

Composite Volume

Conference for the Advancement
of Mathematics Teaching
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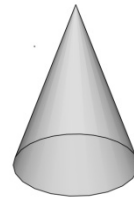
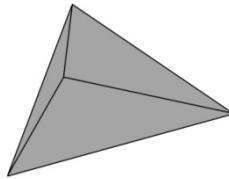
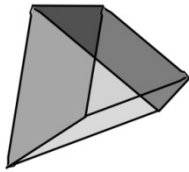
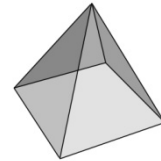
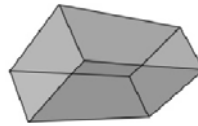
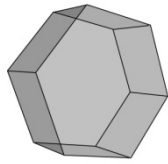


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Name: _____

Solid Riddles

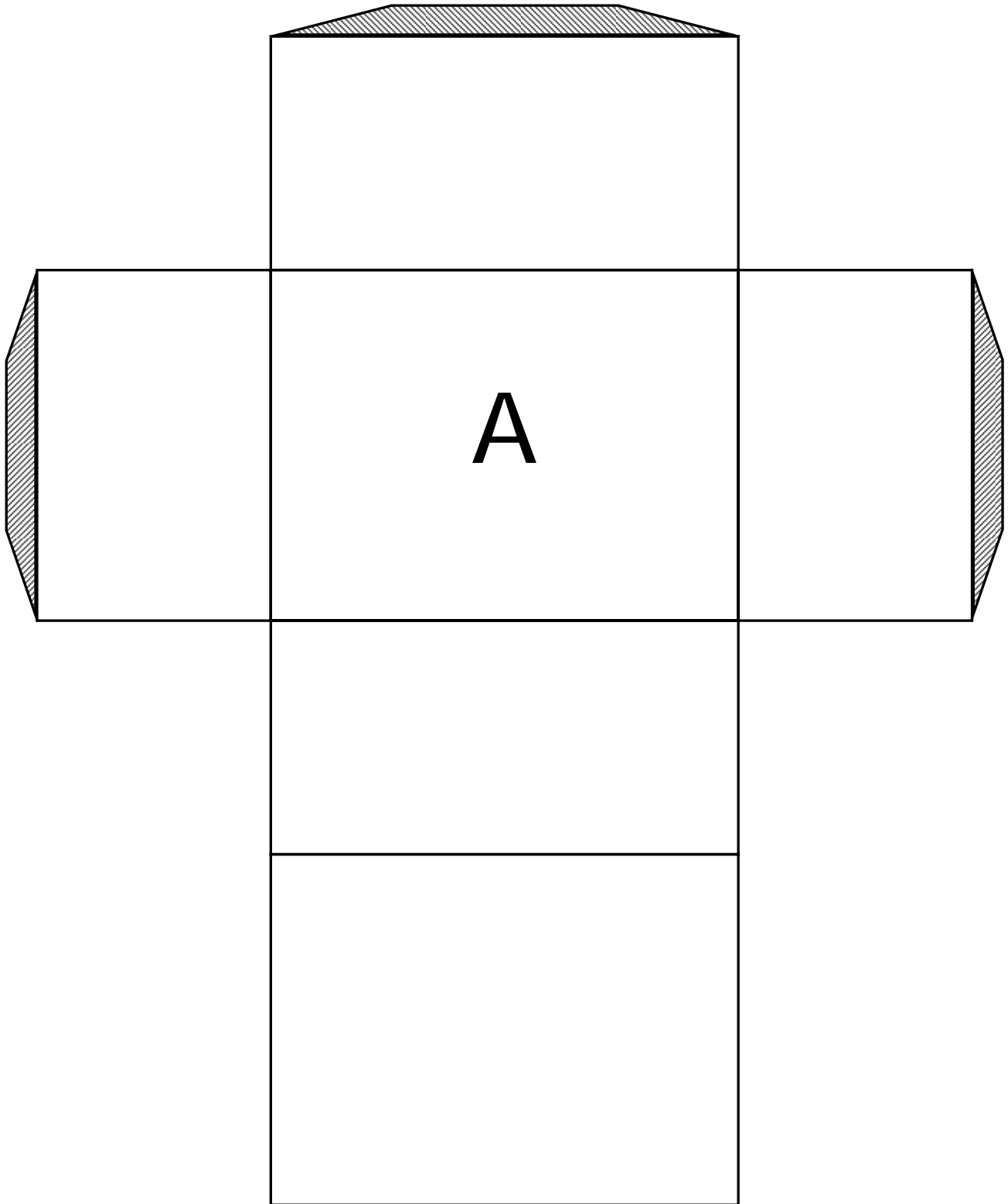
Name the solid that is the correct answer to each riddle below. Each solid will be used only once.



