3D Geometry Review

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Solutions

Key Words

For questions 1 to 3, copy the statement and fill in the blanks. Use some of these words: cube, edges, faces, net, prism, pyramid, triangular, rectangular, skeleton, vertices

1. A [redacted] has two faces that are congruent triangles and three faces that are rectangles.

TRIANGULAR PRISM

2. A [redacted] is a framework made of the [redacted] of a three-dimensional figure.

SKELETON
EDGES

3. The surface area of a three-dimensional figure is the sum of the areas of its [redacted].

FACES

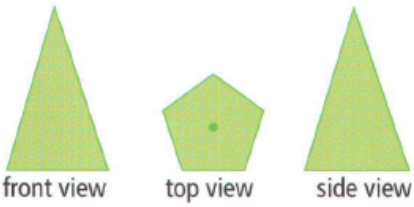
4. Rearrange the circled letters in questions 1 to 3 to make a key word. Define this word.

⇒ NET

A 2-D representation of a 3-D shape. It is the shape unfolded.

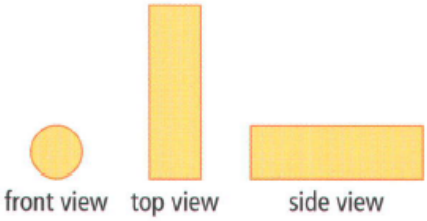
5. Name the three-dimensional figure that has each set of three views.

a)



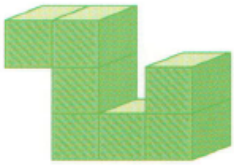
Pentagonal Pyramid

b)

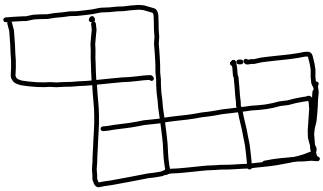


Cylinder

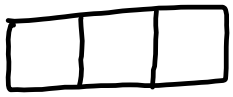
6. Draw the front, top, and side views of this object.



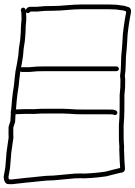
Front



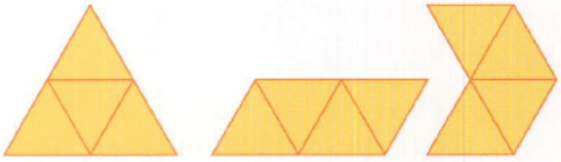
Top



Side

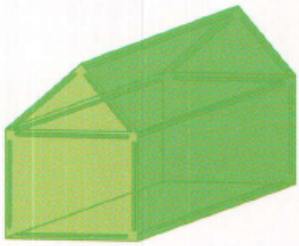


7. Which of the following nets will not fold to form a triangular pyramid? Check your prediction. Draw the nets on paper, and then cut them out and fold to see.



C

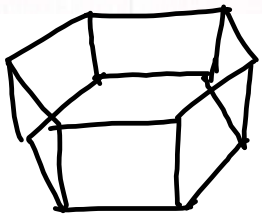
8. How many edges and vertices are in the skeleton of this house?



Edges = 15

Vertices = 10

9. Draw the skeleton for a hexagonal prism. State the number of faces, vertices, and edges it has.

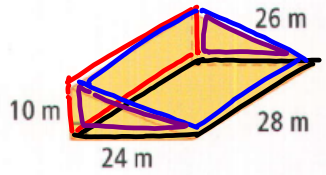


Faces = 8

Vertices = 12

Edges = 18

10. Calculate the surface area of this large ramp.



Calculated to include the base.

$SA = 2\triangle s + 3\square s$

$= 2\left(\frac{1}{2} \times 24 \times 10\right) + (24 \times 28) + (10 \times 28) + (26 \times 28)$

$= 240 + 672 + 280 + 728$

$= 1920 m^2$

11. Yolanda has three vases that are triangular prisms. She wants to spray-paint the outside of the vases. Determine the surface area of each vase to be painted, given the following information.

Vase A: The area of the triangular base is 20 cm^2, and the total area of the rectangular faces is 150 cm^2.

Vase B: The triangular base has an area of 5 cm^2, and each rectangular face has an area of 25 cm^2.

Vase C: The triangular base has an area of 11 cm^2, and each rectangular face measures 5 cm by 20 cm.

