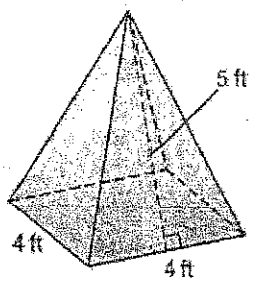
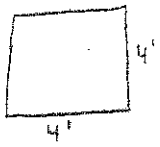
Jordan

EXAMPLE 1 **Find the surface area of the square pyramid.**

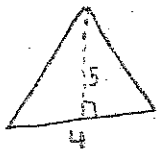




$A = b \times h$

$A = 4' \times 4'$

$= 16 ft^2$



$A = \frac{b \times h}{2}$

$A = \frac{4ft \times 5ft}{2}$

$A = \frac{20 ft^2}{2}$

$\boxed{A = 10 ft^2}$

$4A_\Delta = 40 ft^2$

$T_{SA} = 16 ft^2 + 40 ft^2$

$T_{SA} = 56 ft^2$

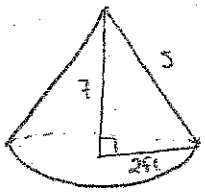
Lets change to squared yards

$$56 ft^2 \times \frac{(1 yd)^2}{(3 ft)^2} = \boxed{6.2 yd^2}$$

Example 3 Determining the Surface Area of a Right Cone

A right cone has a base radius of 2 ft. and a height of 7 ft.
Calculate the surface area of this cone to the nearest square foot.

SOLUTION
(Erase to reveal)



$s^2 = 7^2 + 2^2$

$s^2 = 49 + 4$

$s^2 = 53$

$\boxed{s = 7.3\text{ ft}}$

$\sqrt{7^2 + 2^2}$

$\sqrt{49 + 4}$

53

$SA = \pi r s + \pi r^2$

$= \pi(2\text{ ft})(7.3\text{ ft}) + \pi(2\text{ ft})^2$

$= 45.9\text{ ft}^2 + 12.6\text{ ft}^2$

$= 58.4\text{ ft}^2$

CHECK YOUR UNDERSTANDING

$58.4\text{ ft}^2 \times \left(\frac{12\text{ in}}{1\text{ ft}}\right)^2 \times \left(\frac{2.54\text{ cm}}{1\text{ in}}\right)^2$

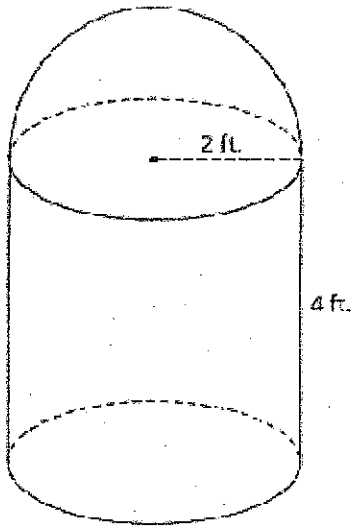
$= 54\,257.4$

Day 16 - 1+

Determining the Surface Area of a Composite Object

To calculate the surface area of a composite object, the first step is to determine the faces that comprise the surface area. Then calculate the sum of the areas of these faces.

EXAMPLE #1: Determine the surface area of this composite object to the nearest square foot.



SOLUTION

(Erase to reveal)

Sphere

$SA = 4\pi r^2$

$= 4\pi(2ft)^2$

$= 50.265\ ft^2$

$\frac{1}{2}$ sphere $= 25.13 ft^2$

Cylinder ← only need bottom

$SA = \pi r^2 + 2\pi rh$

$= \pi(2ft)^2 + 2\pi(2ft)(4ft)$

$= 12.6\ ft^2 + 50.26$

$= 62.8\ ft^2$

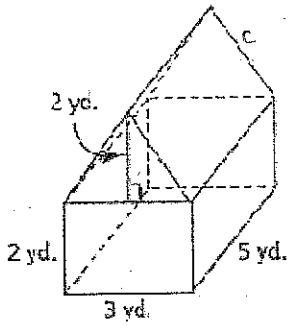
$TSA = 25.13 + 62.8\ ft^2$

$\boxed{= 87.97\ ft^2}$

$$87.97\ ft^2 \times \left(\frac{1\ m}{3.2808\ ft}\right)^2 = \boxed{8.17\ m^2}$$

EXAMPLE #2: Solving a Problem Related to a Composite Object

A cabane à sucre is a composite object formed by a rectangular prism with a right triangular prism as its roof. Determine the surface area of the cabane à sucre in square yards.