Riddle	Answer
1. I have exactly one base and three lateral faces.	
2. Each one of my lateral faces is a rectangle, yet my bases are not. I have only six vertices.	
3. I have more edges than the other solids on this page.	
4. My base is a circle, and I have two heights: one that slants and one that does not.	
5. If you drew my net, it would consist of three shapes: a rectangle and two circles.	
6. I am very interesting because each pair of opposite sides is parallel and congruent; therefore, any one of my sides could be considered my base.	
Name the remaining solid and write a description for it.	

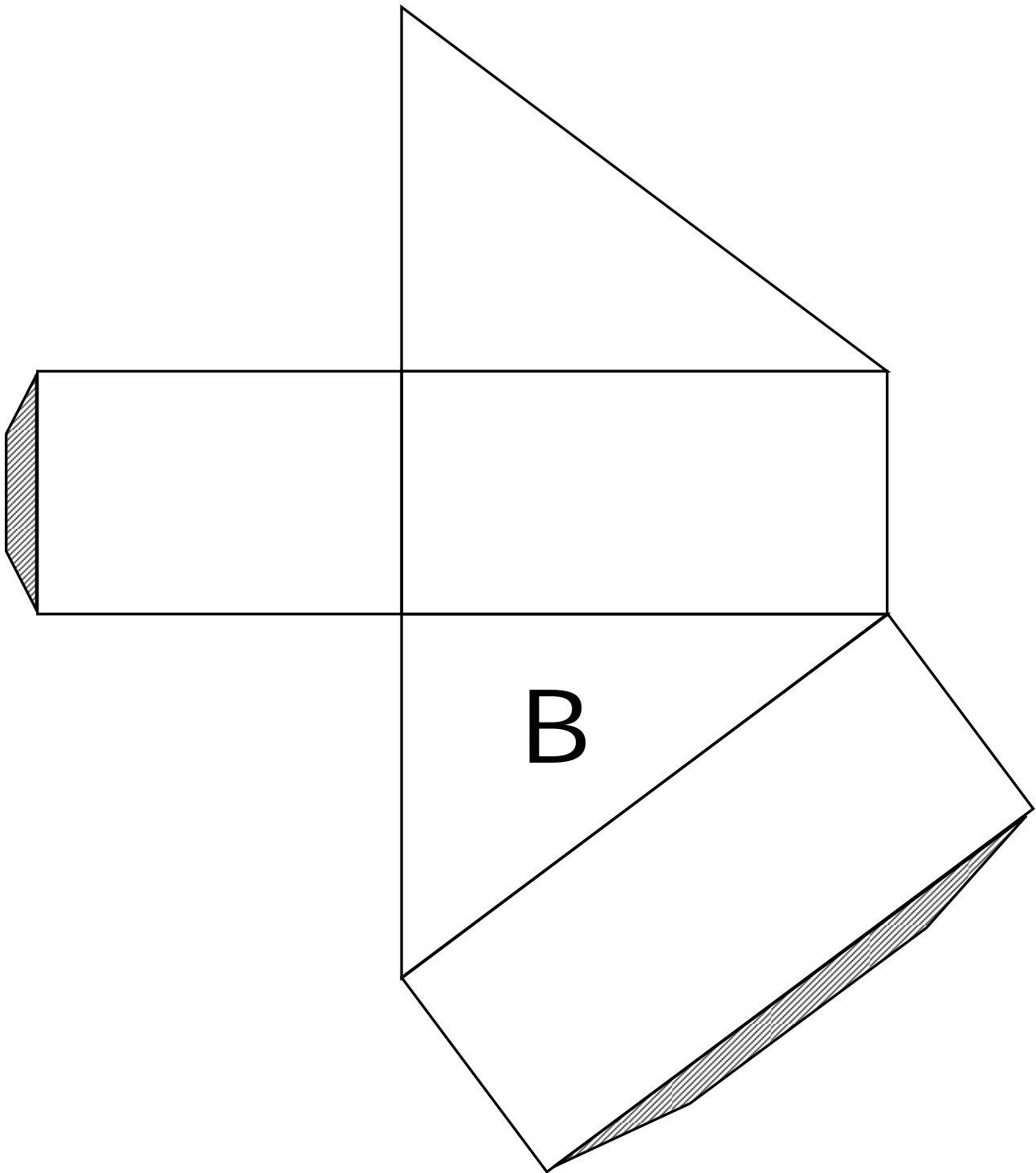
Let's Build It: Solid A

Use your ruler to measure the dimensions in centimeters of the net below (disregard the tabs). Record the dimensions on the net. Cut out the net and build the solid.



