polyhedron have V = F = 9 and E = 16 ?

If yes, draw its figure

67. Check whether a polyhedron can have V =

12, E = 6 and F = 8.

68. A polyhedron has 60 edges and 40 vertices.

Find the number of its faces.

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69. A polyhedron has 20 faces and 12 vertices.

Find the edges of the polyhedron.

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70. A solid has forty faces and, sixty edges. Find the number of vertices of the solid.

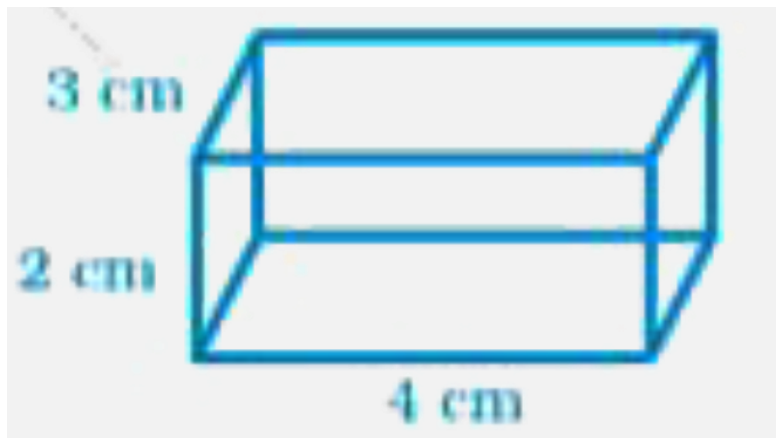**71.** Draw the net of a regular hexahedron with side 3 cm. (Hint: Regular hexahedron - cube)

72. Draw the net of a regular tetrahedron with side 6 cm.

73. Draw the net of the following cuboid:

74. Match the following:

Figure	Name
(a)	(a) Hexahedron
(b)	(b) Hexagonal Prism
(c)	(c) Square Pyramid
(d)	(d) Cone

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75. Complete the table given below by putting

tick mark across the respective property found

in the solids mentioned.

| Properties	Solids			
	Cone	Cylinder	Prism	Pyramid
1. The figure is a Polyhedron.				
2. The figure has diagonals.				
3. The shape has curved edges				
4. The base of figure is a polygon.				
5. The bases are congruent				
6. The base of figure is a polygon and other faces meet at a single point.				
7. The base of figure is a curved edge and other faces meet at a single point.				

76. Draw the net of the following shape.
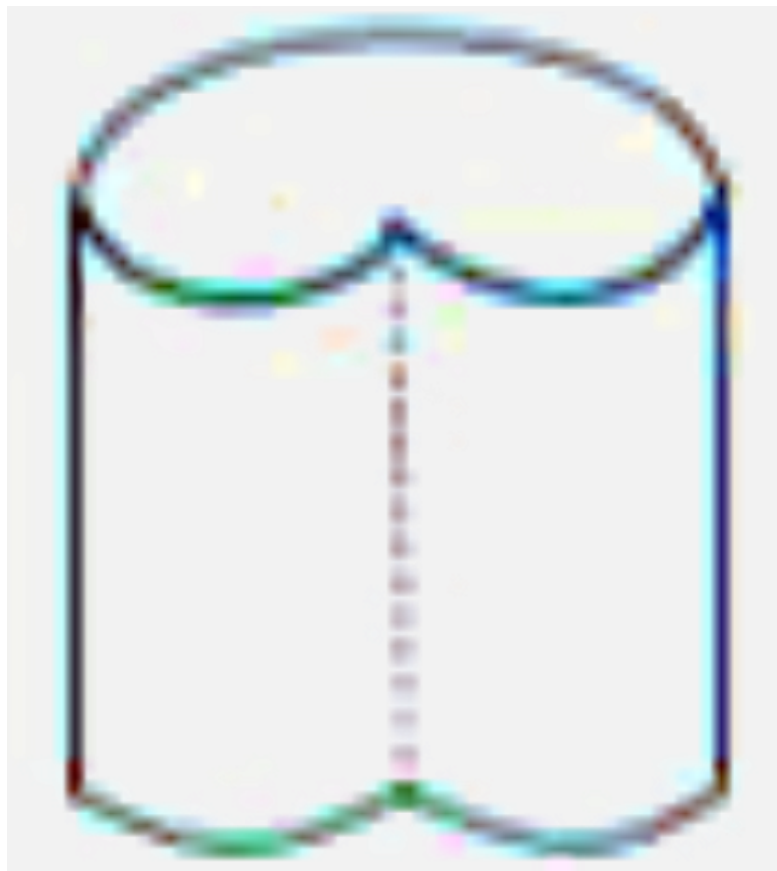
77. Draw the net of the following solid.

