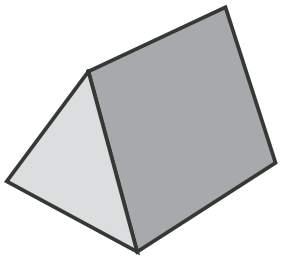

Activity 19

Area of a right triangular prism and a pyramid

Objective

To make the net for a right triangular prism and a right triangular pyramid (regular tetrahedron) and obtain the formulae for the total surface area.

Pre-requisite knowledge

1. Construction of a right triangular prism and a right triangular pyramid in terms of their faces.
2. Understanding of the terms lateral surface area and total surface area.
3. Formulae for the area of a rectangle and a triangle.

Material Required

Chart paper, scale, pencil, a pair of scissors and gum.

Procedure

A) Right triangular Prism

1. Draw the nets with given dimensions on a chart paper.
2. Cut out these nets.
3. Fold along the lines to form a prism. Join the edges with gum.
4. Obtain the two prisms.

Observations

1. Observe that prism obtained from the net in Fig 19 (a) has three congruent squares as lateral surfaces and two congruent equilateral triangles as base.
2. The lateral surface area in this case = 3 × the area of square.
3. The total surface area = lateral surface area + 2 × the area of the equilateral triangle
4. Observe that the prism obtained from the net in Fig 19 (b) has three congruent rectangles as lateral surface and two equilateral triangles as base.
5. So, the lateral surface area in this case = 3 × the area of rectangle.

The total surface area = lateral surface area + 2 × the area of equilateral triangle.

B) Right triangular pyramid (Regular tetrahedron)

1. Draw the net with given dimensions on a chart paper.
2. Cut out this net.
3. Fold along the lines to form a pyramid. Join the edges with gum.
4. Obtain the right triangular pyramid.

Observations

Observe that the pyramid obtained from net in Fig 19 (c) has four congruent equilateral triangles, where three congruent equilateral triangles form lateral surface of pyramid and one triangle forms the base.
So the lateral surface area of pyramid = 3 × the area of equilateral triangle.
Total surface area of pyramid = lateral surface area + area of base triangle
= 4 × the area of equilateral triangle.

Learning Outcome

The students learn to make prisms and pyramids from nets. Further they are able to obtain lateral and total surface area in terms of the area of triangles and rectangles.

Remark

Teachers should help the students to observe, that
3 × the area of rectangle = perimeter of base × height

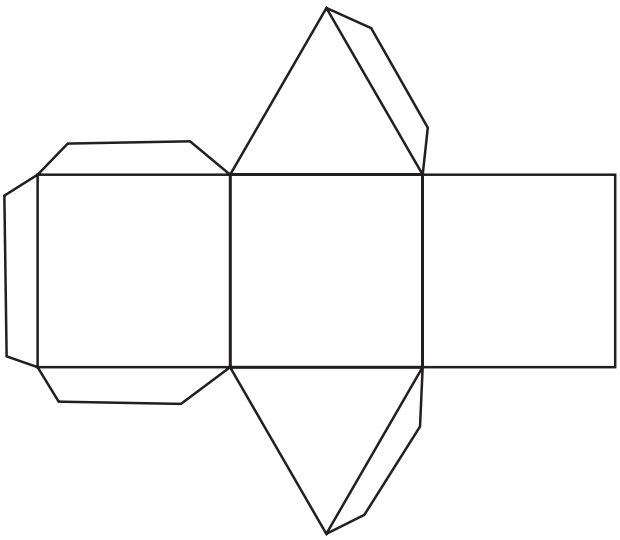

Fig 19 (a)

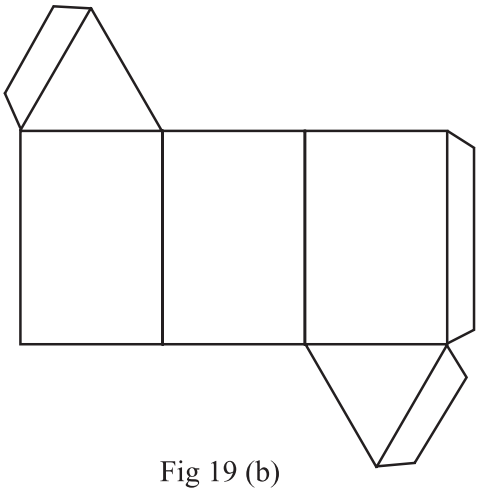

Fig 19 (b)

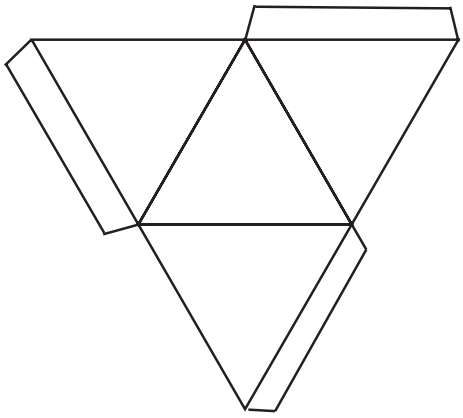

Fig 19 (c)