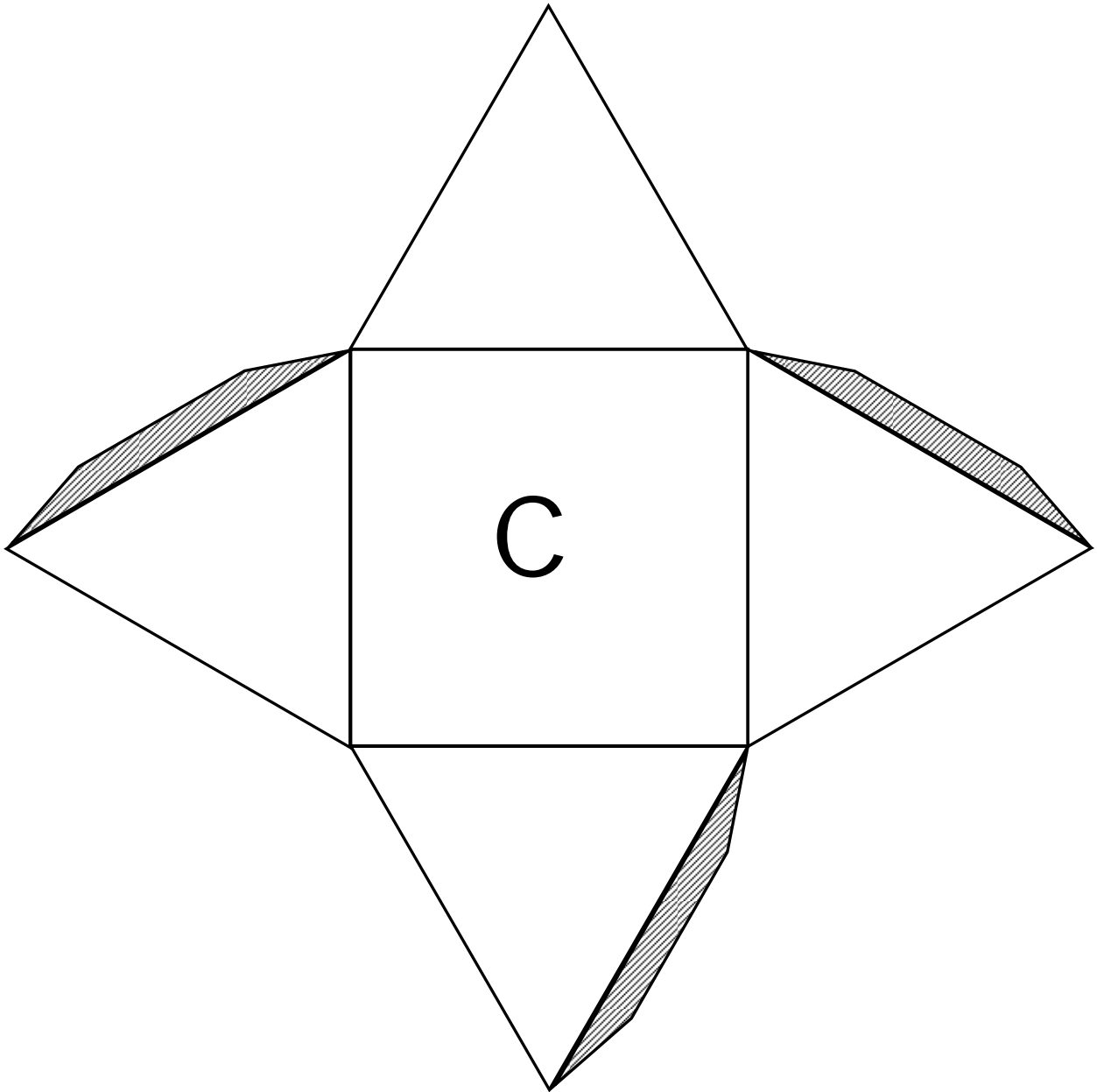
Let's Build It: Solid B

Use your ruler to measure the dimensions in centimeters of the net below (disregard the tabs). Record the dimensions on the net. Cut out the net and build the solid.



