

Algebra & Geometry

Mathematics 306/326

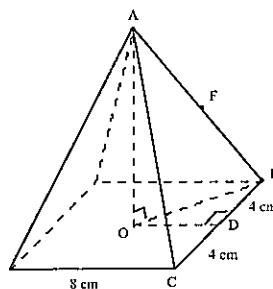
REVIEW

1

The adjacent right pyramid has a square base with side 8 cm. Height AO is 12 cm.

An ant sits at point F midway between A and B. Bait has been put at C.

If the ant takes path FBC to get to the bait, what distance must it cover?



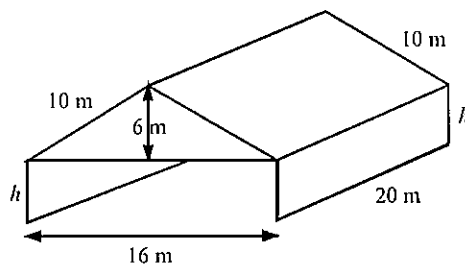
Give your answer to the nearest centimetre.

Work

Result : The ant must cover a distance of _____ cm.

2

It takes 776 m^2 of building material to cover the exterior surface of an airplane hangar completely. The hangar has two identical openings, one at each end. Each gable above the opening is 6 metres high. The dimensions of the hangar are shown below.



What is the height h of each opening of this hangar?

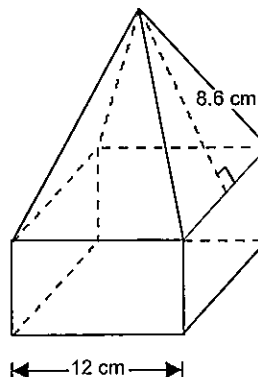
Work

Result : The height of the openings is _____.

3

A box, in the shape of a square-based prism topped by a right pyramid, has a volume of 728 cm^3 . Its dimensions are indicated on the figure to the right.

What is the total height of this box?



Work

Answer : The total height of the box is _____ cm.

Ann Serkey Algebra & Geometry

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REVIEW

1- Contents

Question	Item	Objective	Type	Skill
1	0011	ALG.04	Extended answer	Problem solving
2	0231	GEO.04	Extended answer	Problem solving
3	0254	GEO.04	Extended answer	Problem solving
4	0263	ALG.04	Extended answer	Problem solving
5	0303	GEO.03	Extended answer	Problem solving
6	0362	GEO.04	Extended answer	Problem solving
7	0369	GEO.04	Extended answer	Problem solving
8	0407	GEO.04	Extended answer	Problem solving
9	0410	GEO.04	Extended answer	Problem solving
10	0475	GEO.04	Extended answer	Problem solving
11	0501	GEO.04	Extended answer	Problem solving
12	0597	GEO.04	Extended answer	Problem solving
13	2068	GEO.04	Extended answer	Problem solving

2- Correction key

1 Work : (example)

- Length of $\overline{BD}$ and $\overline{OD}$

$$m \overline{BD} = \frac{m \overline{BC}}{2} = \frac{8}{2} = 4$$

$$m \overline{OD} = 4$$

- Length of $\overline{OB}$

Since $\triangle BOD$ is a right triangle

$$m \overline{OB} = \sqrt{(m \overline{OD})^2 + (m \overline{BD})^2}$$

$$m \overline{OB} = \sqrt{4^2 + 4^2} = \sqrt{32}$$

$$m \overline{OB} = \sqrt{32} \approx 5.66$$

- Length of $\overline{AB}$

Since $\triangle AOB$ is a right triangle

$$m \overline{AB} = \sqrt{(m \overline{AO})^2 + (m \overline{OB})^2}$$

$$m \overline{AB} = \sqrt{12^2 + (\sqrt{32})^2}$$

$$m \overline{AB} = \sqrt{176} \approx 13.27$$

- Length of $\overline{FB}$

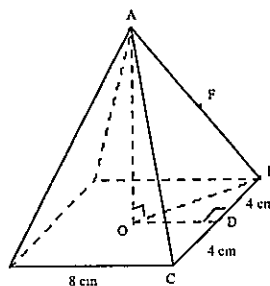
$$m \overline{FB} = \frac{m \overline{AB}}{2} \approx \frac{13.27}{2} = 6.63$$

- Length of path FBC

$$\text{Length of FBC} = m \overline{FB} + m \overline{BC}$$

$$\approx 6.63 + 8 = 14.63$$

Result The ant must cover a distance of 14.63 cm.



2 Work : (example)

Area of the roof

$$(10 \times 20) \times 2 = 400 \text{ m}^2$$

Area of the gables

$$\frac{(16 \times 6)}{2} \times 2 = 96 \text{ m}^2$$

Area of the sides = Total surface area - 400 - 96

$$776 - 400 - 96 = 280$$

Height h of the openings

$$2(20 \times h) = 280$$

$$h = \frac{280}{40}$$

$$h = 7$$

Result The height of each opening is 7 metres.

3 Example of an appropriate solution

Height of pyramid (h_1)

$$h_1 = \sqrt{8.6^2 - 6^2} \approx 6.16$$

Volume of pyramid

$$V = \frac{A_{\text{base}} \times h_1}{3}$$

$$V \approx \frac{12 \times 12 \times 6.16}{3} = 295.68$$

Volume of prism

$$728 - 295.68 = 432.32$$

Height of prism (h_2)

$$V = A_{\text{base}} \times h_2$$

$$h_2 \approx \frac{432.32}{12 \times 12}$$

$$h_2 \approx 3$$

Height of box (h)

$$h = h_1 + h_2$$

$$h \approx 6.16 + 3$$

$$h \approx 9.16$$

Answer The total height of the box is 9.16 cm.