Teacher Notes

Pre- and Post-Tests

This pre-assessment is designed to be completed by students before they start work on Chapter 12. Students should be given about 20–30 minutes to complete this pre-assessment. The teacher can use this assessment formatively, to understand what material students have mastered going into the start of Chapter 12.

This post-assessment is designed to be completed at the culmination of Chapter 12. This test is a parallel form to the pre-assessment. In accordance, students should be allowed 20–30 minutes to complete this post-assessment. Student performance on the post- and pre-assessment can be compared in order to measure gains in student learning from Chapter 12.

Mid-Chapter Test

This mid-chapter assessment is designed to be completed by students when they have completed the first four lessons in Chapter 12. Students should be given about 20–30 minutes to complete this mid-chapter assessment.

Test Item 1

The tent is in the shape of an isosceles triangular prism. Students will need to use the Pythagorean theorem to find the height of the triangular faces.

End of Chapter Test

This is an end of chapter assessment. Give students one class period to complete this assessment.

Test Item 1

Students are required to find the volumes of three different shapes, and in part (d), they are asked to compare the ratio of cost to volume for each of the three shapes. Students may directly compare ratios or they may reason using information from the early parts of the problem. An alternate explanation for part (d) follows: The volume of the large serving was twice the volume of the medium serving, and the volume of the jumbo serving was three times the volume of the medium serving. So, if we were to buy a large serving, it would be equivalent (in volume) to buying two medium servings. If we were to buy a jumbo serving, it would be equivalent to buying three medium servings. As such, we would expect a large serving to cost double the price of a medium ($2.50), and a jumbo would cost triple the price of the medium ($3.75). Thus, the jumbo serving is the best deal because we would save $1.00, while purchasing the large serving would save us only $0.50.

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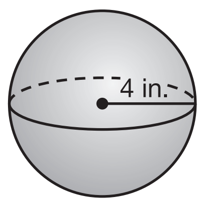
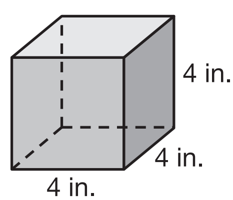
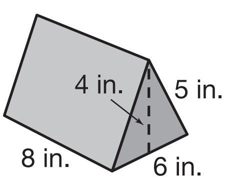
Standardized Test Practice

This test will provide practice for standardized tests that students may take during the school year. Content from all previous chapters will be included on the practice exams. To prepare students for standardized testing, allow students 15 to 20 minutes of time to complete the exam. Emphasize that students should work quickly but carefully to perform well.

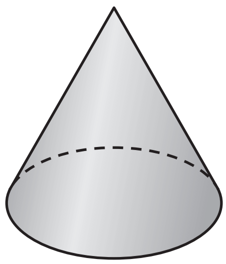
Pre-Test

Name ______________________________ Date ______________

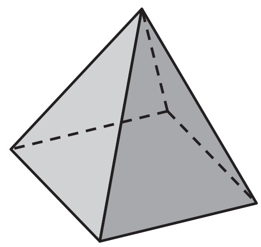
1. The table below shows three common solids. Complete the table by naming each solid, finding the surface area, and finding the volume. Please include units. When appropriate, write your answer in terms of π. (Figures are not drawn to scale.)

	Name of Solid	Surface Area	Volume
	**Sphere**	**The surface area of a sphere is equal to four times the area of a circle of the same radius. For this sphere, the surface area is $4\pi r^2 = 4\pi(16)$ $= 64\pi$ in.^{2}**	**The volume of a sphere can be found by using the following formula.** $V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(4)^3$ $= \frac{256}{3}\pi$ in.^{3}
	**Cube**	**A cube is made of 6 squares joined at the edges. Each side has an area of $4 \times 4 = 16$ in.^{2} The sum of the areas of the 6 sides is $6 \times 16 = 96$ in.^{2}**	**The volume of a cube can be found by multiplying the base length by the width by the height.** $V = 4 \times 4 \times 4 = 64$ in.^{3}
	**Triangular Prism**	**The area of each triangular face is equal to** $\frac{1}{2}bh = \frac{1}{2}(6)(4) = 12$ in.^{2} **The area of each of the two congruent faces is $8 \times 5 = 40$ in.^{2} The area of the remaining rectangular side is $6 \times 8 = 48$ in.^{2} The total surface area is equal to the sum of all the faces:** $12 + 12 + 40 + 40 + 48$ $= 152$ in.^{2}	**The volume of a prism can be found by multiplying the area of the base (a triangle here) by the height of the prism.** $V = \left[\frac{1}{2}(6 \times 4)\right] \times 8$ $= 12 \times 8 = 96$ in.^{3}

2. Find the volume of each figure below. When appropriate, write your answer in terms of π.



Circular base with radius of 3 inches and a height of 6 inches



Square base with dimensions 6 inches $\times$ 6 inches and a height of 5 inches

The volume of the cone is equal to one third of the product of the area of the base and the height.

$$V_{\text{cone}} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(3^2)(6) = 18\pi \text{ in.}^3$$

The volume of the pyramid is equal to one third of the product of the area of the base and the height.