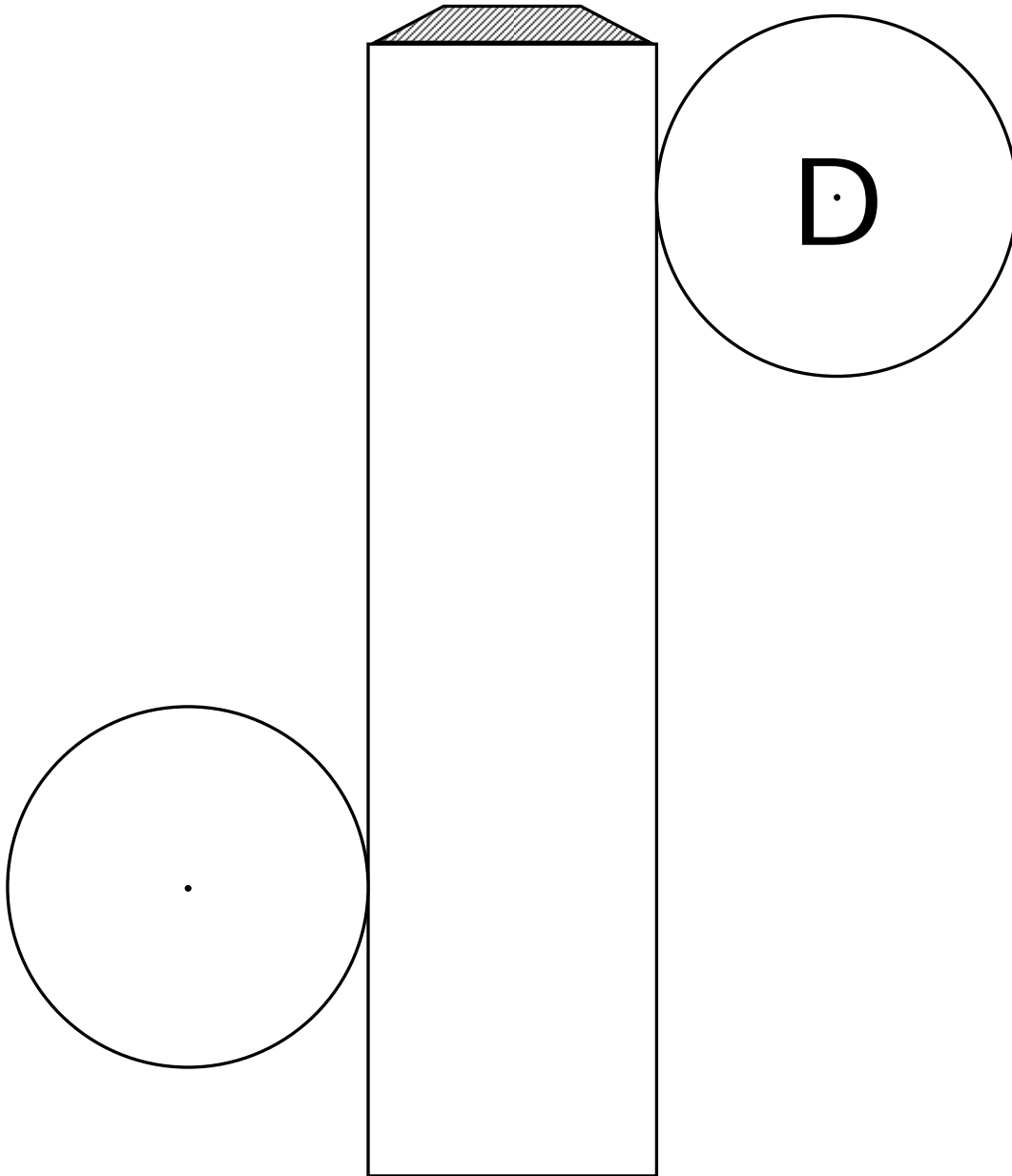
Let's Build It: Solid C

Use your ruler to measure the dimensions in centimeters of the net below (disregard the tabs). Record the dimensions on the net. Cut out the net and build the solid.



