

HOMWORK SOLUTIONS...

Converting English and Metric

- 1) 741.61 cubic feet = 21 cubic meters
- 2) 13.5 square yards = 11.29 square meters
- 3) 26.31 square yards = 22 square meters
- 4) 7 feet = 2.13 meters
- 5) 17.5 yards = 16 meters
- 6) 14.39 cubic yards = 11 cubic meters
- 7) 1 feet = 0.3 meters
- 8) 10 inches = 25.4 centimeters
- 9) 13.73 cubic yards = 10.5 cubic meters
- 10) 335.49 cubic feet = 9.5 cubic meters
- 11) 13.36 miles = 21.5 kilometers
- 12) 17 feet = 5.18 meters
- 13) 2.99 square yards = 2.5 square meters
- 14) 1.24 square inches = 8 square centimeters
- 15) 0.93 square inches = 6 square centimeters
- 16) 4.5 yards = 4.11 meters
- 17) 2 square feet = 0.19 square meters
- 18) 3 cubic feet = 0.08 cubic meters
- 19) 16.4 yards = 15 meters
- 20) 25 inches = 63.5 centimeters

4.3 - Surface Area

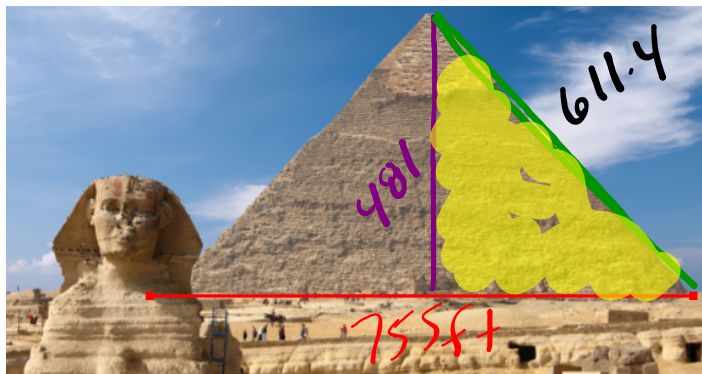


Warm-up

Make Connections

The ancient pyramids at Giza, Egypt, were built about 4500 years ago.

This pyramid has a square base with a side length of 755 feet. The original height of the pyramid was 481 feet. Archeologists believe that the pyramid was once covered with a white limestone casing. How could you calculate the area that was once covered with limestone?



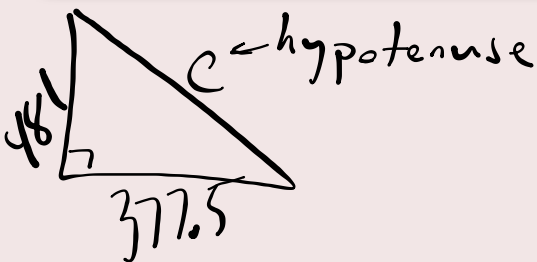
$$c^2 = a^2 + b^2$$

$$c^2 = 481^2 + 377.5^2$$

$$c^2 = 481^2 + 377.5^2$$

481 ² + 377.5 ²
373867.25
√(Ans)
611.4468497

$$c =$$



Surface Area



$$A = \frac{755 \times 611.4}{2}$$

$$SA = 923214 \text{ ft}^2$$

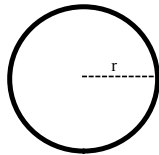
AREA Formulas...

Rectangle or Square



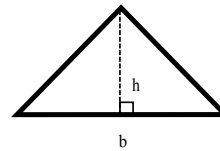
$$A = bh$$

Circle



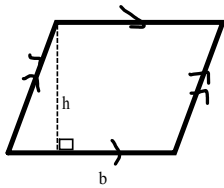
$$A = \pi r^2$$

Triangle



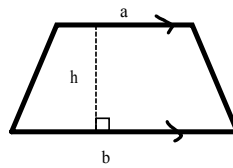
$$A = \frac{1}{2} bh$$

Parallelogram or Rhombus



$$A = bh$$

Trapezoid



$$A = \frac{1}{2} h(a + b)$$

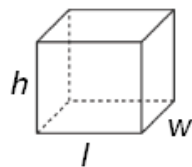
Surface Area

Surface area is the total area of all of the faces of the object.