$$V_{\text{pyramid}} = \frac{1}{3}(6^2)(5) = 60 \text{ in.}^3$$

3. Below are diagrams of three different cardboard patterns that can be folded into three-dimensional figures.

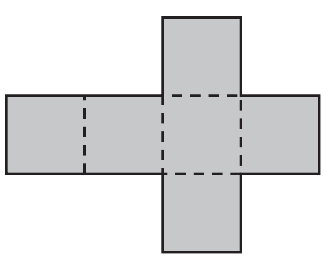


Figure 1

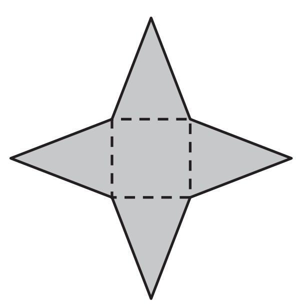


Figure 2

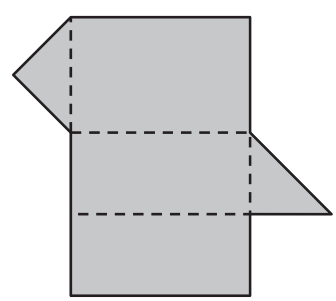


Figure 3

a. Imagine folding Figure 1 along the dotted lines. What shape would you have?

Figure 1 would fold into a cube.

b. Imagine folding Figure 2 along the dotted lines. What shape would you have?

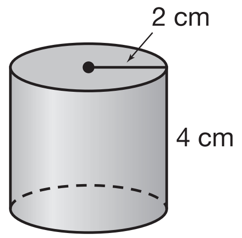
Figure 2 would fold into a square pyramid.

c. Imagine folding Figure 3 along the dotted lines. What shape would you have?

Figure 3 would fold into a triangular prism.

Name ________________________ Date ____________

4. A cylinder with a radius of 2 centimeters and a height of 4 centimeters is shown below.



a. Find the surface area of the cylinder. Write your answer in terms of π.

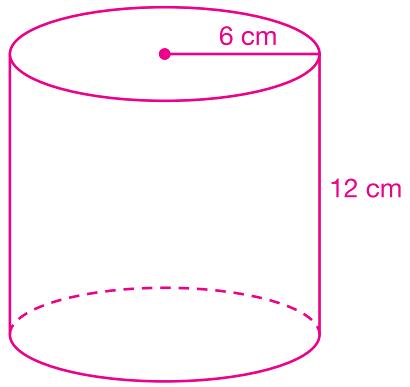
The surface area of a cylinder is equal to the sum of the areas of the bases and the area of the surface between the bases. The bases are circles, so the area of one base is $\pi r^2 = \pi(2)^2 = 4\pi$ square centimeters. The surface between the bases is a rectangle with a height of 4 centimeters and a width equal to the circumference of a circular base. The area of this rectangle is $2\pi rh = 2\pi(2)(4) = 16\pi$ square centimeters. The total surface area is equal to $4\pi + 4\pi + 16\pi = 24\pi$ square centimeters.

b. Find the volume of the cylinder. Write your answer in terms of π.

The volume of the cylinder is equal to the product of the area of a circular base and the height of the cylinder. From part (a), we know that the area of a base is equal to 4π square centimeters. The height of the cylinder is 4 centimeters. So, the volume of the cylinder is $4\pi \times 4 = 16\pi$ cubic centimeters.

c. Sketch an enlargement of the original cylinder with a scale of 3 : 1. Be sure to label the new dimensions.

The original cylinder has a radius of 2 centimeters and a height of 4 centimeters, so we can find the dimensions of the new cylinder by multiplying by a scale factor of 3.



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d. Find the surface area and the volume of the enlarged cylinder. Write your answer in terms of π.

The surface area of the cylinder is equal to the sum of the areas of the bases and the area of the rectangle between the bases. So, the surface area of the cylinder is $2\pi(6^2) + 2\pi(6)(12) = 216\pi$ square centimeters.

The volume of the cylinder is equal to the product of the area of a circular base and the height of the cylinder. So, the volume is $\pi(6^2)(12) = 432\pi$ cubic centimeters.

e. Find the ratio of the surface area of the enlarged cylinder to the surface area of the original cylinder.

Using our work from above, we can write the ratio as the fraction $\frac{216\pi}{24\pi} = \frac{9}{1} = \frac{3^2}{1}$.

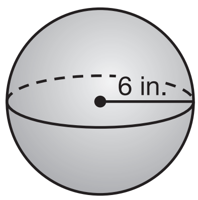
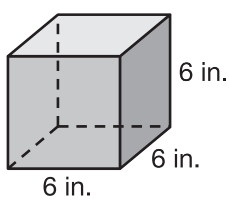
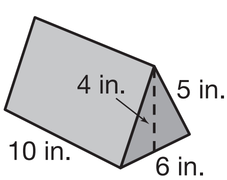
f. Find the ratio of the volume of the enlarged cylinder to the volume of the original cylinder.

Using our work from above, we can write the ratio as the fraction $\frac{432\pi}{16\pi} = \frac{27}{1} = \frac{3^3}{1}$.

Post-Test

Name ______________________ Date ______________

1. The table below shows three common solids. Complete the table by naming each solid, finding the surface area, and finding the volume. Please include units. When appropriate, write your answer in terms of π. (Figures are not drawn to scale.)