$c^2 = 1.5^2 + 2^2$
$= 6.25$
$\boxed{c = 2.5\ yd^2}$

SOLUTION

(Erase to reveal)

△ Prism

don't need base

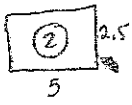
$A = \frac{b \times h}{2}$

$A = \left(\frac{3 \times 2}{2}\right)$

$A = \frac{6}{2}$

$A = 3\ yd^2$

$\boxed{2A = 6\ yd^2}$



$A = b \times h$

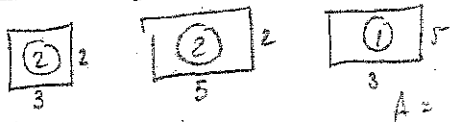
$A = 5 \times 2.5$

$A = 12.5$

$\boxed{2A = 25\ yd^2}$

$TSA_1 = 31\ yd^2$

□ prism



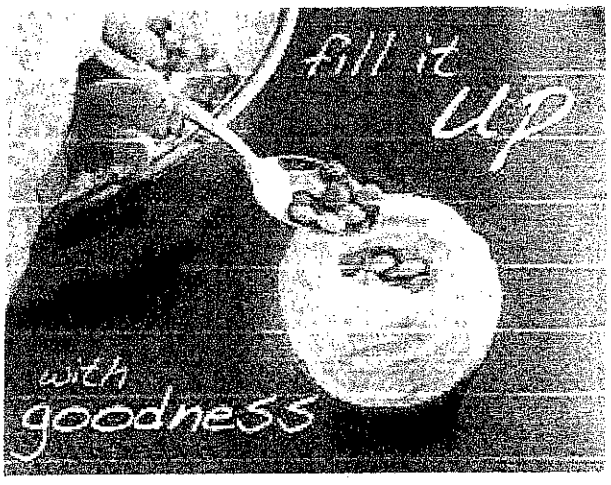
$A = 6$ $\quad$ $A = 10$ $\quad$ $A = 15\ yd^2$

$2A = 12\ yd^2$ $\quad$ $2A = 20\ yd^2$

$TSA = 47\ yd^2$

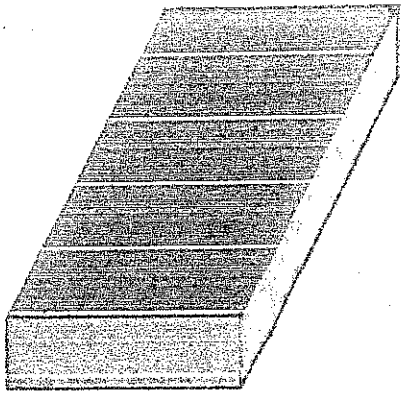
$TSA = 31\ yd^2 + 47\ yd^2$
$= 78\ yd^2$

