

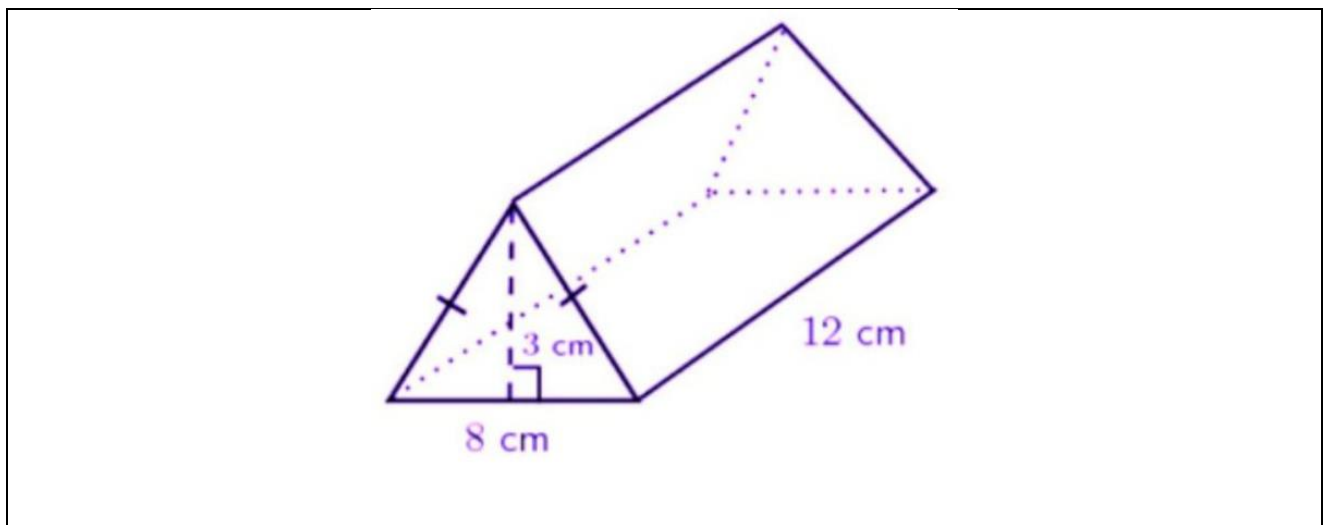
Volume of Prisms and Pyramids Practice

Use the following information to answer the first question.

Below are the dimensions of two prisms and two pyramids.		
A	Prism 1	Length = 16 cm Width = 3 cm Height = 2 cm
B	Prism 2	Length = 7 cm Width = 5 cm Height = 3 cm
C	Pyramid 1	Square base of 4 cm by 4 cm and a height of 10 cm
D	Pyramid 2	Rectangular base of 2 cm by 5 cm and a height of 14 cm

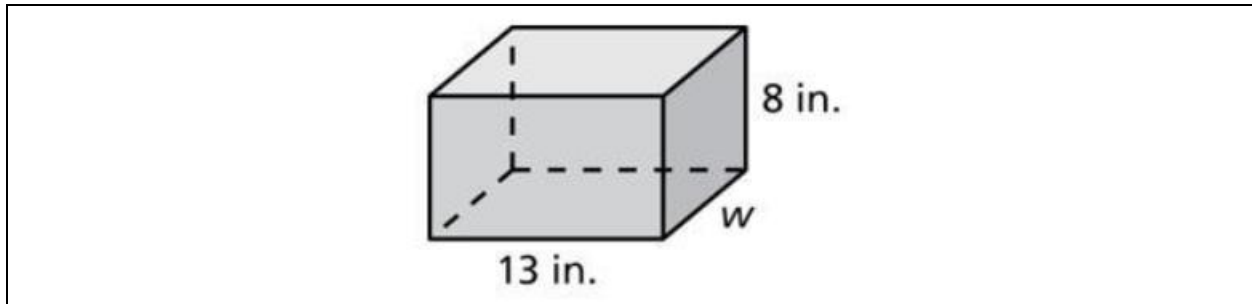
1. The prism with the largest volume **and** the pyramid with the largest volume are
A) A and D B) B and C C) A and C D) B and D

Use the diagram below to answer the next question.