	Name of Solid	Surface Area	Volume
	Sphere	The surface area of a sphere is equal to four times the area of a circle of the same radius. For this sphere, the surface area is $4\pi r^2 = 4\pi(36) = 144\pi$ in.^{2}	The volume of a sphere can be found by using the following formula. $V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(6)^3 = \frac{864}{3}\pi = 288\pi$ in.^{3}
	Cube	A cube is made of 6 squares joined at the edges. Each side has an area of $6 \times 6 = 36$ in.^{2} The sum of the areas of the 6 sides is $6 \times 36 = 216$ in.^{2}	The volume of a cube can be found by multiplying the base length by the width by the height. $V = 6 \times 6 \times 6 = 216$ in.^{3}
	Triangular Prism	The area of each triangular face is equal to $\frac{1}{2}bh = \frac{1}{2}(6)(4) = 12$ in.^{2} The area of each of the two congruent faces is $10 \times 5 = 50$ in.^{2} The area of the remaining rectangular side is $6 \times 10 = 60$ in.^{2} The total surface area is equal to the sum of all the faces: $12 + 12 + 50 + 50 + 60 = 184$ in.^{2}	The volume of a prism can be found by multiplying the area of the base (a triangle here) by the height of the prism. $V = \left[\frac{1}{2}(6 \times 4)\right] \times 10 = 12 \times 10 = 120$ in.^{3}

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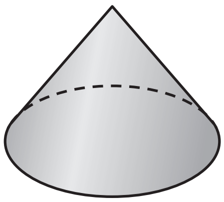
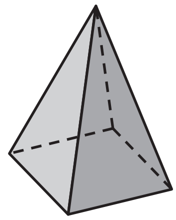
Post-Test PAGE 2

2. Find the volume of each figure below. When appropriate, write your answer in terms of π.



Circular base with
radius of 4 inches and
a height of 5 inches



Square base with dimensions
4 inches $\times$ 4 inches
and a height of 6 inches

The volume of the cone is equal to one third of the product of the area of the base and the height.

$$V_{\text{cone}} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(4^2)(5) = \frac{80}{3}\pi \text{ in.}^3$$

The volume of the pyramid is equal to one third of the product of the area of the base and the height.

$$V_{\text{pyramid}} = \frac{1}{3}(4^2)(6) = 32 \text{ in.}^3$$

3. Below are diagrams of three different cardboard patterns that can be folded into three-dimensional figures.

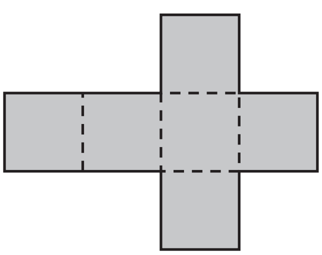


Figure 1

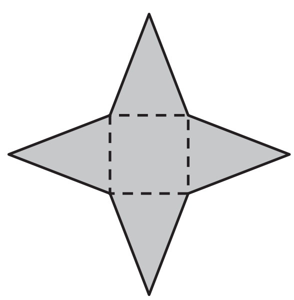


Figure 2

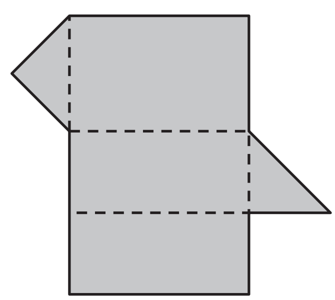


Figure 3

a. Imagine folding Figure 1 along the dotted lines. What shape would you have?

Figure 1 would fold into a cube.

b. Imagine folding Figure 2 along the dotted lines. What shape would you have?

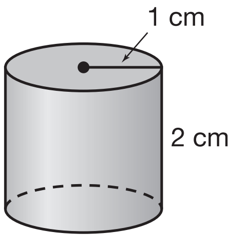
Figure 2 would fold into a square pyramid.

c. Imagine folding Figure 3 along the dotted lines. What shape would you have?

Figure 3 would fold into a triangular prism.

Name ______________________________ Date ______________

4. A cylinder with a radius of 1 centimeter and a height of 2 centimeters is shown below.



a. Find the surface area of the cylinder. Write your answer in terms of π.

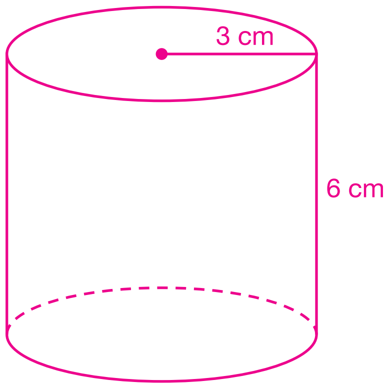
The surface area of a cylinder is equal to the sum of the areas of the bases and the area of the surface between the bases. The bases are circles, so the area of one base is $\pi r^2 = \pi(1)^2 = \pi$ square centimeters. The surface between the bases is a rectangle with a height of 2 centimeters and a width equal to the circumference of a circular base. The area of this rectangle is $2\pi rh = 2\pi(1)(2) = 4\pi$ square centimeters. The total surface area is equal to $\pi + \pi + 4\pi = 6\pi$ square centimeters.

b. Find the volume of the cylinder. Write your answer in terms of π.

