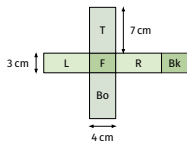


Start Tasks — Answers



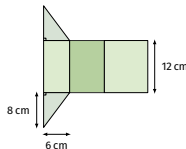
1. Find the total surface area covered by this net (the sum of all 6 face areas).



Solution

$$\begin{aligned}SA &= 2(7 \times 4 + 7 \times 3 + 4 \times 3) \\&= 2(28 + 21 + 12) \\&= 2 \times 61 = 122 \text{ cm}^2.\end{aligned}$$

2. This right-angled triangular prism net has base 6 cm, height 8 cm, and length 12 cm. Find the total area of all 5 faces.



Solution

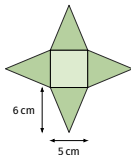
Ends: $2 \times \frac{1}{2}(6)(8) = 48.$

Rects:

$$(6+8+10) \times 12 = 288.$$

$$\text{Total} = 336 \text{ cm}^2.$$

3. This square pyramid net has base side 5 cm and slant height 6 cm. Find the total area of the base plus all 4 triangular faces.



Solution

$$\text{Base} = 5 \times 5 = 25.$$

$$\text{Triangles: } 4 \times \frac{1}{2}(5)(6) = 60.$$

$$\text{Total} = 85 \text{ cm}^2.$$

4. A cube net has total area 150 cm^2 . Work out the edge length of the cube.

Solution

$$6s^2 = 150$$

$$s^2 = 25$$

$$s = 5 \text{ cm}.$$

Start Tasks — Answers



5. A closed cuboid box needs 220 cm^2 of card. If its base is 10 cm by 5 cm, find its height.

Solution

$$SA = 2(10 \times 5 + 10h + 5h) = 100 + 30h$$

$$100 + 30h = 220$$

$$30h = 120$$

$$h = 4 \text{ cm.}$$

7. A triangular prism net has a right-angled triangular cross-section with legs 9 cm and 12 cm, and length 20 cm. Find the total surface area of the net.

Solution

$$\text{Hyp} = \sqrt{9^2 + 12^2} = 15.$$

$$\text{Ends: } 2 \times \frac{1}{2}(9)(12) = 108.$$

$$\text{Rects: } (9+12+15) \times 20 = 720.$$

$$\text{Total} = 828 \text{ cm}^2.$$

6. A manufacturer compares two cuboid nets: Box A is 8 cm by 6 cm by 4 cm and Box B is 12 cm by 4 cm by 4 cm. Which net uses less card, and by how much?

Solution

$$\text{Box A: } 2(48 + 32 + 24) = 208.$$

$$\text{Box B: } 2(48 + 48 + 16) = 224.$$

$$\text{Box A uses less, by } 224 - 208 = 16 \text{ cm}^2.$$

8. Explain why a square-based pyramid's net cannot be made from 5 identical squares, and state what shapes are needed instead.

Solution

Five equal squares fold into a cube (or open box), not a pyramid. A pyramid needs 1 square base plus 4 congruent triangles that meet at a single apex.

Start Tasks — Answers



9. A cube's net has a total area of 96 cm^2 . Find the volume of the cube.

Solution

$$6s^2 = 96 \Rightarrow s^2 = 16 \Rightarrow s = 4 \text{ cm.}$$

$$\text{Volume} = 4^3 = 64 \text{ cm}^3.$$

11. A gift box designer wants a triangular prism net (base 5 cm, height 12 cm, hypotenuse 13 cm) to fit on a single sheet of card 60 cm by 40 cm. Find the maximum length the prism can be so the net still fits, showing your reasoning.

Solution

$$\text{Net width} = 5 + 12 + 13 = 30 \text{ cm } (\leq 60, \text{ fits}).$$

$$\text{Net height} = L + 2(12) = L + 24 \text{ must be } \leq 40.$$

$$L \leq 16, \text{ so the maximum length is } 16 \text{ cm.}$$

10. A cuboid net is drawn with faces 6 cm by 4 cm, 6 cm by 3 cm, and 4 cm by 3 cm (one of each pair). Find the volume of the cuboid.

Solution

The three edge lengths are 6, 4 and 3 cm.

$$\text{Volume} = 6 \times 4 \times 3 = 72 \text{ cm}^3.$$

12. Two students each draw a valid net for the same square-based pyramid, but their nets look different on the page. Explain what property both nets must share, and what may differ.

Solution

Both must have the same square base and 4 congruent triangular faces of equal measurements; only their arrangement (layout) on the page may differ.