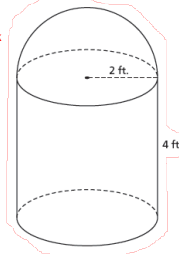### Determining the Surface Area of a Composite Object

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**   See answer sheet on my desk
(Erase to reveal)   Write on board

The surface area of the composite object is approximately 88 square feet.

Sphere

$SA = 4\pi r^2$

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

$SA = 50.265\ ft^2$

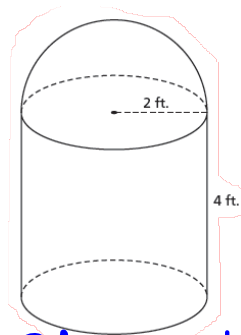1.7 Solving Problems Involving Objects

$\downarrow \frac{1}{2} SA$

Cylinder

$SA = \overline{2\pi r^2} + 2\pi r h$

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

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

$= 62.8\ ft^2$

$T_{SA} = 25.13ft^2 + 62.8\ ft^2$

$= 88\ ft^2$

Copy this picture.

Together we will find the total SA.

$SA_{cyl} = 2\pi r^2 + 2\pi r h$

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

$= 2\pi(4) + 2\pi(8)$

$= 8\pi + 16\pi$

$= 24\pi$

$= 75.4\ ft^2$

$SA_{sphere} = 4\pi r^2$

$= 4\pi(2)^2$

$= 4\pi(4)$

$= 16\pi$

$= 50.3\ ft^2$

$\div 2\ (half)$

$= 25.15\ ft^2$

Overlap
Top of the cyl.

$A = \pi r^2$

$= \pi(2)^2$

$= 4\pi = 12.6\ ft^2$

$Total\ SA = 75.4 + 25.15 - 12.6$

$= 87.95\ ft^2$

$$236.25 \, ft^2 \times \left[\frac{1 \, m}{3.2808 \, ft}\right]^2$$

$$21 \times \underline{\quad\quad}$$

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.

✓ SOLUTION   See answer sheet on my desk
(Erase to reveal)   Write on board

$T_{SA} = A_1 + 2A_2 + 2A_3$
$= 15 + 20 + 12$
$= 47 \, yd^2$

$c = \sqrt{2^2 + 1.5^2}$
$c = 2.5$

Tri prism:

$A_\triangle = \frac{b \times h}{2}$

$A_\triangle = \frac{3 \times 2}{2}$

$A_\triangle = 3 \, yd^2$

$2A_\triangle = 6 \, yd^2$

$A_\square = b \times h$
$= 5 \, yd \times 2.5 \, yd$
$A_\square = 12.5 \, yd^2$

$2A_\square = 25 \, yd^2$

$T_{SA_2} = 6 \, yd^2 + 25 \, yd^2$
$= 31 \, yd^2$

So

$T_{SA_1} + T_{SA_2} = 47 \, yd^2 + 31 \, yd^2$

Copy this picture.

Together we will find the total SA.

$a^2 + b^2 = c^2$
$1.5^2 + 2^2 = c^2$
$2.25 + 4 = c^2$
$\sqrt{6.25} = \sqrt{c^2}$
$c = 2.5$

2 yd.
2 yd.   5 yd.
3 yd.

① F + B
$A = \dfrac{b \times h}{2}$
$= \dfrac{3 \times 2}{2}$
$= 3\ yd^2$
$\times 2$
$= 6\ yd^2$

① F + B
$A = b \times h$
$= 2 \times 3$
$= 6\ yd^2$
$\times 2$
$12\ yd^2$

② L + R
$A = b \times h$
$= 2 \times 5$
$= 10\ yd^2$
$\times 2$
$20\ yd^2$

B
$A = b \times h$
$= 5 \times 3$
$= 15\ yd^2$
$15\ yd^2$

2.5 | L + R
$A = b \times h$
$= 2.5 \times 5$
$= 12.5\ yd^2$
$\times 2$
$25\ yd^2$

Overlap
bottom of tri not inc.
top of rect. not incl.

Total SA $= 12\ yd^2 + 20\ yd^2 + 15\ yd^2 + 6\ yd^2 + 25\ yd^2$
$= 78\ yd^2$

TRY THIS ONE...

A tool shed is formed by a rectangular prism with a triangular prism as its roof. Determine the surface area of the tool shed to the nearest square foot.

3 ft.
5 ft.
6 ft.
4 ft.

$c^2 = a^2 + b^2$
$= 2^2 + 3^2$
$= 4 + 9$
$c^2 = 13$
$c = \sqrt{13}$
$c = 3.6$

① F + B
$A = b \times h$
$= 5 \times 4$
$= 20\ ft^2$
$\times 2$
$40\ ft^2$

L + R
$A = b \times h$
$= 6 \times 5$
$= 30\ ft^2$
$\times 2$
$60\ ft^2$

T + B
$A = b \times h$
$= 4 \times 6$
$= 24$
$\times 2$
$48\ ft^2$

1.7 Solving Problems Involving Objects

② F + B
$A = \dfrac{b \times h}{2}$
$= \dfrac{4 \times 3}{2}$
$= 6\ ft^2$
$\times 2$
$12\ ft^2$

3.6 | L + R
$A = b \times h$
$= 3.6 \times 6$
$= 21.6\ ft^2$
$\times 2$
$43.2\ ft^2$

B
$A = b \times h$
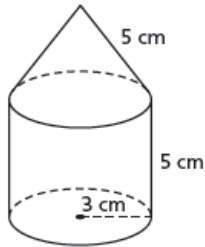$= 4 \times 6$
$= 24\ ft$

Overlap → bottom of tri
top & bottom of rect.
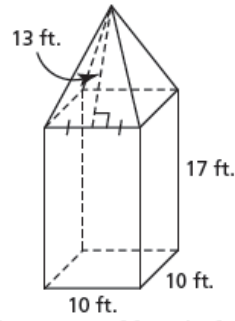
Total SA $= 40 + 60 + 12 + 43.2$
$= 155.2\ ft^2$

HOMEWORK...

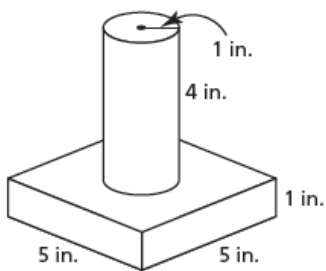**#1.** Determine the surface area of each composite object to the nearest square unit.
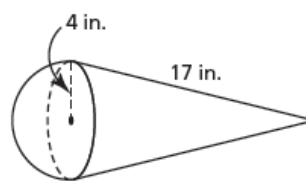
a) right cylinder and right cone

5 cm

5 cm

3 cm

b) right square prism and right square pyramid

13 ft.

17 ft.

10 ft.

10 ft.

c) right square prism and right cylinder

1 in.

4 in.

1 in.

5 in.   5 in.

d) right cone and hemisphere

4 in.

17 in.

Solutions...

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

Attachments

Practice - Converting Measurements.pdf

Worksheet - Finding Surface Area of a Composite Object.docx