The volume of the cylinder is equal to the product of the area of a circular base and the height of the cylinder. From part (a), we know that the area of a base is equal to π square centimeters. The height of the cylinder is 2 centimeters. So, the volume of the cylinder is $\pi \times 2 = 2\pi$ cubic centimeters.

c. Sketch an enlargement of the original cylinder with a scale factor of 3 : 1. Be sure to label the new dimensions.

The original cylinder has a radius of 1 centimeter and a height of 2 centimeters, so we can find the dimensions of the new cylinder by multiplying by a scale factor of 3.



d. Find the surface area and the volume of the enlarged cylinder. Write your answer in terms of π.

The surface area of the cylinder is equal to the sum of the areas of the bases and the area of the rectangle between the bases. So, the surface area of the cylinder is $2\pi(3^2) + 2\pi(3)(6) = 54\pi$ square centimeters.

The volume of the cylinder is equal to the product of the area of a circular base and the height of the cylinder. So, the volume is $\pi(3^2)(6) = 54\pi$ cubic centimeters.

e. Find the ratio of the surface area of the enlarged cylinder to the surface area of the original cylinder.

Using our work from above, we can write the ratio as the fraction $\frac{54\pi}{6\pi} = \frac{9}{1} = \frac{3^2}{1}$.

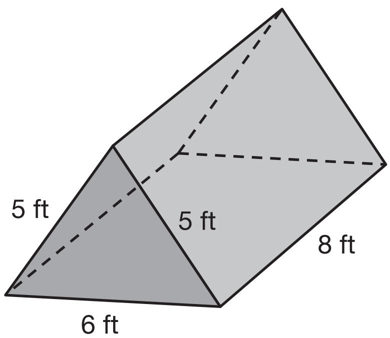
f. Find the ratio of the volume of the enlarged cylinder to the volume of the original cylinder.

Using our work from above, we can write the ratio as the fraction $\frac{54\pi}{2\pi} = \frac{27}{1} = \frac{3^3}{1}$.

Mid-Chapter Test

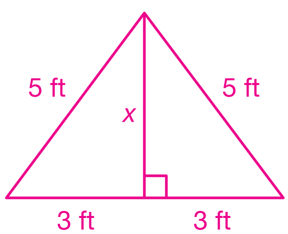
Name ______________________________ Date ______________

1. Below is a diagram of a simple two-person camping tent.



a. Find the volume of the tent.

The tent is a triangular prism. The volume of a prism is equal to the product of the area of the base and the height of the prism. The base of the prism is an isosceles triangle with a 6-foot base and two 5-foot legs. The figure at the right is an enlargement of one of the bases of the prism. We can find the height of the base by using the Pythagorean theorem: $5^2 = 3^2 + x^2$; $16 = x^2$; $4 = x$. So the area of the triangular base of this prism is $\frac{1}{2}(6 \times 4) = 12$ square feet. The height of the prism is 8 feet. The volume of the prism is $12 \times 8 = 96$ cubic feet.



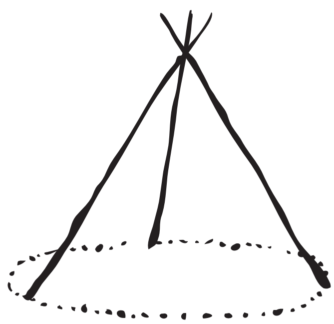
b. The tent is made from a heavy cloth. Use the dimensions shown in the diagram to find the total surface area of the material for the tent (in square feet).

The tent has five faces made of fabric. Two of the faces are the triangles from part (a) (each has an area of 12 square feet). There are also two rectangular faces that each have dimensions of 5 feet $\times$ 8 feet (each has an area of 40 square feet). There is also one rectangular face that has dimensions of 6 feet by 8 feet (the area is 48 square feet). The total surface area of the material for the tent is $12 + 12 + 40 + 40 + 48 = 152$ square feet.

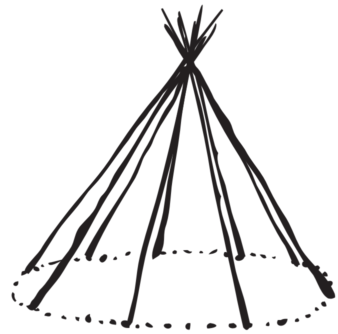
c. The tent is made from a heavy cloth that weighs one half ounce per square foot. How much does the fabric of the tent weigh?

The total surface area of the tent is 152 square feet (from part b). If each square foot weighs one half of an ounce, the fabric of the tent will weigh $152 \times \frac{1}{2} = 76$ ounces.

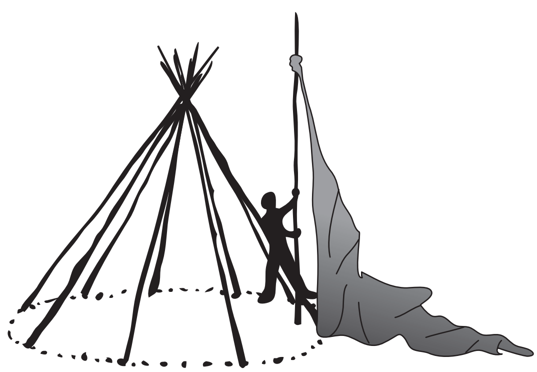
2. Kevin wants to build a tepee in the shape of a cone using instructions he found online.



