

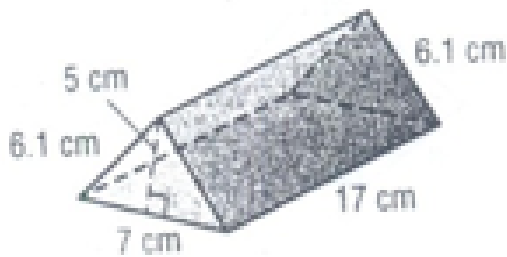
# Homework ???

Worksheet - Surface Area of Prisms and Cylinders.docx

## Solutions...

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

5.



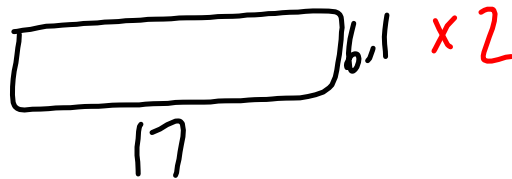
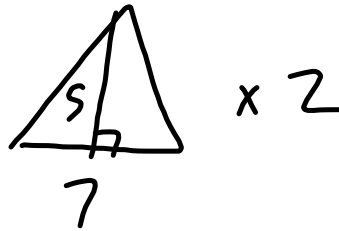
$$SA_{\text{prism}} = 2 \left( \frac{7 \times 5}{2} \right)$$

$$+ (17 \times 7)$$

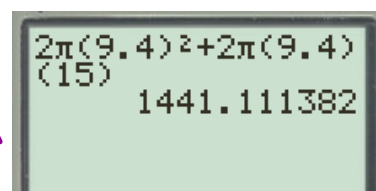
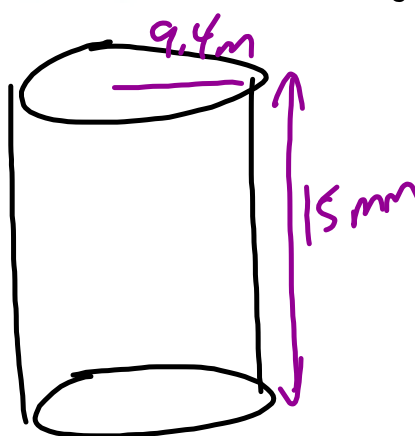
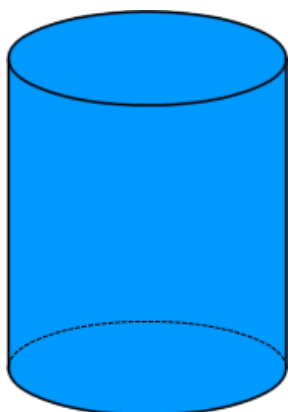
$$+ 2(b \cdot l)$$

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$$361.4 \text{ cm}^2$$



15. cylinder: radius, 9.4 mm; height, 15 mm  $SA_{\text{cylinder}} = 2\pi r^2 + 2\pi rh$



$$= 1441.1 \text{ mm}^2$$

called the **slant height**. The surface area of a pyramid is the sum of the areas of the lateral faces, or **lateral area**, plus the area of the base.

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

Find the lateral area and the base area.

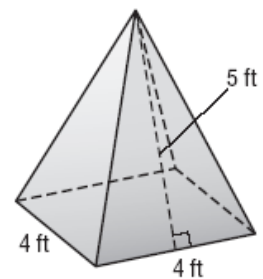
**Area of each lateral face**

$$A = \frac{1}{2}bh \quad \text{Area of a triangle}$$

$$A = \frac{1}{2}(4)(5) \quad b = 4, h = 5$$

$$A = 10 \quad \text{Simplify.}$$

 **SOLUTION**  
(Erase to reveal)



There are 4 faces, so the lateral area is  $4(10)$  or 40 square feet.

**Area of base**

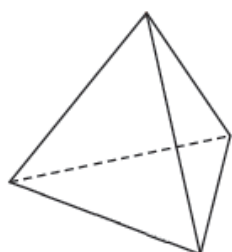
$$A = s^2 \quad \text{Area of a square}$$

$$A = 4^2 \text{ or } 16 \quad s = 4$$

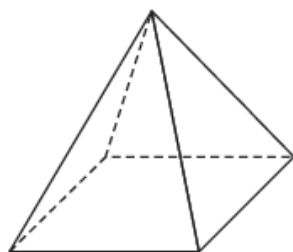
The surface area of the pyramid is the sum of the lateral area and the area of the base,  $40 + 16$  or 56 square feet.