Capacity - the maximum amount a container can hold

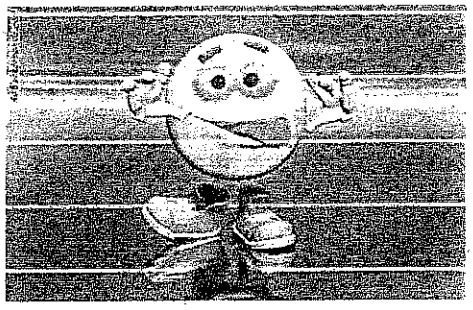


Volume - the amount of space a solid occupies

Elementary School



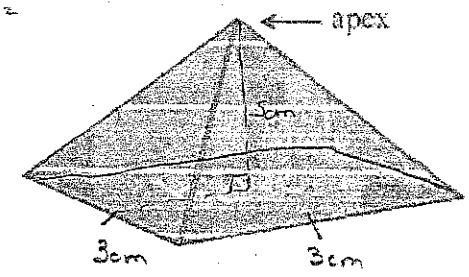
V= L x W x H



Volume of Pyramid: $V = \frac{A_{base} \times Height}{3}$

$A_b = 3 \times 3$

$9cm^2$

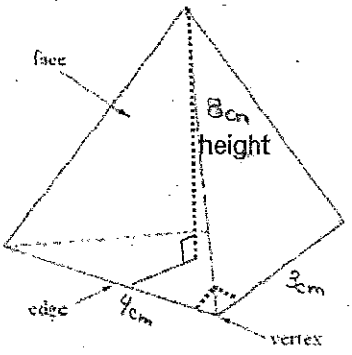


$V = \frac{A_b \times h}{3}$

$= \frac{9cm^2 \times 5cm}{3}$

$= \frac{45\ cm^3}{3}$

$V = 15\ cm^3$



Triangular Pyramid

$A_b = \frac{3 \times 4}{2}$

$= \frac{12}{2}$

$= 6\ cm^2$

$V = \frac{A_{base} \times h}{3}$

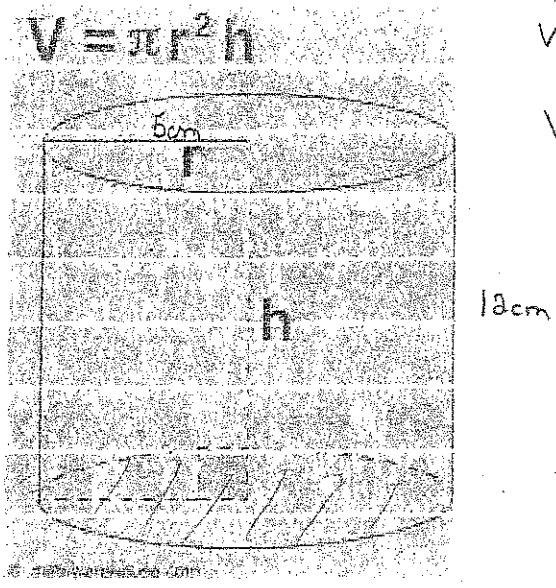
$V = \frac{6cm^2 \times 8cm}{3}$

$V = \frac{48cm^3}{3}$

$V = 16\ cm^3$

Volume of Cylinder: $V = A_{base} \times \text{Height}$

$$V = \underbrace{\pi r^2}_{} \times h$$



$V = \pi (5cm)^2 \times 12$

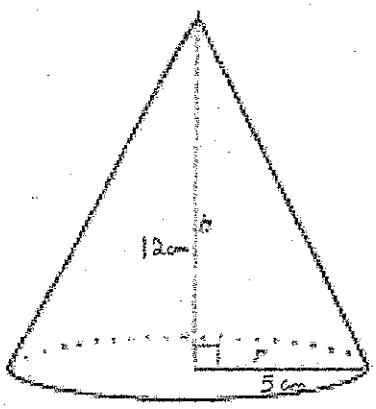
$V = \pi (25) \times 12$

$V = 942.3\ cm^3$

Volume of Cone: $V = \frac{A_{base} \times Height}{3}$

$= \frac{\pi r^2 \times h}{3}$

Cone



Volume

$V = \frac{1}{3} \pi r^2 h$

$V = \frac{\pi (5)^2 \times (12)}{3}$

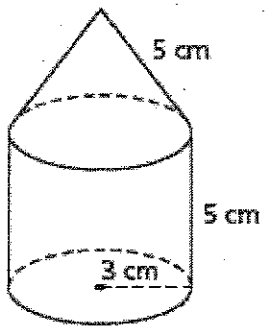
$V = \frac{942.5 \text{ cm}^3}{3}$

$V = 314.2 \text{ cm}^3$

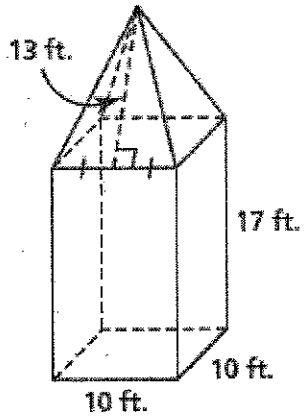
GMF 10 – Finding the Surface Area of Composite Objects

#1. Determine the surface area of each composite object to the nearest square unit.

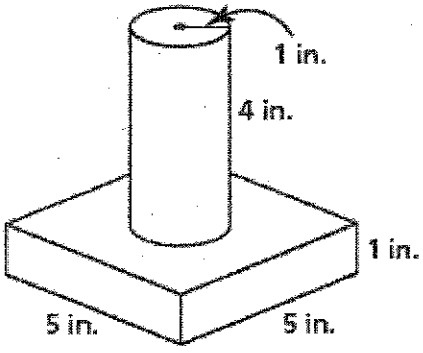
a) right cylinder and right cone



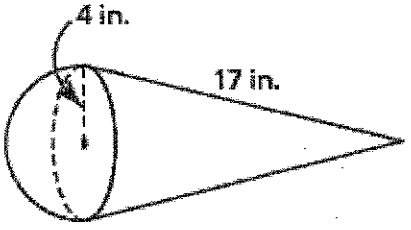
b) right square prism and right square pyramid