Step 1: Set up the tripod.



Step 2: Bind six poles to the tripod.



Step 3: Fasten the cover to the tenth pole.

Step 4: Attach the tenth pole and unfold the cover around the structure.

Kevin wants his tepee to have a volume of at least 100 cubic feet. He is going to make the base of the tepee six feet in diameter. How tall will the tepee need to be, to make sure that the volume is at least 100 cubic feet? Use 3.14 for π and round your answer to the nearest tenth of a foot.

The volume of a cone is equal to one third of the product of the area of the base and the height, or $V = \frac{1}{3}\pi r^2 h$. Substitute the values for V and r and solve the equation for h.

$$100 = \frac{1}{3}(3.14)(3^2)h$$

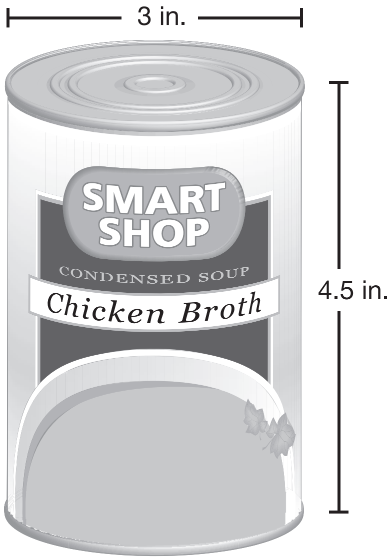
$$100 = 9.42h$$

$$10.6 \approx h$$

The height is approximately 10.6 feet. So, Kevin's tepee needs to be at least 10.6 feet tall.

Name ______________________________ Date ______________

3. The figure below shows the dimensions of a can of chicken broth. A packaging plant has been hired to label and package 1200 of these cans.



a. A paper label is placed around each can with a 0.125-inch metal rim exposed at the top and bottom. How many square inches of paper are used to make a label for each can? Use 3.14 for π.

The can label is a rectangle with a width equal to the circumference of the can and a height equal to the height of the can minus 0.25 inch (exposed metal rim). The circumference of the can is equal to $\pi d = 3\pi$ inches. The height of the label is equal to $4.5 - 0.25 = 4.25$ inches. The amount of paper used for one label is equal to $3\pi \times 4.25 = 12.75\pi$ ¯ 40.035 square inches.

b. A customer would like the cans packed 12 per box, in 3 rows of 4 cans placed side-by-side. Using the smallest possible box, what are the dimensions of the boxes the company will need to make?

The length of the box will need to be three times the diameter of a can, or $3(3) = 9$ inches. The width of box will need to be four times the diameter of a can, or $4(3) = 12$ inches. The height of the box will need to be equal to the height of a can. So, the dimensions of the smallest possible box that the company will need to make are 9 inches $\times$ 12 inches $\times$ 4.5 inches.

Mid-Chapter Test

c. Find the volume of the box from part (b).

The volume of the box is equal to the length times the width times the height. So, the volume of the box is $9 \times 12 \times 4.5 = 486$ cubic inches.

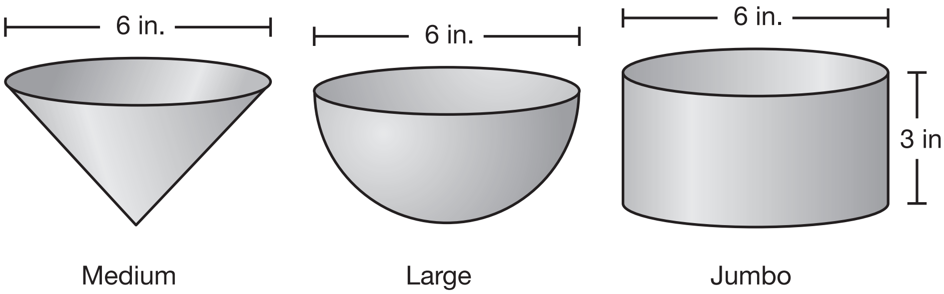
d. Find the amount of wasted space (the space around the cans) in the box from part (b). Use 3.14 for π and round your answer to the nearest cubic inch.

The volume of one can is equal to the product of the area of the base and the height of the can, or $\pi(1.5^2)(4.5) = 10.125\pi$ cubic inches. So, the combined volume of 12 cans is $10.125\pi \times 12 = 121.5\pi$ ¯ 382 cubic inches. The volume of the box is 486 cubic inches (from part c). So, there are about $486 - 382 = 104$ cubic inches of wasted space.

End of Chapter Test

Name ______________________________ Date ______________

1. A store sells frozen yogurt in three different shapes of containers, as shown below. Each container has a diameter of six inches and each container is three inches deep. The names of the three containers are medium, large, and jumbo.



a. Find the volume of each serving size. Write your answer in terms of π.

The medium container is a cone with a a diameter of 6 inches and a height of 3 inches. So, the volume is equal to one third of the product of the area of the base and the height, or $\frac{1}{3}\pi(3^2)(3) = 9\pi$ cubic inches.