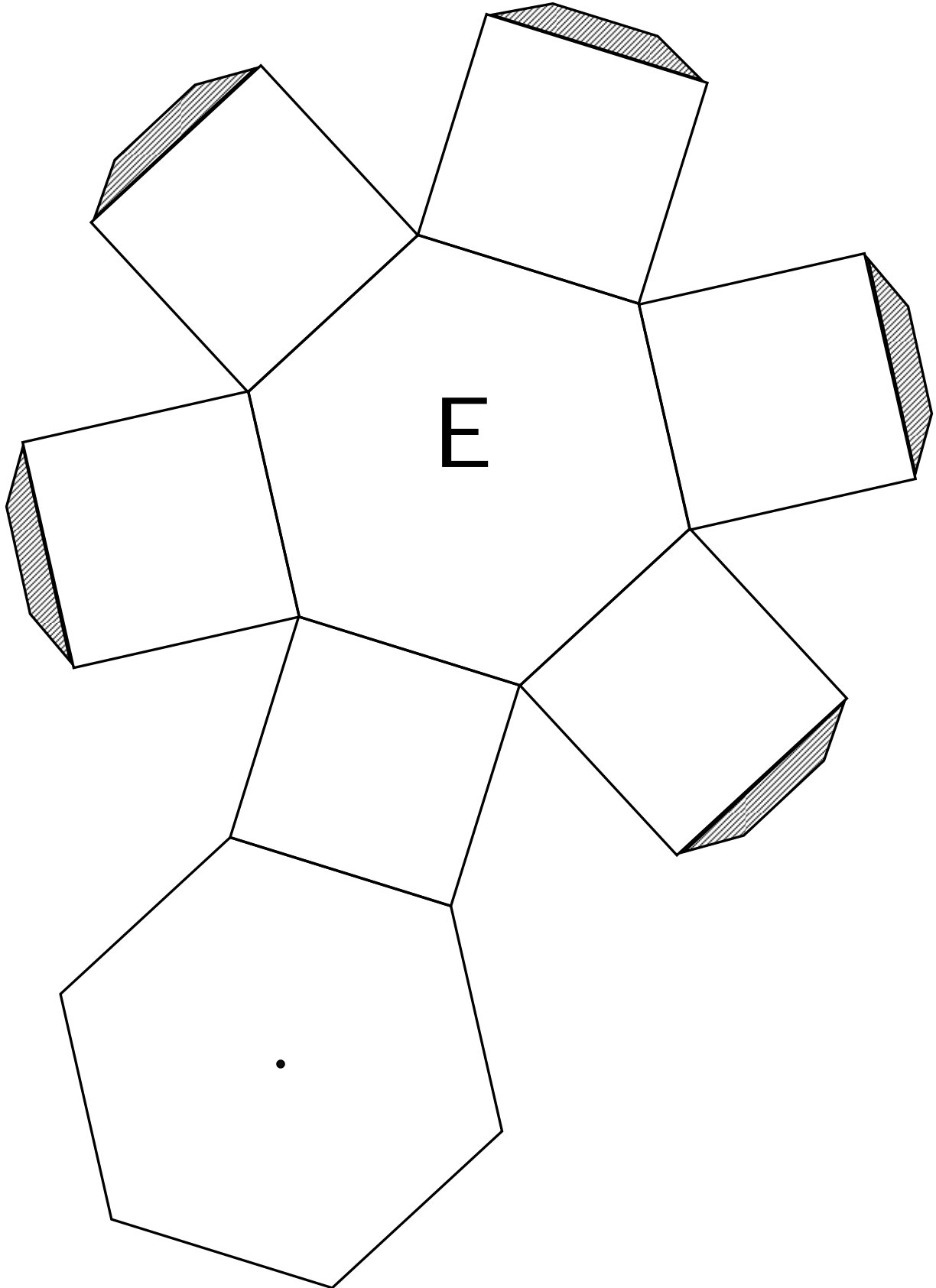
Let's Build It: Solid D

Use your ruler to measure the dimensions in centimeters of the net below (disregard the tabs). Record the dimensions on the net. Cut out the net and build the solid.



Let's Build It: Solid E

Use your ruler to measure the dimensions in centimeters of the net below (disregard the tabs). Record the dimensions on the net. Cut out the net and build the solid.



Name: _____

Volume Recording Sheet*

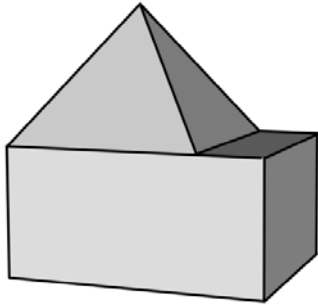
Use the measurements on the solids you built to complete the table below.