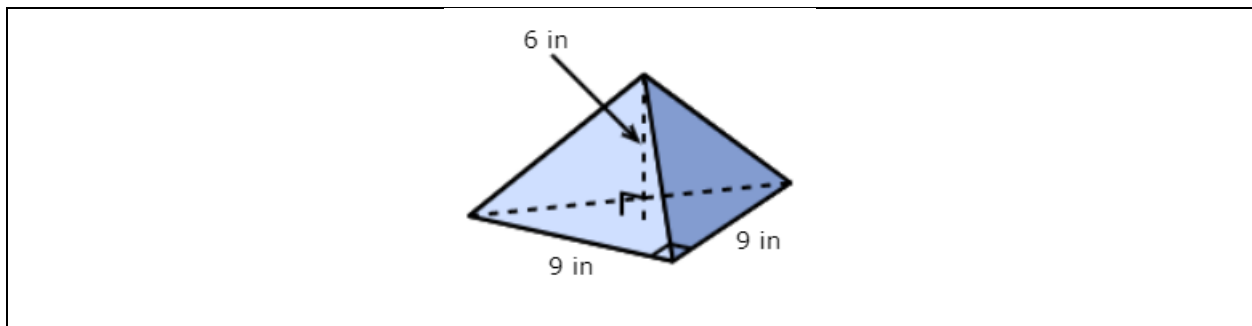
2. The volume of this triangular prism is
A) 108 cm^3 B) 144 cm^3 C) 288 cm^3 D) 312 cm^3

Use the following information to answer the next question.



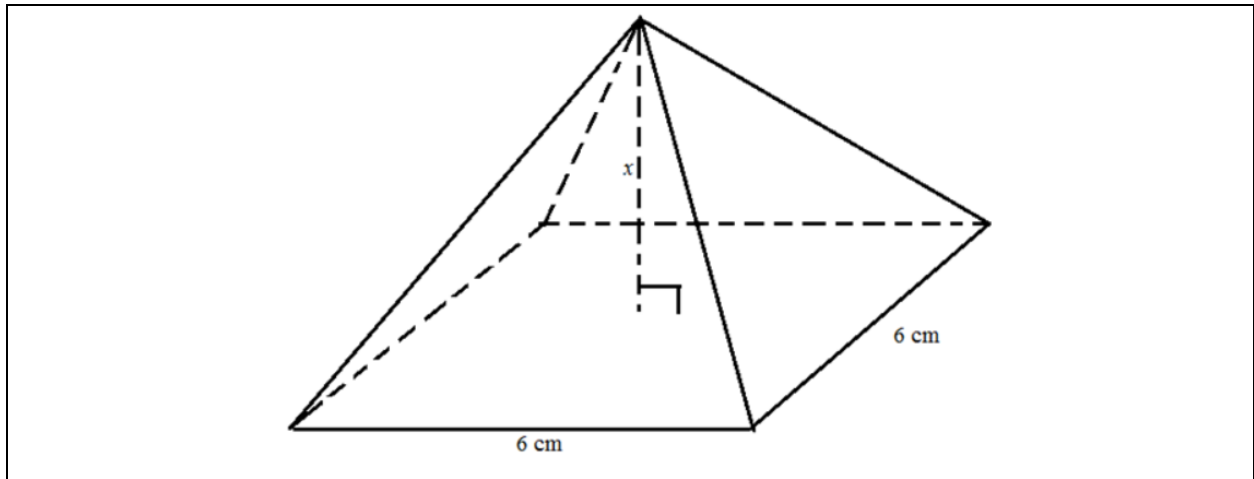
3. Given that the volume of the prism shown above is 728 in^3 , the width, w , to the nearest integer is _____.

Use the following diagram to answer the next question.



4. If each of the given dimensions in the diagram above was increased by 1 inch, determine the volume of the pyramid, to the nearest tenth.