The large container is one half of a sphere with a diameter of 6 inches. So, the volume is equal to one half of four thirds times π times the radius cubed, or $\frac{1}{2}\left(\frac{4}{3}\right)\pi(3^3) = 18\pi$ cubic inches.

The jumbo container is a cylinder with a diameter of 6 inches and a height of 3 inches. So, the volume is equal to the product of the area of a base and the height, or $\pi(3^2)(3) = 27\pi$ cubic inches.

b. How much more frozen yogurt is in a large serving compared to a medium serving?

The large serving size has a volume of 18π cubic inches. The medium serving size has a volume of 9π cubic inches. So, the large size has twice as much frozen yogurt as the medium size.

This problem can also be solved by comparing the formulas for the volumes of the two shapes. The formula for the volume of a cone is $V_{cone} = \frac{1}{3}\pi r^2 h$. The formula for the volume of a hemisphere is $V_{hemisphere} = \frac{2}{3}\pi r^3$. For this particular situation, the radius of both shapes is equal to 3 inches and the height of the cone is equal to 3 inches. So, the volume of a hemisphere is equal to twice the volume of a cone. The large container will hold twice as much yogurt as the medium container.

c. How much more frozen yogurt is in a jumbo serving compared to a medium serving?

The jumbo serving size has a volume of 27π cubic inches. The medium serving size has a volume of 9π cubic inches. So, the jumbo size has three times as much frozen yogurt as the medium size.

This problem can also be solved by comparing the formulas for the volumes of the two shapes. The formula for the volume of a cone is $V_{cone} = \frac{1}{3}\pi r^2 h$. The formula for the volume of a cylinder is $V_{cylinder} = \pi r^2 h$. For this particular situation, the radius and height of both shapes is equal to 3 inches. So, the volume of a cone is equal to one third the volume of a cylinder with the same dimensions. The jumbo container will hold three times as much yogurt as the medium container.

d. The store sells the medium serving for $1.25, the large serving for $2.00, and the jumbo size for $2.75. Which size is the best value? Write a complete sentence to justify your answer.

To determine the best value, compare the price to volume ratio for the three containers.

The medium costs $\frac{\$1.25}{9\pi} \approx \$0.044$ per cubic inch.

The large costs $\frac{\$2.00}{18\pi} \approx \$0.035$ per cubic inch.

The jumbo costs $\frac{\$2.75}{27\pi} \approx \$0.032$ per cubic inch.

The jumbo container is the best value at approximately 3 cents per cubic inch.

Name ____ Date ____________________

2. Marie is a professional dollhouse architect and designer. Each of her houses are built using a scale of 1 : 12. A customer has requested a set of scaled kitchen items including a box of cookies and a box of cereal.

Marie takes the following measurements from items in her kitchen.

	Height	Width	Depth
Box of cookies	7.75 inches	5.35 inches	2.5 inches
Box of cereal	12 inches	7.75 inches	2.25 inches

a. Find the volume of the box of cookies and the box of cereal from Marie's kitchen. Round each answer to the nearest hundredth of a cubic inch.

The volume of the box of cookies is equal to the product of the height, width, and depth, or $7.75 \times 5.35 \times 2.5 \approx 103.66$ cubic inches.

The volume of the box of cereal is equal to the product of the height, width, and depth, or $12 \times 7.75 \times 2.25 = 209.25$ cubic inches.

b. Complete the table below with the dimensions of the scaled items. Round your answers to the nearest hundredth of an inch.

	Height	Width	Depth
Scaled box of cookies	$\frac{7.75}{12} \approx 0.65$ in.	$\frac{5.35}{12} \approx 0.45$ in.	$\frac{2.5}{12} \approx 0.21$ in.
Scaled box of cereal	$\frac{12}{12} = 1$ in.	$\frac{7.75}{12} \approx 0.65$ in.	$\frac{2.25}{12} \approx 0.19$ in.

c. What is the volume of each of the scaled items?

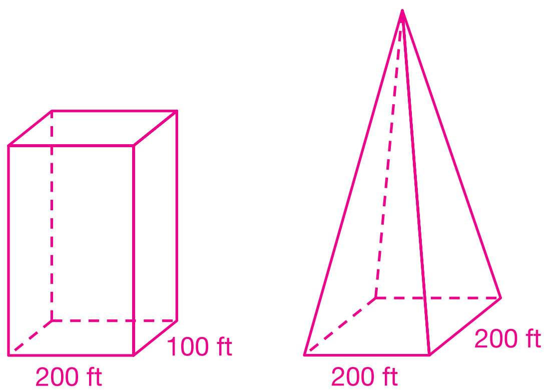
The scaled box of cookies has a volume of $0.65 \times 0.45 \times 0.21 \approx 0.06$ cubic inches. The scaled box of cereal has a volume of $1 \times 0.65 \times 0.19 \approx 0.12$ cubic inches.

d. What is the ratio of volumes for each scaled item to its corresponding original item? Is this ratio the same for both items?

From parts (a) and (c), we have the volume before and after scaling. We can write these ratios as fractions. The ratio of the volume of the scaled cookie box to the original cookie box is $\frac{0.06}{103.66} = 0.000579$. The same ratio for the cereal boxes can be written as $\frac{0.12}{209.25} = 0.000573$. These two ratios are very similar and any difference is due to rounding.