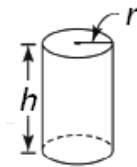
Steps need to find Surface area are:

1. Draw all of the faces with dimensions displayed on them.
2. Find the area of each face.
3. Then add up the areas of all of the faces.

Activate Prior Learning: Surface Areas of Right Prisms and Cylinders

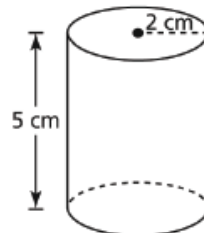
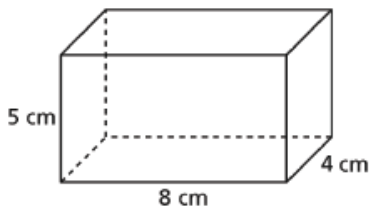


$$SA = 2wl + 2hl + 2hw$$



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

Which object below has the greater surface area?



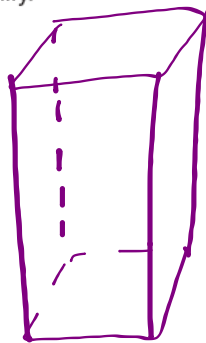
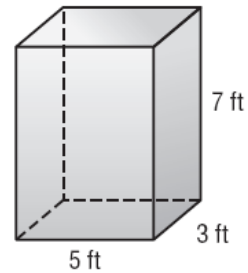
1.4 Surface Areas of Right Pyramids and Right Cones

The surface area of a prism is equal to the sum of the areas of its faces. For a rectangular prism with length ℓ , width w , and height h , the surface area is $S = 2\ell w + 2\ell h + 2wh$.

EXAMPLE 1 Find the surface area of the rectangular prism.

$$S = 2\ell w + 2\ell h + 2wh$$

Surface area of a prism
 $\ell = 3, w = 5, h = 7$
 Simplify.



SOLUTION
 (Erase to reveal)

$$\begin{aligned}
 SA &= (15 \times 2) \\
 &+ (35 \times 2) \\
 &+ (21 \times 2) \\
 &= 142 \text{ ft}^2
 \end{aligned}$$

Handwritten calculations for the surface area of the prism:

- For the front and back faces (width 5, height 7):

$$\begin{aligned}
 & \boxed{\begin{matrix} \times 2 \\ 5 \end{matrix}} \begin{matrix} 7 \\ \end{matrix} \rightarrow A = 5 \times 7 \\
 & \hspace{10em} A = 35 \text{ ft}^2
 \end{aligned}$$
- For the top and bottom faces (length 3, width 5):

$$\begin{aligned}
 & \boxed{\begin{matrix} \times 2 \\ 3 \end{matrix}} \begin{matrix} 5 \\ \end{matrix} \rightarrow A = 3 \times 5 \\
 & \hspace{10em} A = 15 \text{ ft}^2
 \end{aligned}$$
- For the left and right faces (length 3, height 7):

$$\begin{aligned}
 & \boxed{\begin{matrix} \times 2 \\ 3 \end{matrix}} \begin{matrix} 7 \\ \end{matrix} \rightarrow A = 3 \times 7 \\
 & \hspace{10em} = 21 \text{ ft}^2
 \end{aligned}$$

The surface area S of a cylinder with height h and radius r is the area of the two bases plus the area of the curved surface, or $S = 2\pi r^2 + 2\pi rh$.

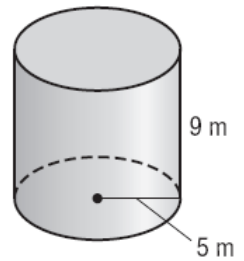
Label

Top/Bottom

EXAMPLE 2 Find the surface area of the cylinder.
Round to the nearest tenth.

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

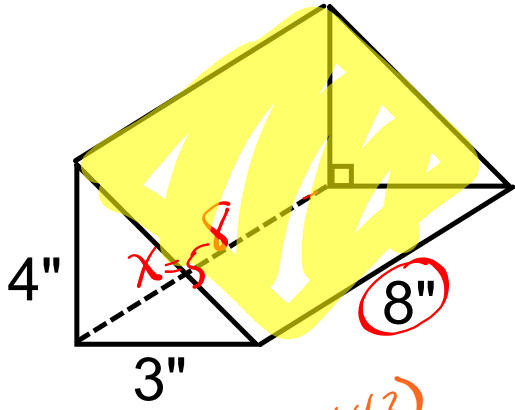
Surface area of a cylinder
 $r = 5, h = 9$
 Simplify.