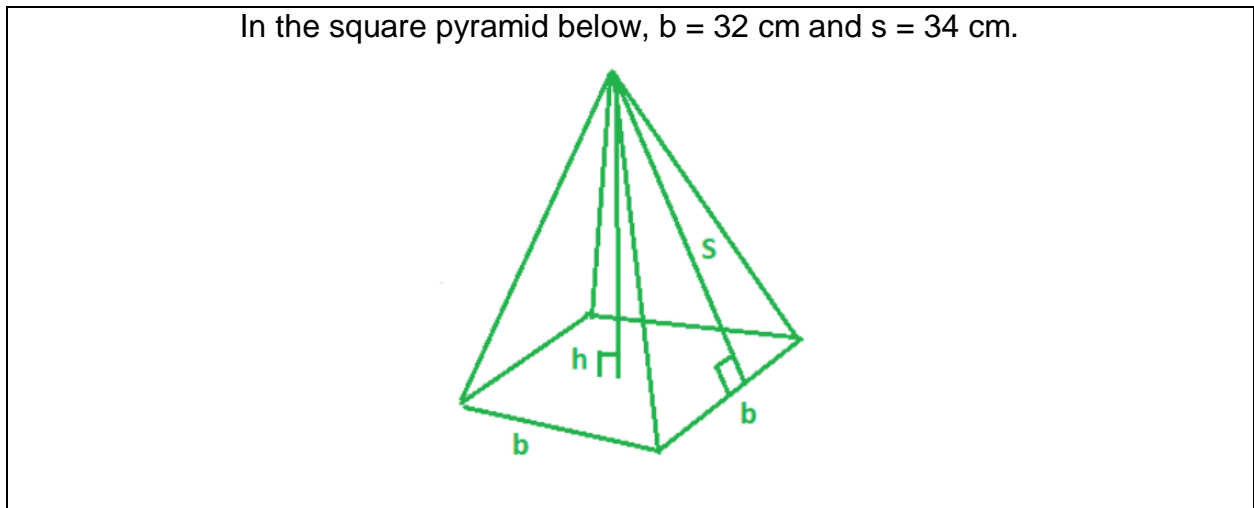
Use the following diagram to answer the next question.



5. The volume of the pyramid shown above is 54 cm^3 . The height, x , of the pyramid, to the nearest tenth, is _____.

Use the following information to answer the next question.

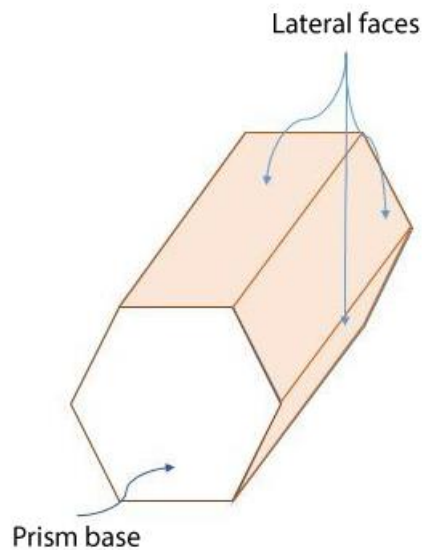
In the square pyramid below, $b = 32 \text{ cm}$ and $s = 34 \text{ cm}$.



6. The volume of this pyramid is
A) $10\,240 \text{ cm}^3$ B) $11\,605 \text{ cm}^3$ C) $30\,720 \text{ cm}^3$ D) $34\,816 \text{ cm}^3$

Use the following information to answer the next question.

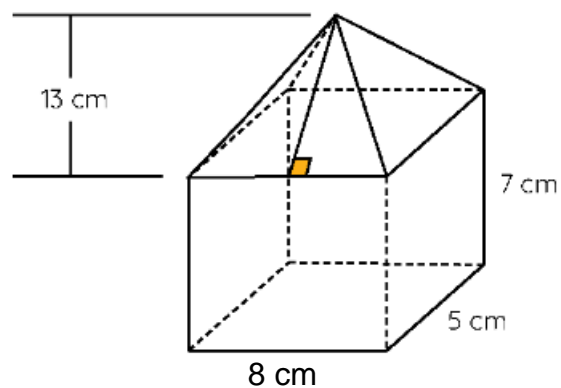
The area of the prism base shown below is 75 cm^2 .



7. If the volume of the prism is 937.5 cm^3 , then the height, to the nearest tenth, is _____ cm.

Use the following information to answer the next question.

A pyramid sits directly on top of a prism



8. Determine the volume of this object, to the nearest whole number.

Volume of Prisms and Pyramids Practice **Solutions**

Use the following information to answer the first question.

Below are the dimensions of two prisms and two pyramids.		
A	Prism 1	Length = 16 cm Width = 3 cm Height = 2 cm
B	Prism 2	Length = 7 cm Width = 5 cm Height = 3 cm
C	Pyramid 1	Square base of 4 cm by 4 cm and a height of 10 cm
D	Pyramid 2	Rectangular base of 2 cm by 5 cm and a height of 14 cm

1. The prism with the largest volume **and** the pyramid with the largest volume are

A) A and D

B) B and C

C) A and C

D) B and D

Solution

The volume of these prisms is determined by multiplying the length by the width by the height. In other words, the volume is the area of the base multiplied by the height.

$$\begin{aligned} V_{\text{prism 1}} &= (16)(3)(2) \\ &= 96 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} V_{\text{prism 2}} &= (7)(5)(3) \\ &= 105 \text{ cm}^3 \end{aligned}$$

The volume of these pyramids is determined by multiplying the area of the base by the height, and then dividing by 3.

