Unit 5 · Area and Volume

WORKSHEET

Full marks 33

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

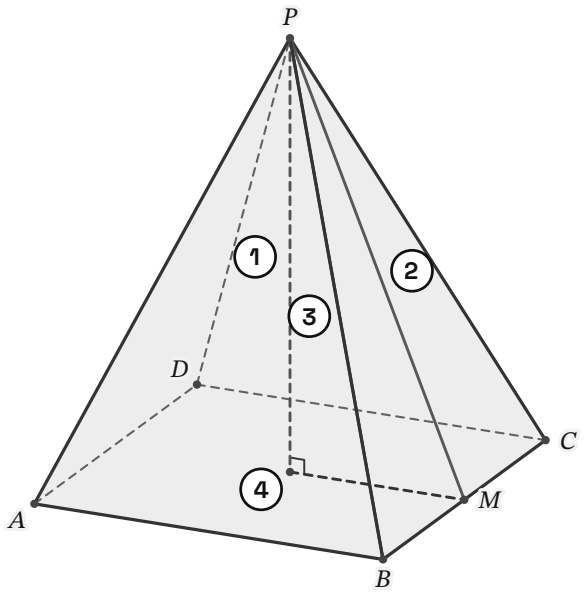
1 Key words [3]

Match each word or formula in Column A with its meaning in Column B. Write the letter in the box. One meaning in Column B is not needed. Each match carries 0.5 mark.

Column A		Column B
1. slant height	☐	**a.** the curved surface area of a cone
2. vertical height	☐	**b.** the area of every face, the base included
3. lateral surface area	☐	**c.** the distance from the apex straight down to the center of the base
4. total surface area	☐	**d.** the height of a sloping face, from the apex to the middle of a base edge
5. $\frac{1}{3}\,a^2\,h$	☐	**e.** the area of the sloping faces only
6. $\pi\,r\,l$	☐	**f.** the volume of a cylinder
		g. the volume of a square pyramid

2 Fill the diagram [2]

The drawing shows a square pyramid. For each numbered label, write its letter: h for the vertical height, l for the slant height, e for an edge, or O for the center of the base. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. A square pyramid has a base 10 cm square and a vertical height of 12 cm. What is its slant height? [1]

a. 12 cm **b.** 13 cm

c. 15.6 cm **d.** 22 cm

ii. A cone and a cylinder have the same base and the same height. The cylinder holds 300 cm^3. How much does the cone hold? [1]

a. 100 cm^3 **b.** 150 cm^3

c. 300 cm^3 **d.** 900 cm^3

iii. A cone has radius 7 cm and slant height 10 cm. What is its curved surface area? ($\pi = 22/7$) [1]

a. 154 cm^2 **b.** 220 cm^2

c. 374 cm^2 **d.** 440 cm^2

iv. The height of a cone is doubled and its base kept the same. Its volume [1]

a. doubles **b.** becomes 4 times as much

c. becomes 8 times as much **d.** stays the same

v. A dome, a hemisphere of radius r, sits on a cylindrical tower of the same radius and height h. What is the area of the outside surface, the floor left out? [1]

a. $2\pi rh + 2\pi r^2$ **b.** $2\pi rh + 3\pi r^2$

c. $2\pi rh + \pi r^2$ **d.** $2\pi rh + 4\pi r^2$

4 Very short answers [3]

Write very short answers to the following questions.

a. Write the formula for the total surface area of a cone of radius r and slant height l. [1]

b. A square pyramid's base is 6 cm square, and its four triangles together have an area of 60 cm^2. What is its total surface area? [1]

c. A cone holds 154 cm^3. How much does a cylinder with the same base and height hold? [1]

5 Short answers [6]

Write short answers to the following questions.

a. Explain why a pyramid's slant height is always more than its vertical height. [2]

b. Ram found the volume of a cone of radius 7 cm and slant height 25 cm as $\frac{1}{3} \times \frac{22}{7} \times 7^2 \times 25 \approx 1283.33\ \text{cm}^3$. Find his mistake and write the correct volume. **[2]**

c. A cone's curved surface area is 550 cm^2 and its radius is 7 cm. Find its slant height. **[2]**

6 Problems [12]

Solve the following problems. Show your working.

a. Sophiya has a pot shaped like a square pyramid, 25 cm high on a base 30 cm square. How much water does it hold when full? **[2]**

Answer:

b. A cone-shaped tent has volume 1,232 m^3 and its floor has area 154 m^2. Find the radius of its floor and its height. **[3]**

Answer:

c. A toy is a cone and a hemisphere, both of radius 14 cm; it is 49 cm high. Find its total surface area. **[3]**

Answer:

d. Another room is 1 ft longer, wider and higher than the first, and its four walls (windows and doors included) are painted at Rs 340 a square foot. By how much does the cost rise or fall? **[4]**

Answer: _____

7 Think **[2]**

Think, then answer.

A square pyramid and a cone are the same height, and the pyramid's base has the same area as the cone's base. Which holds more? Explain.

8 Activity: Roll a cone (not marked)

Draw a circle of radius 10 cm on paper and cut out a sector (a slice) of it: 180°, then 120°, then 90°. Roll each into a cone and tape it. Measure its radius and height, then work them out from the sector, and fill in the table.

	Sector 1	Sector 2	Sector 3
angle of the sector	180°	120°	90°
slant height l, cm	10	10	10
radius measured, cm			
radius worked out, $l \times \text{angle} \div 360$			
height measured, cm			
height worked out, $\sqrt{l^2 - r^2}$			

Which cone is tallest? Why?