SA = $2\pi \cdot 5^2 + 2\pi \cdot 5 \cdot 9$
 439.8229715
 $SA = 439.8 \text{ m}^2$

SOLUTION
 (Erase to reveal)

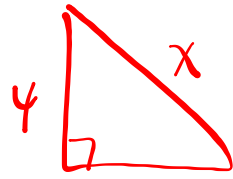
EXAMPLE #3:



ANOTHER FORMULA...



$$a^2 + b^2 = c^2$$

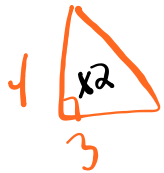


$$x^2 = 4^2 + 3^2$$

$$x^2 = 16 + 9$$

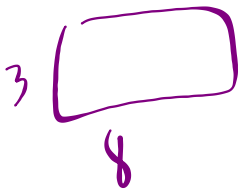
$$\sqrt{x^2} = \sqrt{25}$$

$$x = 5$$



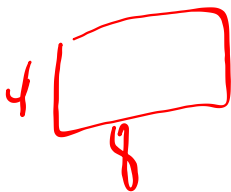
$$A = \frac{4(3)}{2}$$

$$A = 6 \text{ in}^2$$



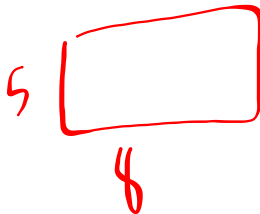
$$A = 3 \times 8$$

$$A = 24 \text{ in}^2$$



$$A = 4 \times 8$$

$$A = 32 \text{ in}^2$$



$$A = 5 \times 8$$

$$A = 40 \text{ in}^2$$

$$SA = (6 \times 2)$$

$$+ 24$$

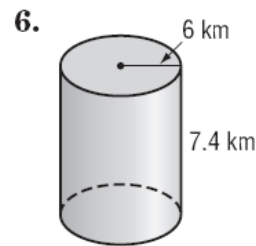
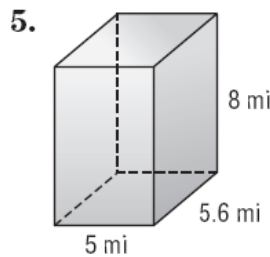
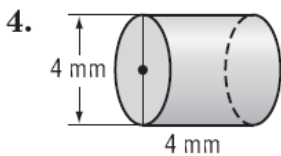
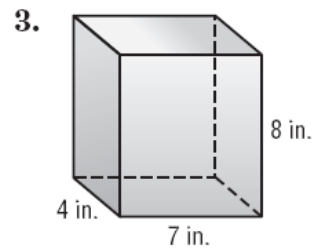
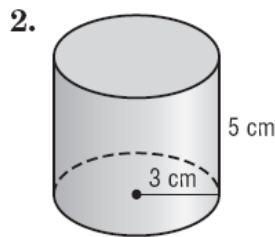
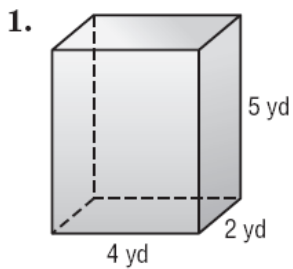
$$+ 32$$

$$+ 40$$

$$108 \text{ in}^2$$

EXERCISES

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




7. rectangular prism: length, 2.3 in.; width, 7 in.; height, 8 in.

8. cylinder: radius, 4 cm; height, 8.2 cm

Solutions...

- 1) 76 yd² 2) 150.8 cm² 3) 232 in² 4) 75.4 mm²
 5) 225.6 mi² 6) 505.2 km² 7) 181 in² 8) 306.6 cm²

Homework...

 Worksheet - Surface Area of Prisms and Cylinders.docx

Solutions...

- 1) 88 ft^2 2) 169.6 in^2 3) 96 mm^2 4) 276.5 yd^2
5) 361.4 cm^2 6) 304 m^2 7) 210 mi^2 8) 325.8 km^2
9) 464.0 ft^2 10) 558 m^2 11) 378 cm^2 12) 1164.9 in^2
13) 726 m^2 14) 1043.6 cm^2 15) 1441.1 mm^2 16) 2339.9 in^2

Attachments

Worksheet - Surface Area of Prisms and Cylinders.docx