When the base of a right pyramid is a regular polygon, the triangular faces are congruent. Then the **slant height** of the right pyramid is the height of a triangular face.

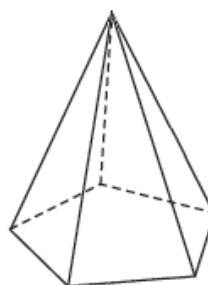
?



regular tetrahedron



right square pyramid



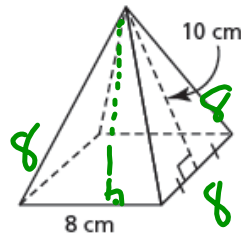
right pentagonal pyramid

The surface area of a right pyramid is the sum of the areas of the triangular faces and the base.

1.4 Surface Areas of Right Pyramids and Right Cones

This right square pyramid has a slant height of 10 cm and a base side length of 8 cm.

?



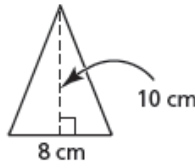
The area,  $A$ , of each triangular face is:

$$A = \frac{1}{2}(8)(10)$$

$$A = 40$$

*x4*

$$\text{Area} = 160$$



?

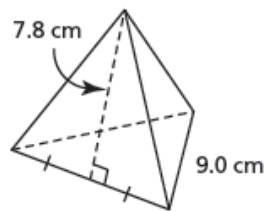
?

$$\begin{aligned} SA_{\text{pyramid}} &= 160 \\ &+ 8^2 \\ \hline &224 \text{ cm}^2 \end{aligned}$$

**Example 1**

**Determining the Surface Area of a Regular Tetrahedron Given Its Slant Height**

Jeanne-Marie measured then recorded the lengths of the edges and slant height of this regular tetrahedron. What is its surface area to the nearest square centimetre?



*↳ all faces equal*

**SOLUTION**  
(Erase to reveal)

$$A_{\text{face}} = \frac{7.8 \times 9}{2} = 35.1$$

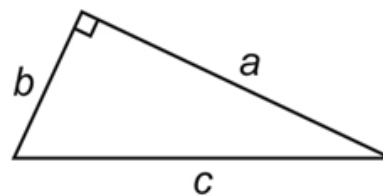
$$SA = 35.1 \times 4 = 140.4 \text{ cm}^2$$



CHECK YOUR UNDERSTANDING

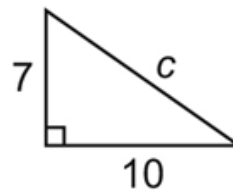
# Activate Prior Learning: The Pythagorean Theorem

In any right triangle, the sum of the squares of the two shorter sides is equal to the square of the longer side.



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

What is the unknown length in this right triangle?



$$c^2 = 7^2 + 10^2$$

$$c^2 = 49 + 100$$

$$\sqrt{c^2} = \sqrt{149}$$

$$c = 12.2$$

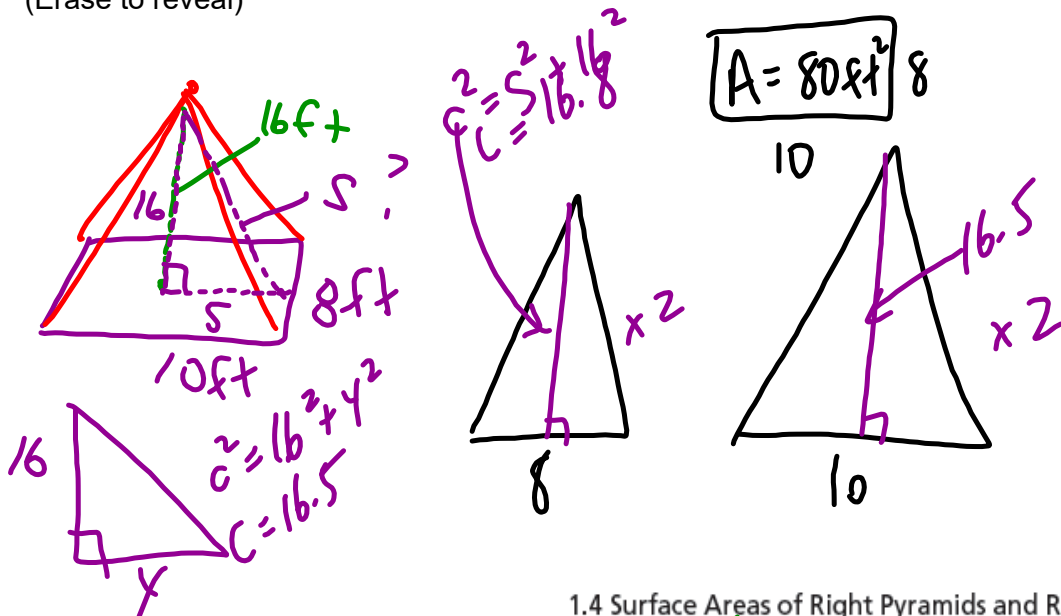
1.4 Surface Areas of Right Pyramids and Right Cones