Solid	<ul style="list-style-type: none"> • Name of Solid • Shape of Base 	Volume Formula	<ul style="list-style-type: none"> • Area of Base • Height of Solid 	Volume of Solid
A	Solid: Shape of Base:	$V = \underline{\hspace{2cm}}$ where $B = \underline{\hspace{2cm}}$	Area of Base: Height of Solid:	
B	Solid: Shape of Base:	$V = \underline{\hspace{2cm}}$ where $B = \underline{\hspace{2cm}}$	Area of Base: Height of Solid:	
C	Solid: Shape of Base:	$V = \underline{\hspace{2cm}}$ where $B = \underline{\hspace{2cm}}$	Area of Base: Height of Solid:	
D	Solid: Shape of Base:	$V = \underline{\hspace{2cm}}$ where $B = \underline{\hspace{2cm}}$	Area of Base: Height of Solid:	
E	Solid: Shape of Base:	$V = \underline{\hspace{2cm}}$ where $B = \underline{\hspace{2cm}}$	Area of Base: Height of Solid:	

What Can It Hold?

Use the information from the table you created to find the following composite volumes.

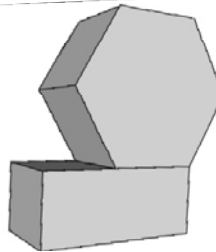
1. What is the volume of the composite solid?



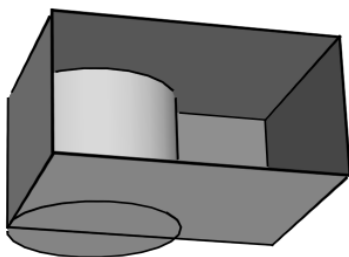
2. The triangular prism is placed adjacent to rectangular prism A to create a ramp with a platform. What is the volume of the composite solid?

3. The rectangular prism and the triangular prism are placed side by side with the square pyramid on top. What is the volume of the composite solid?

4. What percentage of the volume of the composite solid is represented by the hexagonal prism? Round answers to the nearest whole number.



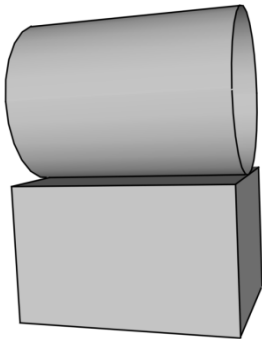
5. What is the volume of the box not occupied by the half cylinder?



6. Determine the amount of space remaining in solid E when solid D is placed inside.

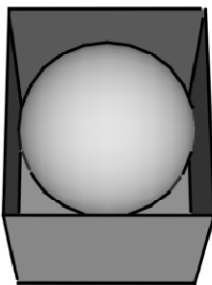
Composite Volume Notes Page

1. Describe the steps you would take to determine the total volume of the figure below.



2. Calculate the total volume of the solid shown above if the cylinder has a height of 3 feet and a diameter of 2 feet, and the prism is a square prism with base side lengths of 2 feet and a height of 3 feet.

3. Describe the steps you would take to determine the amount of space in the cube not occupied by the sphere.



4. Calculate the amount of space remaining in the box if the sphere has a radius of 12.4 inches, and the box is a cube with side lengths of 25 inches.

Composite Volume Sentence Starters*

Cut apart the sentence starters. Eight sets of sentence starters are provided below.

Sentence Starters	Sentence Starters
The figure is made up of . . .	The figure is made up of . . .
The resulting volumes are then . . .	The resulting volumes are then . . .
The base of the figure is a . . .	The base of the figure is a . . .
I would find the volume by . . .	I would find the volume by . . .
The composite volume is the . . .	The composite volume is the . . .