78. Find the number of cubes in the base layer of the following figure.
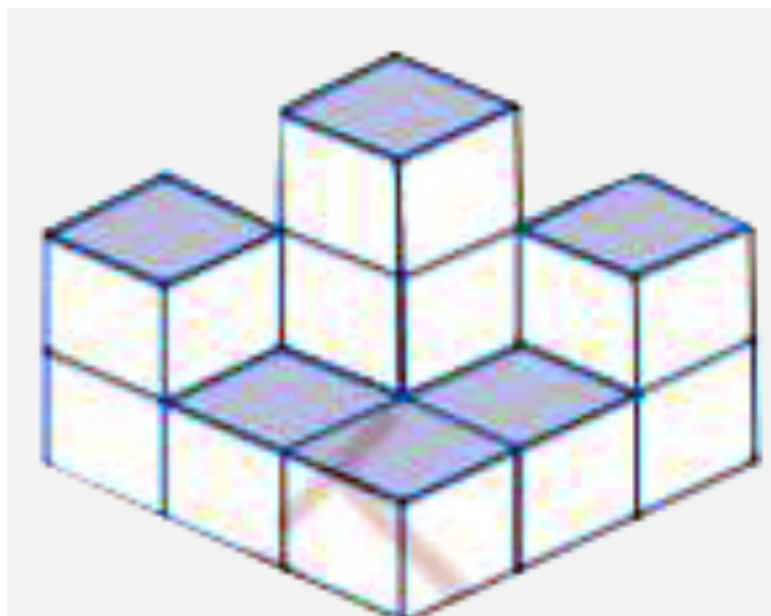
79. In the above figure, if only the shaded cubes are visible from the top, draw the base layer.

80. How many faces, edges and vertices does a pyramid have with n sided polygon as its base?
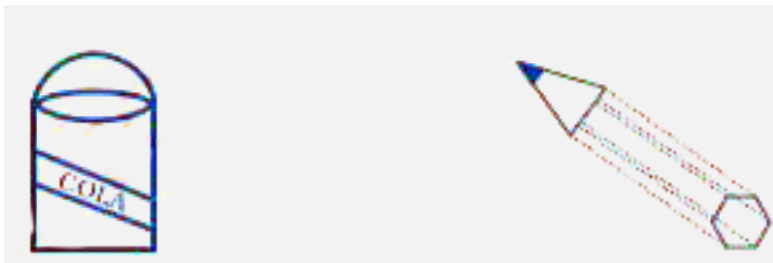
81. Draw a figure that represents your mathematics textbook. What is the name of this figure? Is it a prism?

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82. In the given figures, identify the different shapes involved.