**Example 2** Determining the Surface Area of a Right Rectangular Pyramid

A right rectangular pyramid has base dimensions 8 ft. by 10 ft., and a height of 16 ft. Calculate the surface area of the pyramid to the nearest square foot.

**SOLUTION**  
(Erase to reveal)

The surface area of the pyramid is approximately 379 square feet.



← ?  
CHECK YOUR UNDERSTANDING

1.4 Surface Areas of Right Pyramids and Right Cones

$$SA = (8 \times 10) + \left( \frac{8 \times 16.8}{2} \right) + 2 \left( \frac{10 \times 16.5}{2} \right)$$

$$= 380 \text{ ft}^2$$



A *right circular cone* is a 3-dimensional object that has a circular base and a curved surface. ?

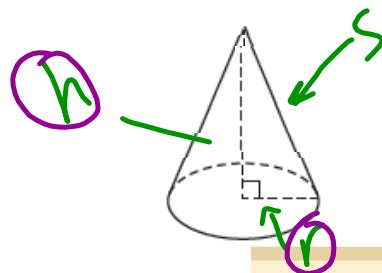
The *height* of the cone is the perpendicular distance from the apex to the base. ?

The *slant height* of the cone is the shortest distance on the curved surface between the apex and a point on the circumference of the base. ?

$$SA_{\text{cone}} = \pi r s + \pi r^2$$



A right circular cone is usually called a **right cone**.

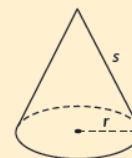


**Surface Area of a Right Cone**

Surface area = lateral area + base area

For a right cone with slant height  $s$  and base radius  $r$ :

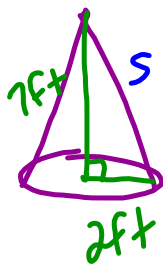
$$SA = \pi r s + \pi r^2$$



**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)



$$S^2 = 7^2 + 2^2$$

$$S = 7.3$$

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

$$= 58.3 \text{ ft}^2$$

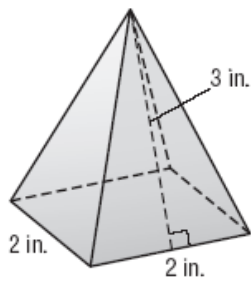


CHECK YOUR UNDERSTANDING

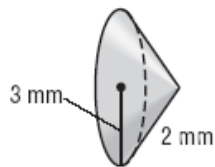
**EXERCISES**

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

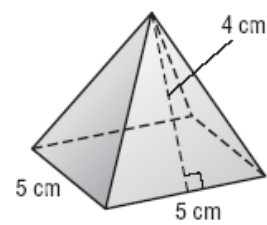
1.



2.



3.




Solutions...

1)  $16 \text{ in}^2$  2)  $47.1 \text{ mm}^2$  3)  $65 \text{ cm}^2$

# Homework... Quiz → Converting

Help

Mon → Mrs. M  Worksheet - Surface Area of Pyramids and Cones.pdf

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Thurs → Mr. H  
**Solutions...**

- 1)  $113.1 \text{ in}^2$
- 2)  $40 \text{ m}^2$
- 3)  $188.5 \text{ mm}^2$
- 4)  $63.3 \text{ yd}^2$
- 5)  $84 \text{ ft}^2$
- 6)  $263.9 \text{ cm}^2$
- 7)  $208 \text{ m}^2$
- 8)  $301.6 \text{ in}^2$
- 9)  $123.7 \text{ ft}^2$
- 10)  $263.2 \text{ mm}^2$
- 11)  $95.7 \text{ cm}^2$
- 12)  $210 \text{ yd}^2$
- 13)  $74.4 \text{ cm}^2$
- 14)  $152 \text{ yd}^2$
- 15)  $857.7 \text{ in}^2$

## Attachments

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Worksheet - Surface Area of Prisms and Cylinders.docx

Worksheet - Surface Area of Pyramids and Cones.pdf