c) right square prism and right cylinder



d) right cone and hemisphere

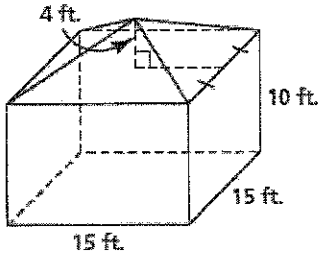


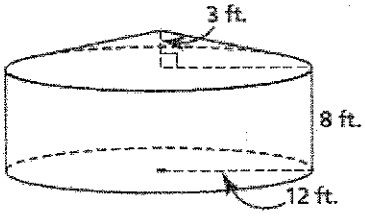
Solutions...

#1. a) 170 cm^2 b) 1040 $ft.^2$
c) 95 $in.^2$ d) 314 $in.^2$

#2. Here are two different grain storage bins.

Each storage bin has a cement base.
The materials for the walls and roof of the square-based bin cost \$10.49 per square foot.
The materials for the walls and roof of the circular-based bin cost \$9.25 per square foot.
Which bin is cheaper to build? Justify your answer.





Solution...

#2. Square-based bin

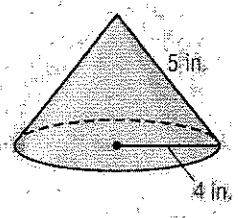
NAME _____ DATE _____ PERIOD _____

7-8 Practice: Skills

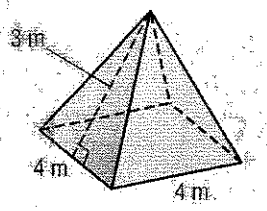
Surface Area of Pyramids and Cones

Find the surface area of each solid. Round to the nearest tenth if necessary.

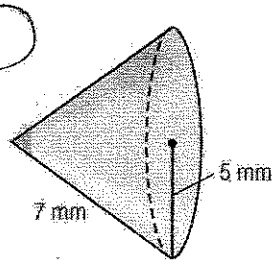
1.



2.



3.



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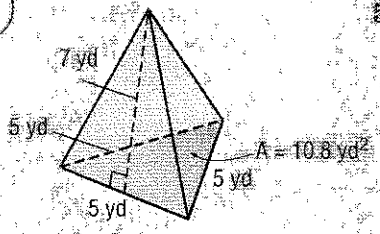

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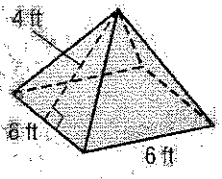

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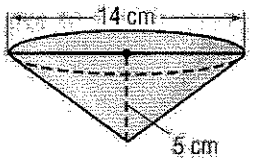

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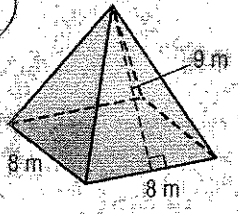

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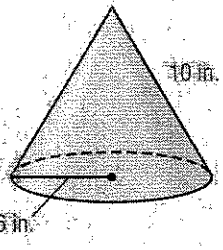
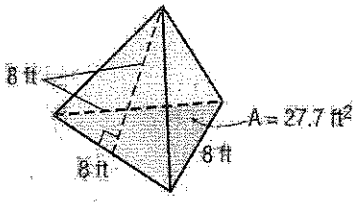


9.



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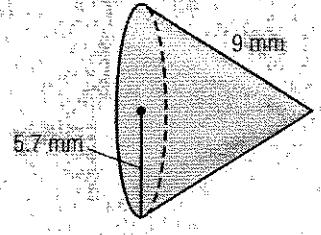

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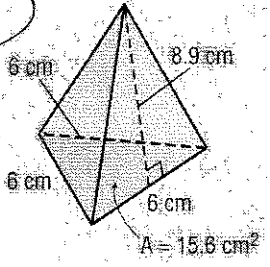

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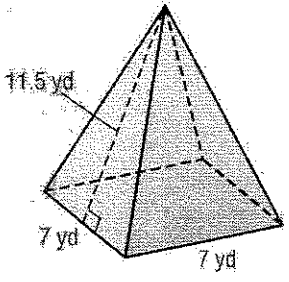

13. square pyramid: base side length, 4 cm; slant height, 7.3 cm

14. square pyramid: base side length, 5 yd; slant height, 12.7 yd

15. cone: diameter, 26 in.; slant height, 8 in.

Lesson 7–8