3. The city of Washington is building two new office buildings. One building will be in the shape of a rectangular prism, with a base that measures 200 feet by 100 feet. The second building will be in the shape of a pyramid, with a square base that is 200 feet by 200 feet.

a. Draw a sketch of these two buildings.



b. The height of the rectangular prism building is 400 feet. Find the volume of the building.

The volume of the rectangular prism is equal to the length times the width times the height. So, the volume of the building is 100 × 200 × 400 = 8,000,000 cubic feet.

c. The city planning department would like the volume of the two buildings to be the same. Find the height of the pyramid building.

The volume of a pyramid is equal to one third of the product of the area of the base and the height, or $V = \frac{1}{3}Bh$. Substitute the values for V and B and solve the equation for h.

$$8{,}000{,}000 = \frac{1}{3}(200 \times 200)h$$

$$8{,}000{,}000 = \frac{40{,}000}{3}h$$

$$600 = h$$

The height of the pyramid building is 600 feet.

Name ______________________ Date ______________

4. One half-gallon of ice cream can be packaged in a rectangular box that measures 8 inches long by 5 inches wide by 4 inches deep. The company has decided to change the shape of the container to a cylinder with a diameter of 6 inches.

a. Find the volume of the current container.

The current container is a rectangular prism. The volume of a rectangular prism is equal to the length times the width times the height. So, the volume of the current container is $8 \times 5 \times 4 = 160$ cubic inches.

b. The company plans for the new cylindrical container to have the same volume as the old container. Find the height of the new container. Use 3.14 for π and round your answer to the nearest tenth of an inch.

The volume of a cylinder is equal to the product of the area of the base and the height, or $V = \pi r^2 h$. The volume is 160 cubic inches and the radius is 3 inches, so substitute these values into the equation and solve for h.

$160 = (3.14)(3^2)h$

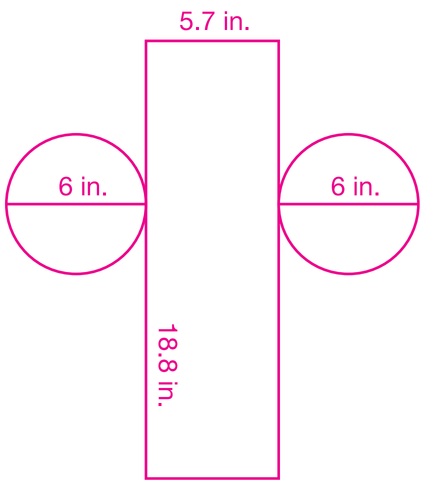
$160 = 28.26h$

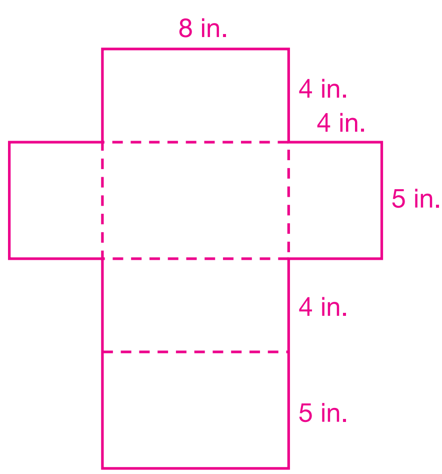
$5.7 \approx h$

The height of the new container is approximately 5.7 inches.

c. Draw a net and label the dimensions for each of the two containers.

The nets for the two containers are shown below. The dimensions of the rectangle in the cylinder net are the height of the cylinder and the circumference of the circular base ($C = \pi d = 6\pi \approx 18.8$). These nets are not drawn to scale.





d. Which container uses the least amount of material? Explain your answer.

To determine the amount of material that each container uses, find the surface area of each container.

The surface area of the rectangular box is equal to the sum of the areas of the six rectangular faces. Two of the rectangles have an area of $8 \times 5 = 40$ square inches, two of the rectangles have an area of $5 \times 4 = 20$ square inches, and two of the rectangles have an area of $8 \times 4 = 32$ square inches. So, the surface area of the rectangular box is $2(40) + 2(20) + 2(32) = 184$ square inches.

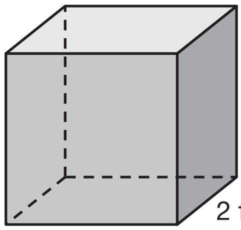
The surface area of the cylindrical container is equal to the sum of the areas of the two circular bases and the rectangle between the bases. So, the surface area of the cylindrical container is $2\pi(3^2) + 6\pi(5.7)$ ¯ 163.9 square inches.

So, the new cylindrical container uses less material than the old rectangular box.