Vase A

$2\triangle s$ + rectangles

$= 2(20) + 150$

$= 190 cm^2$

Vase B

$2\triangle s + 3\square s$

$= 2(5) + 3(25)$

$= 85 cm^2$

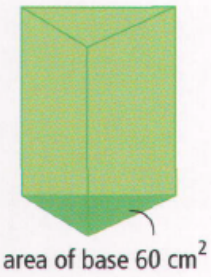
Vase C

$2\triangle s + 3\square s$

$= 2(11) + 3(5 \times 20)$

$= 322 cm^2$

12. What is the height of this triangular prism if its volume is 1200 cm^3?



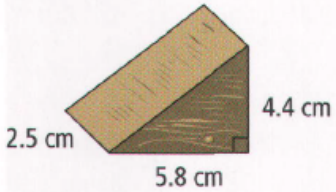
$$\text{Vol} = \text{area of base} \times \text{height}$$

$$\frac{1200}{60} = \frac{60 \times \text{height}}{60}$$

$$20 = \text{height}$$

$$\Rightarrow \text{height} = 20\text{ cm}$$

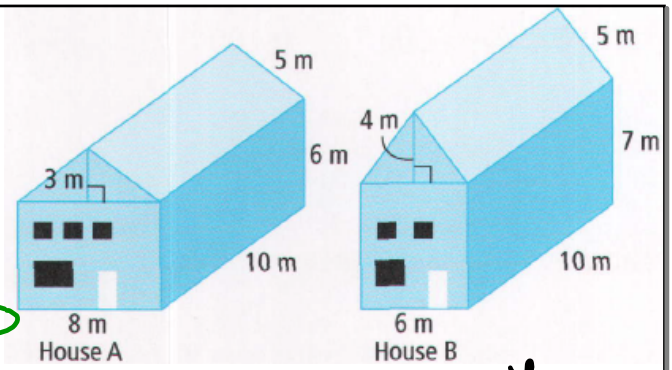
13. Find the volume of this wooden doorstop.



$$\text{Vol} = \frac{1}{2} \times 5.8 \times 4.4 \times 2.5$$

$$= 31.9\ cm^3$$

14. The two houses in the diagram are on the same street and they are both for sale. Henry wants to buy the house with the most attic space. Which house should he buy?



Attic A

$Vol = \frac{1}{2} \times 8 \times 3 \times 10$

$= 120 m^3$

Attic B

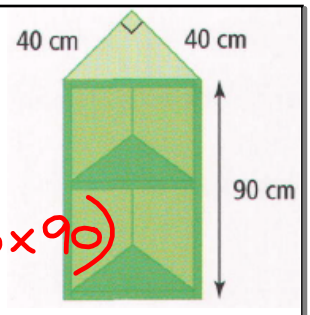
$Vol = \frac{1}{2} \times 6 \times 4 \times 10$

$= 120 m^3$

They both have the same attic space, so he could buy either.

15. Helen is building a triangular corner shelving unit to display pictures and awards. The unit resembles a triangular prism and is made using five pieces of wood.

a) Calculate the area of wood needed to make the shelving unit.
b) Calculate the amount of space taken up by the shelving unit.



a) $SA = 3\triangle s + 2\square s$

$= 3(\frac{1}{2} \times 40 \times 40) + 2(40 \times 90)$

$= 2400 + 7200$

$= 9600 cm^2$

b) $Vol = \frac{1}{2} \times 40 \times 40 \times 90$

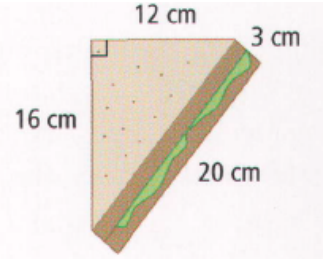
$= 72000 cm^3$

16. Pierre is packing sandwiches into his lunch box. Each sandwich has been sliced diagonally into halves.

a) How much plastic is required to wrap each sandwich to keep it fresh? Justify your answer.

b) How many sandwiches can fit in the lunch box if its volume is 1625 cm^3?

c) What assumptions did you make in part b)?



a) $SA = 2\Delta s + 3\square s$

$= 2(\frac{1}{2} \times 12 \times 16) + (12 \times 3) + (16 \times 3) + (20 \times 3)$

$= 192 + 36 + 48 + 60$

$= 336\ cm^2$

b) $Vol = \frac{1}{2} \times 12 \times 16 \times 3$

$= 288\ cm^3$

$\#\ sandwiches = \frac{1625}{288}$

$= 5.64$

$\Rightarrow 5$ sandwiches

c) That the sandwiches will fit into the lunchbox