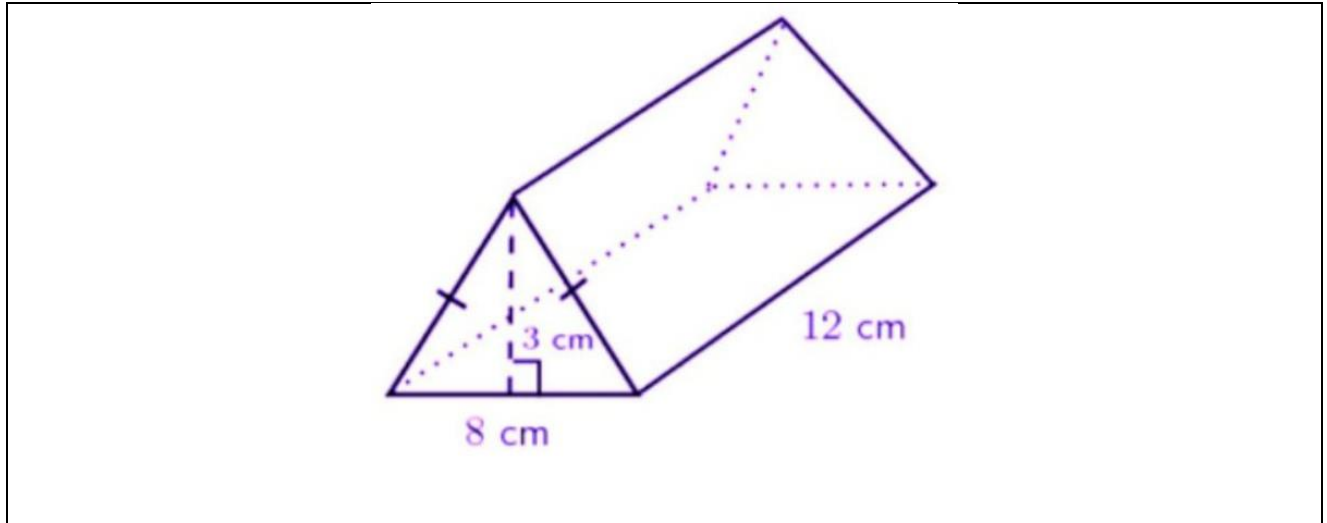
$$V_{\text{pyramid 1}} = \frac{(4)(4)(10)}{3} = 53.3\dots \text{ cm}^3$$

$$V_{\text{pyramid 2}} = \frac{(2)(5)(14)}{3} = 46.6\dots \text{ cm}^3$$

The prism with the largest volume is #2 (B) and the pyramid with the largest volume is #1 (C).

The correct answer is B.

Use the diagram below to answer the next question.



2. The volume of this triangular prism is
- A) 108 cm^3 B) 144 cm^3 C) 288 cm^3 D) 312 cm^3

Solution

The area of the triangular base is $\frac{(3)(8)}{2} = 12 \text{ cm}^2$.

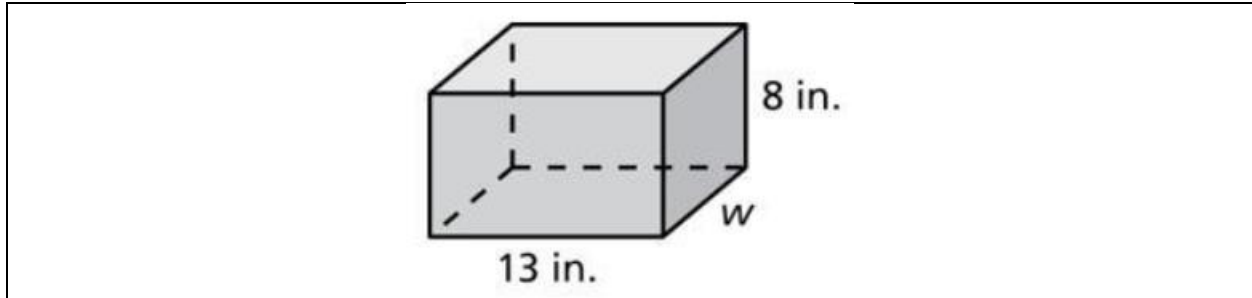
The volume is the area of the base multiplied by the height.

$$V = (12)(12)$$

$$V = 144 \text{ cm}^3.$$

The correct answer is B.