Standardized Test Practice

Name ______________________________ Date ______________

1. Find the volume of the rectangular prism below.



a. 32 cubic feet

b. 16 cubic feet

c. 8 cubic feet

d. 64 cubic feet

2. Find the least common multiple of 7 and 5.

a. 1

b. 20

c. 35

d. 70

3. Find the surface area of a sphere with a radius of 3 centimeters.

a. 12π square centimeters

b. 36π square centimeters

c. 9π square centimeters

d. 27π square centimeters

4. Find the product $(-3) \times (-21)$.

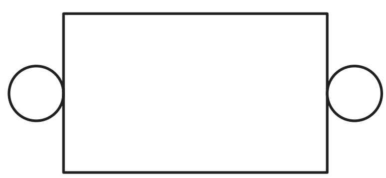
a. 63

b. 7

c. -63

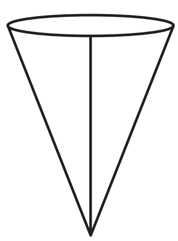
d. -7

5. The net below represents the surface area of a solid figure.

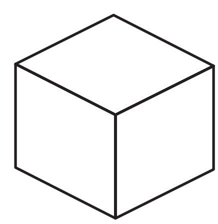


Which figure represents this solid figure? Figures are not drawn to scale.

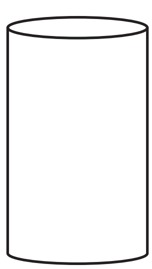
a.



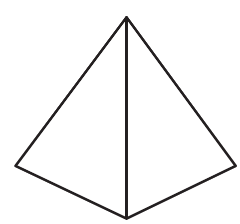
b.



c.



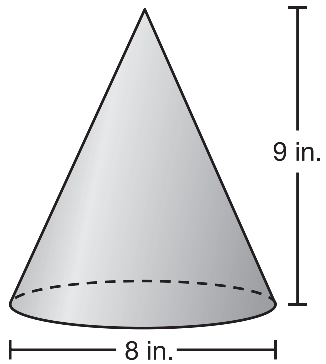
d.



Standardized Test Practice PAGE 3

Name ______________________________ Date ______________

6. Find the volume of the figure below.



a. 144π cubic inches

b. 192π cubic inches

c. 104π cubic inches

d. 48π cubic inches

7. Find the sum $2\frac{5}{6} + \left(-1\frac{3}{4}\right)$.

a. $1\frac{1}{2}$

b. $1\frac{2}{3}$

c. $1\frac{1}{12}$

d. $\frac{17}{6}$

8. Which equation is an equivalent equation for $2x - 3 = 5$?

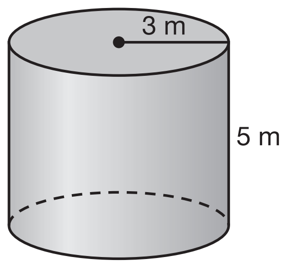
a. $x = 1$

b. $x = 4$

c. $x = 8$

d. $x = 2.5$

9. Find the surface area of the figure below.



a. 30π square meters

b. 18π square meters

c. 45π square meters

d. 48π square meters

10. Find the mean of the numbers in Set *M*.

$M = \{3, 4, 6, 2, 6, 9\}$

a. 5

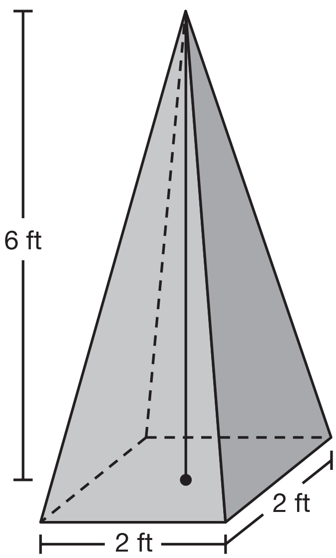
b. 6

c. 4

d. 9

Name ______________________________ Date ______________

11. Find the volume of the figure below.



a. 24 cubic feet

b. 4 cubic feet

c. 12 cubic feet

d. 8 cubic feet

12. Write 5,660,000 in scientific notation.

a. 5.66×10^{6}

b. 5.66×10^{4}

c. 56.6×10^{5}

d. 5.66×10^{-6}

13. Find the missing number that makes the proportion $\frac{2}{7} = \frac{6}{x}$ true.

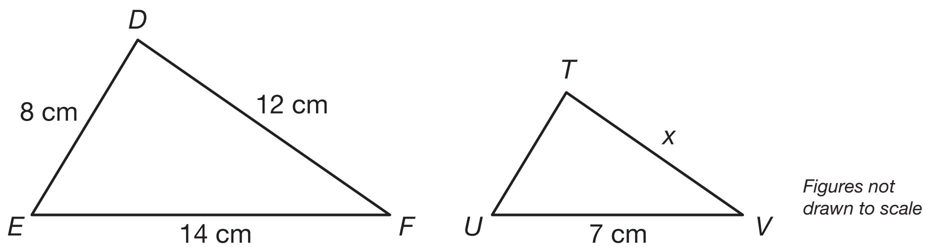
a. 11

b. 14

c. 7

d. 21

14. Triangle *DEF* is similar to triangle *TUV*. Find the length of side *TV*.



a. 5 centimeters

b 6 centimeters

c. 4 centimeters

d. 7 centimeters

15. The volume of Sphere A is 36π cubic units. Sphere A is similar to Sphere B. The radius of Sphere B is twice as long as the radius of Sphere A. Find the volume of Sphere B.

a. 72π cubic units

b. 288π cubic units

c. 17π cubic units

d. $\frac{32}{3}\pi$ cubic units

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