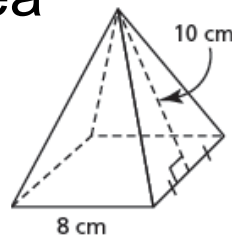# Find the Surface Area

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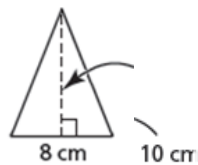
10 cm

8 cm

This net shows the faces and base of the pyramid.

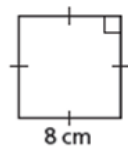The area, A, of each triangular face is:

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

$A = 40$

8 cm   10 cm

The area, B, of the base is:

$B = (8)(8)$

$B = 64$

8 cm

So, the surface area, SA, of the pyramid is:

$SA = 4A + B$

$SA = 4(40) + 64$

$SA = 224$

The surface area of the pyramid is 224 cm^2.

1.4 Surface Areas of Right Pyramids and Right Cones

Problems with Homework ?

5. $A = 2$ triangles $+ 3$ rectangles

$= 2\left(\dfrac{bh}{2}\right) + lw + wh + lh$

$= 2\left(\dfrac{7(5)}{2}\right) + (17)(7) + 17(6.1) + 17(6.1)$

$= 35 + 119 + 103.7 + 103.7$

$= 361.4 \text{ cm}^2$

6. $A = 2lw + 2lh + 2wh$

$= 2(8)(4) + 2(8)(10) + 2(4)(10)$

$= 64 + 160 + 80$

$= 304 \ m^2$

8. $A = 2lw + 2lh + 2wh$

$= 2(5.7)(6) + 2(5.7)(11) + 2(6)(11)$

$= 68.4 + 125.4 + 132$

$= 325.8 \text{ km}^2$

Solutions.

1. 88 ft²
2. 169.6 in²
3. 96 mm²
4. 276.5 yd²
5. 361.4 cm²
6. 304 m²
7. 210 mi²
8. 325.8 km²

9. 464.0 ft²
10. 558 m²
11. 378 cm²
12. 1164.9 in²
13. 726 m²
14. 1043.6 cm²
15. 1441.1 mm²
16. 2339.9 in²

Feb 21-8:47 AM

| **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?

7.8 cm

9.0 cm
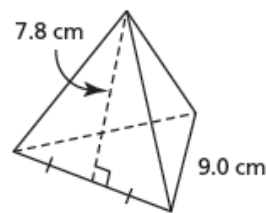
✓ **SOLUTION**
(Erase to reveal)

A = A(4 triangles)

$= 4(\frac{1}{2}bh)$

$= 4(\frac{1}{2}(9)(7.8))$

$= 140.4 \text{ cm}^2$

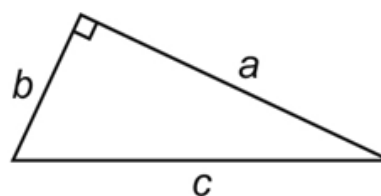1.4 Surface Areas of Right Pyramids and Right Cones

CHECK YOUR UNDERSTANDING

Example 1

Activate Prior Learning:
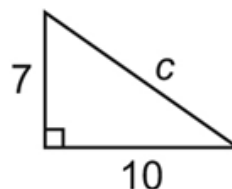# The Pythagorean Theorem

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?

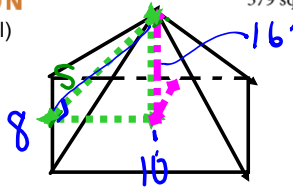1.4 Surface Areas of Right Pyramids and Right Cones

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.

1.4 Surface Areas of Right Pyramids and Right Cones

side triangles

$$S^2 = 16^2 + 5^2$$
$$S = \sqrt{256 + 25}$$
$$= 16.7'$$

$$A = 2\left(\frac{bh}{2}\right)$$
$$= 2\left(\frac{8(16.7)}{2}\right)$$
$$= 133.6 \, in^2$$

Front/Back Triangles

$$S_2^2 = 16^2 + 4^2$$
$$S_2 = \sqrt{256 + 16}$$
$$= 16.5$$

$$A = 2\left(\frac{bh}{2}\right)$$
$$= 2\left(\frac{(10)(16.5)}{2}\right)$$
$$= 165 \, in^2$$

Base $A = 8 \times 10$
$$= 80 \, in^2$$

A (total) = 165 + 133.6 + 80
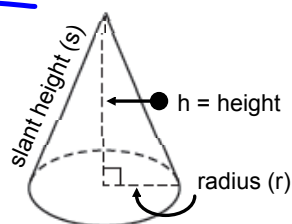= 378.6 ft²

Example 2

8

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. ?

Cone

slant height (s)

h = height

radius (r)

$$A = \pi r^2 + \pi rs$$

1.4 Surface Areas of Right Pyramids and Right Cones

Key Concepts p. 6

1. $S.A = \pi r^2 + \pi r \, s$

    $= \pi (4)^2 + \pi (4)(5)$

    $= 16\pi + 20\pi$

    $= 36\pi \ in^2$

    $= 113.1 \ in^2$

2. $S.A = 4(triangles) + square$

    $= 4\left(\frac{1}{2}(4)(3)\right) + (4)(4)$

Sep 18-11:41 AM

Homework...

Worksheet - Surface Area of Pyramids and Cones.pdf

Solutions...

1) 113.1 in² 2) 40 m² 3) 188.5 mm²   4) 63.3 yd²
5) 84 ft² 6) 343.1 cm²   7) 208 m² 8) 301.6 in²
9) 123.7 ft²   10) 263.2 mm²   11) 95.7 cm²   12) 210 yd²
13) 74.4 cm²   14) 152 yd² 15) 857.7 in²

Sep 14-10:11 PM

Attachments

Worksheet - Surface Area of Prisms and Cylinders.pdf

Worksheet - Surface Area of Pyramids and Cones.pdf