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83. The edge of a cube is decreasing at the rate of 0.04 cm/sec. If the edge of cube is 10 cm, then the rate of decrease of its surface area is

84. Draw a map of your school playground. Mark all necessary places like 2 library,

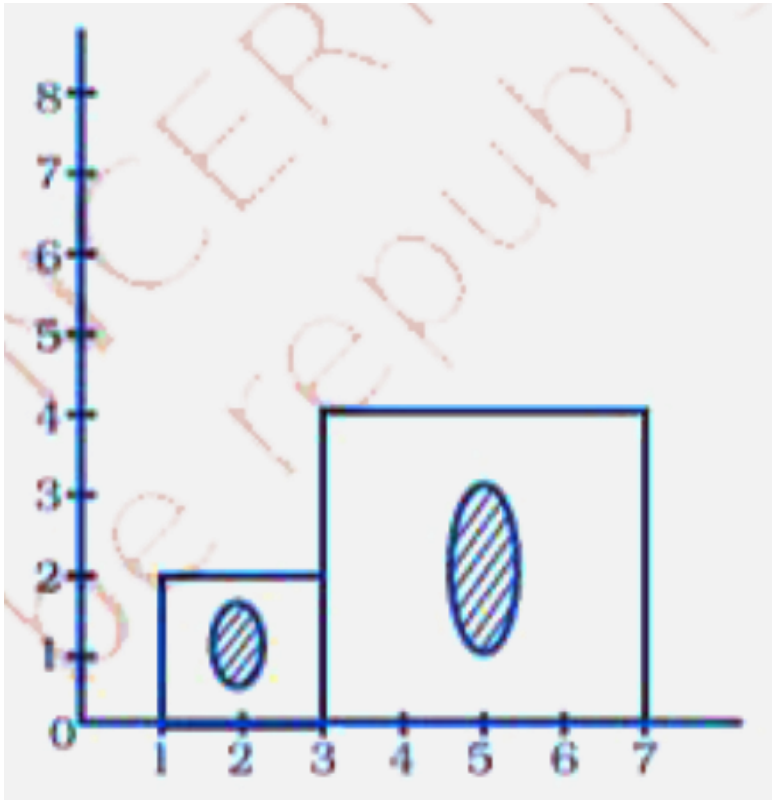Playground, Medical Room, Classrooms, Assembly area, etc.

85. A photographer uses a computer program to enlarge a photograph. What is the scale

according to which the width has enlarged?

86. The side of a square board is 50 cm. A student has to draw its image in her notebook. If the drawing of the square board in the notebook has perimeter of 40 cm, then by which scale the figure has been drawn?

87. The distance between school and house of a girl is given by 5 cm in a picture, using the

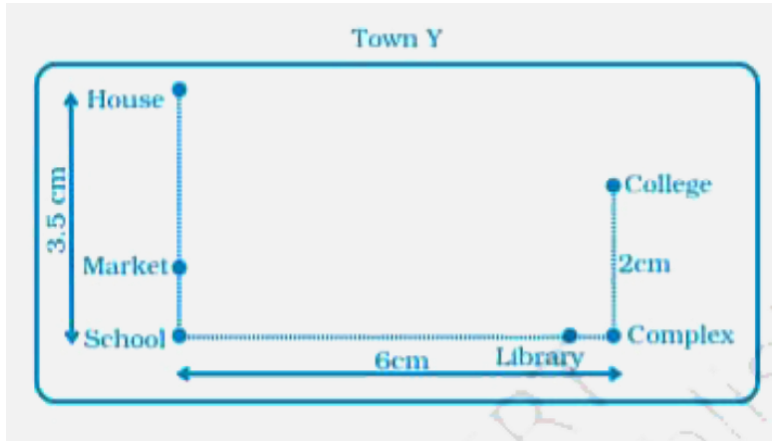scale 1 cm : 5 km. Find the actual distance between the two places?

88. Use a ruler to measure the distance in cm between the places joined by dotted lines. If the map has been drawn using the scale 1 cm :10 km, find the actual distances between

(1) School and Library

(2) College and Complex

(3) House and School

89. The actual length of a painting was 2 m. What is its length in the photograph if the

scale used is 1 mm : 20 cm.

90. Find the scale.

(a) Actual size 12 m Drawing size 3 cm

(b) Actual size 45 feet Drawing size 5 inches

91. In a town, an ice cream parlour has displayed an ice cream sculpture of height 360 cm. The parlour claims that these ice creams and the sculpture are in the scale 1:30. What is the height of the ice creams served?