

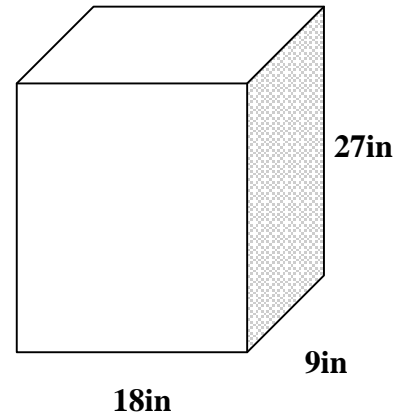
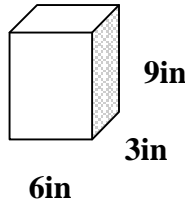
# Test Review Book 6 Name: \_\_\_\_\_

The Apple Theater concession sells two sizes of popcorn, a micro box and a jumbo box. Answer questions 1-5, and remember to show enough work so that someone reading your paper will know how you found your answers.

- 1) About how many square inches of cardboard are needed to make the micro box?

**198 in<sup>2</sup>**

$2(lw+lh+wh) = 2 \times (6 \times 3 + 6 \times 9 + 3 \times 9) = 198$   
*(This is the kiss butt method. Don't forget to x2 after you have added the three products). The label on surface area is always squared.*



- 2) About how many square inches of cardboard are needed to make the jumbo box?

**1,782 in<sup>2</sup>**

$2(lw+lh+wh) = 2 \times (18 \times 9 + 18 \times 27 + 9 \times 27) = 1,782$

- 3) What is the scale factor from the small box to the large box?

**The scale factor is three.** All measurements on the large box are 3 times larger than those on the small box.

- 4) How many times more material is used for the large box? Why?

$1,782 \text{ (from \#2)} / 198 \text{ (from \#1)} = 9$

When you are dealing with surface area, if you square the scale factor, that is how many times more material is used.  $3^2=9$  (**9 times more material is used**)

- 5) How many cubic inches of popcorn will fit in the micro box if the top of the popcorn is level with the top of the box?

**162 in<sup>3</sup>**

$l \times w \times h = 6 \times 3 \times 9 = 162$ . The label on volume is always cubed.

- 6) How many cubic inches of popcorn will fit in the jumbo box if the top of the popcorn is level with the top of the box?

**4,374 in<sup>3</sup>**

$l \times w \times h = 18 \times 9 \times 27 = 4,374$

- 7) How many times more popcorn can fit in the large box? Why?

$4,374 / 162 = 27$

When you are dealing with volume, when you cube the scale factor, that is how many times more volume it has.  $3^3=27$  (**27 times more volume**)

8) If the micro box sells for \$0.75, what should the price of the jumbo box be if it is based on the amount of popcorn the box holds?

¶ **\$20.25**

¶ Again there are two ways to get this answer. The basic way is to take the answer from #6 divided by the answer from #5 and multiply by the \$.75. This would be  $4,374/162=27$ ,  $27 \times \$0.75 = \$20.25$

¶ The other method, if you understand the scale factors is to recognize that since the scale factor from the small box to the large box is 3, the volume will then be 27 times bigger.  $27 \times \$0.75 = \$20.25$

9) One face of a cube has an area of  $49 \text{ cm}^2$

a. What is the surface area of the cube?

**$294 \text{ cm}^2$**

If the shape is a cube, and one face has an area of 49, and a cube has 6 identical sides, to get the answer, take  $49 \times 6$  and you get  $294 \text{ cm}^2$

b. What is the volume of the cube?

**$343 \text{ cm}^3$**

If the shape is a cube, and one face has an area of 49, then the side lengths must be 7 because  $7 \times 7 = 7^2 = 49$ . To find the volume of a cube you take the length of the side and cube it, so  $7^3 = 343 \text{ cm}^3$

10) These are scale drawings of 2 cylinders. One cylinder has a base circumference of 18 cm and a height of 11 cm. The other cylinder has a base circumference of 11 cm and a height of 18 cm.

a. Do the cylinders have the same volume? Show calculations.

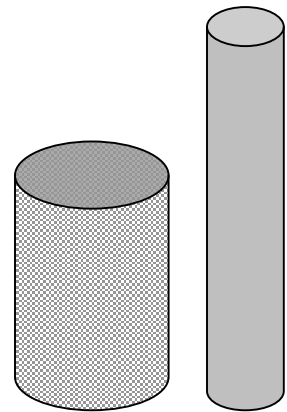
¶ **No**

¶ To find volume of a cylinder the equation is  $Pr^2xh$

¶ To find the radius if you are given circumference, you need to divide by 2 and then by  $P$  because  $2Pr = \text{Circumference}$  so  $\text{Circumference} \div 2$  and then by  $P = r$

¶ Short cylinder =  $18/(2)/P = 2.8647 = \text{radius}$   
 $P \times 2.8647^2 \times 11 = 283.6 \text{ cm}^3$

¶ Tall cylinder =  $11/(2)/P = 1.7507 = \text{radius}$   
 $P \times 1.7507^2 \times 18 = 173.3 \text{ cm}^3$



b. Do the cylinders have the same surface area? Show your calculations.

¶ **No**

¶ To find Surface Area of a cylinder the equation is  $2Pr^2+2Prh$ . In this situation since you know the rectangle around the cylinder is  $18 \times 11$ , you can simply use that as the second part of the equation. In the second part of the equation  $2Pr$  is the circumference, so rather than re-calculating the circumference and multiplying by the height, simply use the circumference that was given to you.

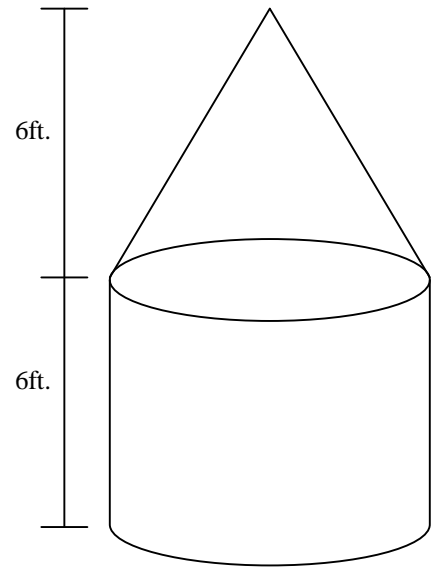
¶ To find the of each, look at letter "a"

¶  $2 \times P \times 2.8647^2 + 18 \times 11 = 249.6 \text{ cm}^3$

¶  $2 \times P \times 1.7507^2 + 11 \times 18 = 217.3 \text{ cm}^3$

11) This is a sketch of the nose of the delivery system for a new satellite. Find its volume.

- ¶ To find volume of a cylinder the equation is  $P r^2 x h$
- ¶ To find volume of a cone the equation is  $1/3 P r^2 x h$
- ¶ In this situation both the cylinder and the cone have the same height and radius, so once you have calculated the volume of the cylinder, you can multiply by  $1/3$ , or divide by 3, to get the volume of the cone.
- ¶ Since the diameter is 8, the radius is 4.
- ¶ Volume of the cylinder =  $P \times 4^2 \times 6 = 301.6$
- ¶ Volume of the cone =  $301.6 \times 1/3 = 100.5$
- ¶ Adding those two answers together you get  $301.6 + 100.5 = 402.1 \text{ ft}^2$



Diameter of the base is 8 ft.