Use the following information to answer the next question.



3. Given that the volume of the prism shown above is 728 in^3 , the width, w , to the nearest integer is 7.

Solution

Volume = (Area of the Base) (Height)

$$728 = ((13)(w)) (8)$$

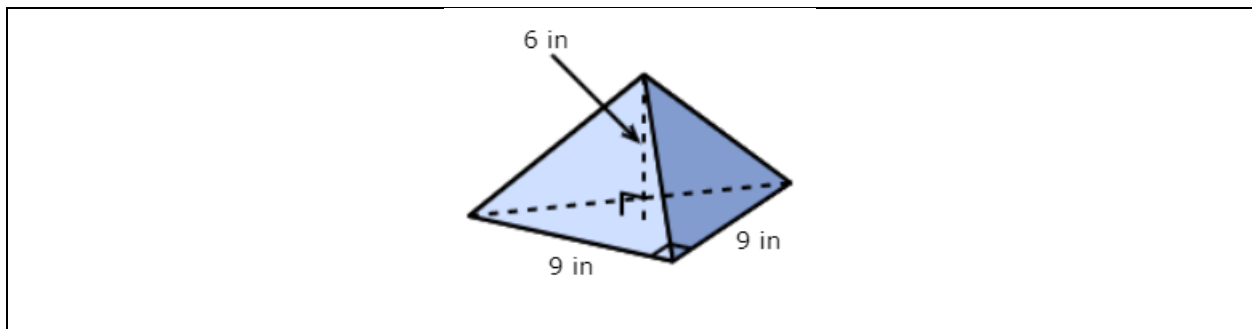
$$728 = (13w) (8)$$

$$728 = 104w$$

$$7 = w$$

Given that the volume of the prism shown above is 728 in^3 , the width, w , to the nearest integer is 7.

Use the following diagram to answer the next question.



4. If each of the given dimensions in the diagram above was increased by 1 inch, determine the volume of the pyramid, to the nearest tenth.

Solution

The base of the pyramid is a triangle with given dimensions of 9 in. When these lengths are increased by 1 inch, the triangle now has new dimensions of 10 in.

The area of a triangle is $\frac{(b)(h)}{2}$, or $\frac{(10)(10)}{2}$, which is equal to 50 in².

In the diagram, the given height is 6 in. It will now be increased by 1 in to 7 in.

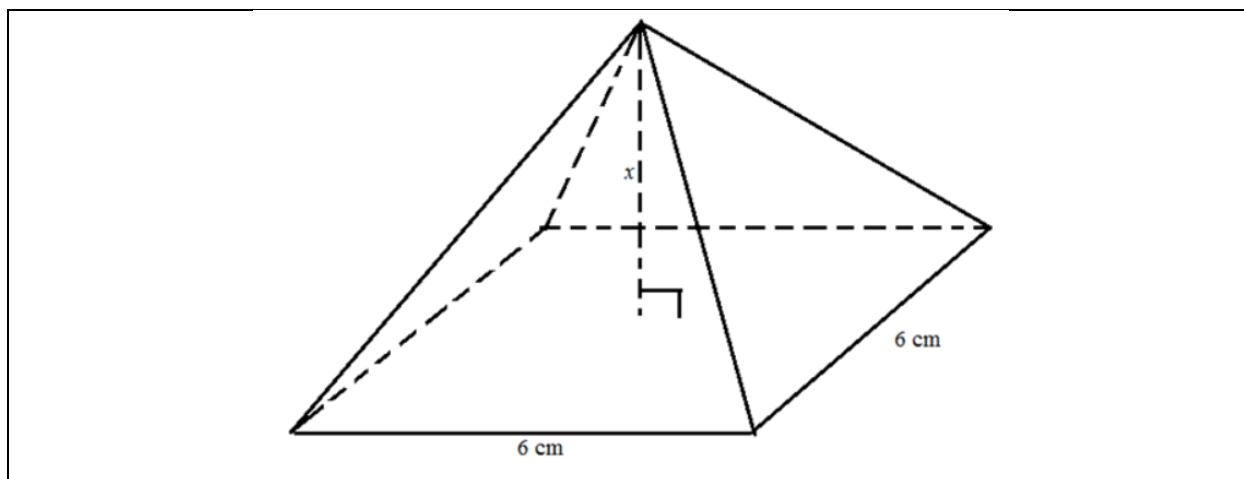
$$\text{Volume} = \frac{(\text{Area of the base})(\text{height})}{3}$$