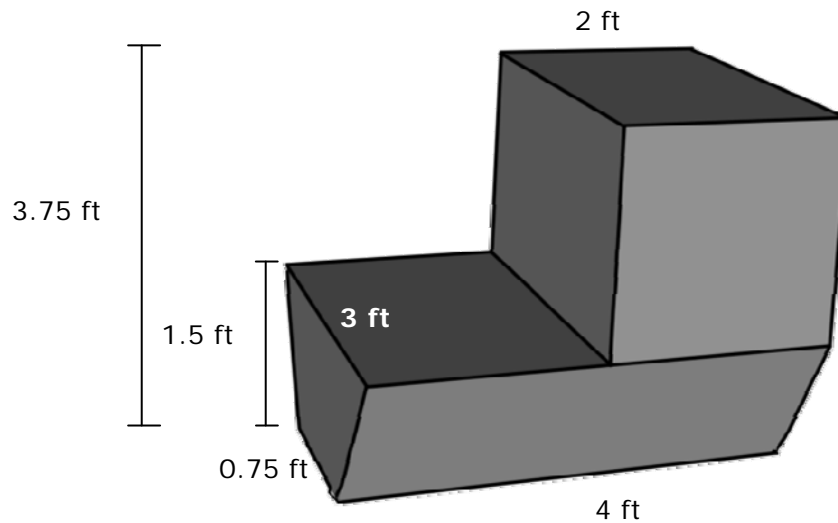
Sentence Starters	Sentence Starters
The figure is made up of . . .	The figure is made up of . . .
The resulting volumes are then . . .	The resulting volumes are then . . .
The base of the figure is a . . .	The base of the figure is a . . .
I would find the volume by . . .	I would find the volume by . . .
The composite volume is the . . .	The composite volume is the . . .

Sentence Starters	Sentence Starters
The figure is made up of . . .	The figure is made up of . . .
The resulting volumes are then . . .	The resulting volumes are then . . .
The base of the figure is a . . .	The base of the figure is a . . .
I would find the volume by . . .	I would find the volume by . . .
The composite volume is the . . .	The composite volume is the . . .

Sentence Starters	Sentence Starters
The figure is made up of . . .	The figure is made up of . . .
The resulting volumes are then . . .	The resulting volumes are then . . .
The base of the figure is a . . .	The base of the figure is a . . .
I would find the volume by . . .	I would find the volume by . . .
The composite volume is the . . .	The composite volume is the . . .

Applying Composite Volume

1. The picture below shows a feeding and storage structure used to feed sheep or goats. What is the maximum amount of grain the structure could hold?

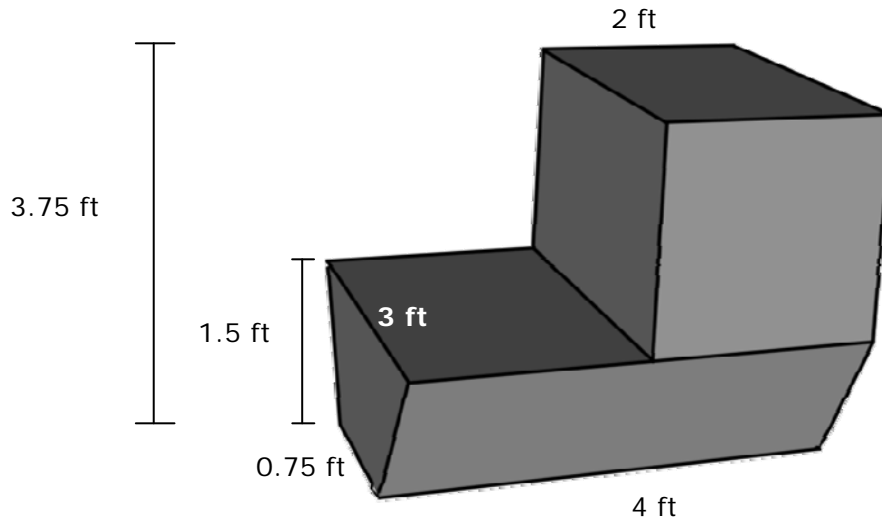


2. Mr. Qualrem has a box that is in the shape of a square prism with a base with side lengths of 2.5 feet and a height of 3 feet. He is packing several gifts in the box to mail to his relatives. The shapes and dimensions of the gifts are listed below.
- One cube with a side length of 1 foot 9 inches
 - A triangular prism with a height of 3 feet and a base that is a right triangle with leg lengths of 18 inches and 9 inches
 - One cylinder with a diameter of 1 foot and a height of 2.75 feet
 - A rectangular prism with a base with a length of 1.5 feet, a width of 0.75 feet, and a height of 3 feet

If he is planning to fill the extra space in the box with packing peanuts, approximately how many cubic feet of packing peanuts does he need?

Applying Composite Volume*

1. The picture below shows a feeding and storage structure used to feed sheep or goats. What is the maximum amount of grain the structure could hold?



- a. What two solids create the feeding and storage structure?
- b. Calculate the volume of the two solids.

Solid 1 _____	$V = \underline{\hspace{2cm}}$ where $B = \underline{\hspace{2cm}}$	Area of Base: Height of Solid:	Volume:
Solid 2 _____	$V = \underline{\hspace{2cm}}$ where $B = \underline{\hspace{2cm}}$	Area of Base: Height of Solid:	Volume:

- c. What is the volume of the composite figure?