$$\text{Volume} = \frac{(50)(7)}{3}$$

$$\text{Volume} = 116.666\dots$$

To the nearest tenth, the volume of the pyramid, when each of the given dimensions is increased by 1 inch, is 116.7 in³.

Use the following diagram to answer the next question.



5. The volume of the pyramid shown above is 54 cm^3 . The height, x , of the pyramid, to the nearest tenth, is _____.

Solution

$$\text{Volume} = \frac{(\text{Area of the base})(\text{height})}{3}$$

$$54 = \frac{(6)(6)(x)}{3}$$

Multiply both sides of the equal sign by 3 to clear the fraction.

$$162 = 36x$$

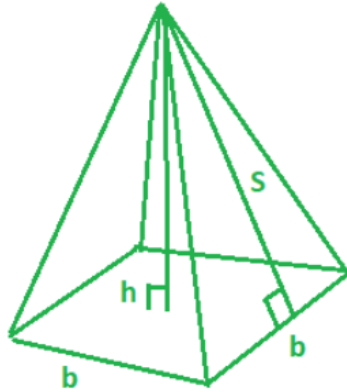
Divide both sides of the equal sign by 36.

$$4.5 = x$$

The height, x , of the pyramid, to the nearest tenth, is 4.5 cm.

Use the following information to answer the next question.

In the square pyramid below, $b = 32$ cm and $s = 34$ cm.

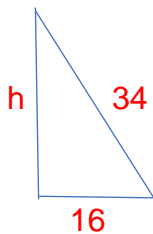


6. The volume of this pyramid is
A) 10 240 cm³ B) 11 605 cm³ C) 30 720 cm³ D) 34 816 cm³

Solution

We are given the slant height, but not the perpendicular height, which is needed to determine volume.

However, we can use the slant height, along with half the length of one side of the base (16), to find the required height using the Pythagorean Theorem.



$$h^2 = 34^2 - 16^2$$

$$h^2 = 34^2 - 16^2$$

$$h^2 = 900$$

Take the square root of both sides.

$$h = 30$$

Now we can proceed with determining the volume.

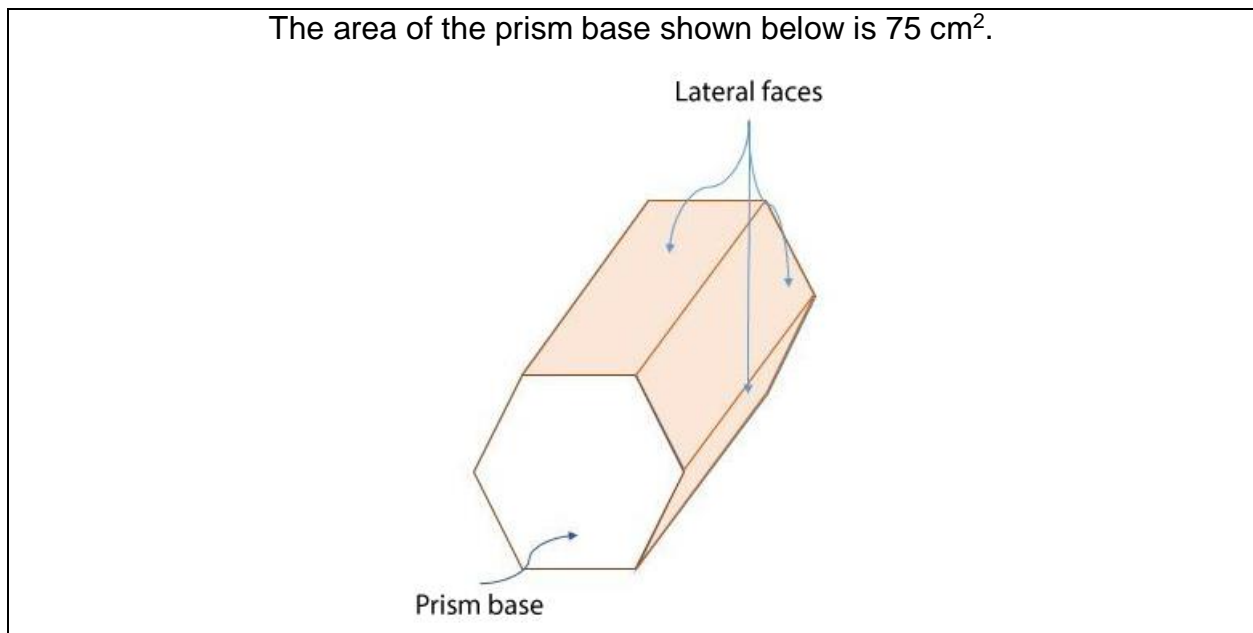
$$\text{Volume} = \frac{(\text{Area of the base})(\text{height})}{3}$$

$$\text{Volume} = \frac{((32)(32))(30)}{3}$$

$$\text{Volume} = 10\,240 \text{ cm}^3.$$

The correct answer is A.

Use the following information to answer the next question.



7. If the volume of the prism is 937.5 cm^3 , then the height, to the nearest tenth, is 12.5 cm.

Solution

The base of this prism is a hexagon. We are given the area of the base to be 75 cm^2 .

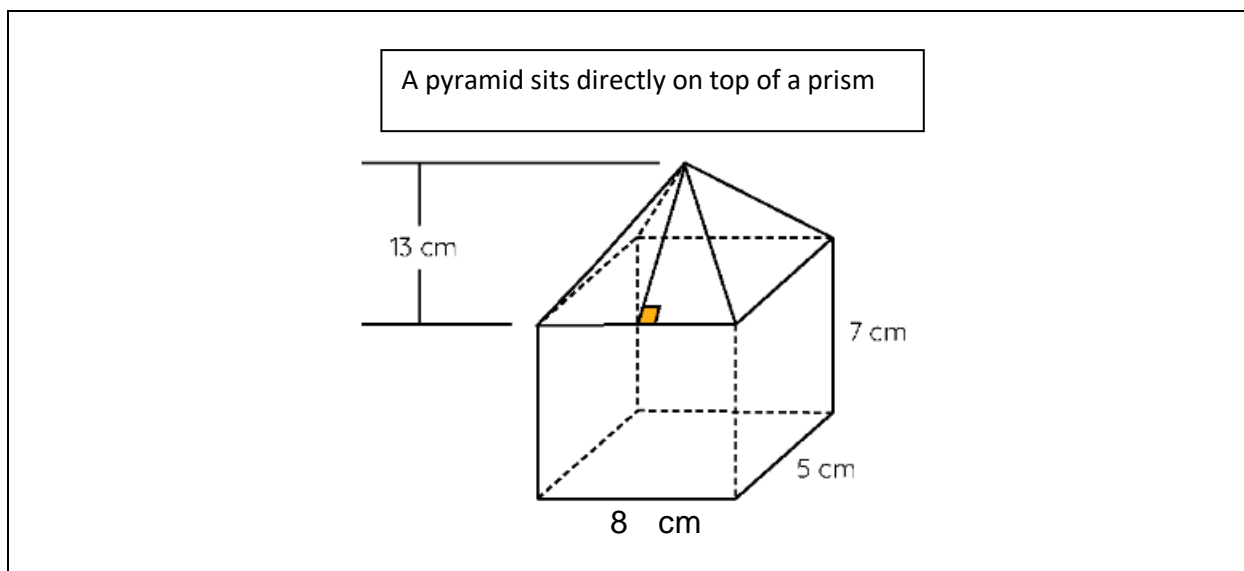
$$\text{Volume} = (\text{Area of the Base}) (\text{Height})$$

$$937.5 = (75) (\text{Height})$$

$$12.5 = \text{Height}$$

If the volume of the prism is 937.5 cm^3 , then the height, to the nearest tenth, is 12.5 cm.

Use the following information to answer the next question.



8. Determine the volume of this object, to the nearest whole number.

Solution

Total Volume = Volume_{prism} + Volume_{pyramid}

$$\text{Total Volume} = (8)(5)(7) + \frac{(8)(5)(13)}{3}$$

$$\text{Total Volume} = 280 + 173.333\dots$$

$$\text{Total Volume} = 453.333\dots$$

The volume of this object is 453 cm³.