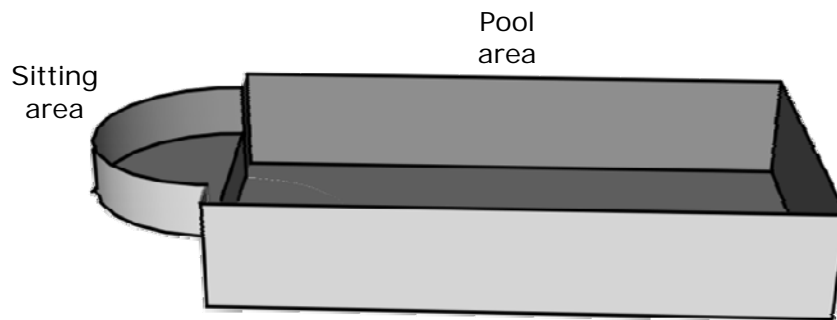
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If he is planning to fill the extra space in the box with packing peanuts, approximately how many cubic feet of packing peanuts does he need?

- a. What is the volume of the box?
- b. List the shapes of the gifts that are going to be placed in the box.
- c. What is the volume in cubic feet of each of the gifts?
- d. What is the total amount of space occupied by the gifts?
- e. What is the amount of space remaining in the box?

Evaluate: Composite Volume

- 1 Athletic Outfitters packs tennis balls into a cylinder with a diameter of 9.6 centimeters and a height of 39.5 centimeters. Each tennis ball has a diameter of 9.5 centimeters and there are 4 tennis balls in each container. Approximately how much extra space is in the container?
- A** 1063 cm³
- B** 1796 cm³
- C** 2410 cm³
- D** 2895 cm³
- 2 A rectangular resort pool has a length of 45 feet and a width of 30 feet. A sitting area is attached to the pool and is in the shape of a semicircle with a diameter of 20 feet, as shown below.

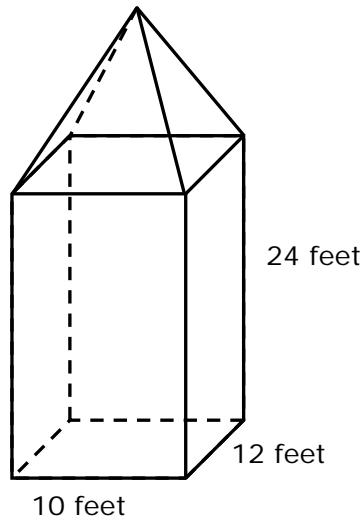


If the pool is filled to a depth of 5 feet and the sitting area is filled to a depth of 2.5 feet, approximately how much water is contained in both the sitting area and the pool?

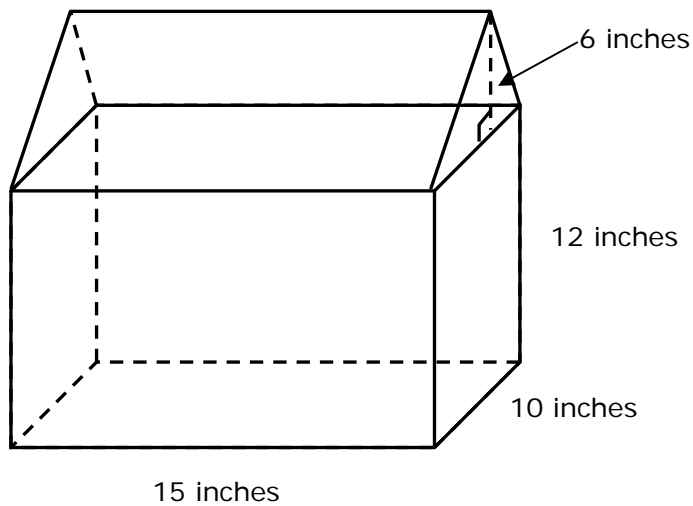
- A** 6357 ft³
- B** 6750 ft³
- C** 7143 ft³
- D** 7535 ft³

- 3 The height of the tower shown below is 38 feet. What is the total amount of space inside the tower?

- A 2880 ft³
- B 2320 ft³
- C 3440 ft³
- D 4560 ft³



- 4 What percentage of the total volume of the structure below is contained in the rectangular prism?



- A 85%
- B 80%
- C 75%
- D 67%