CHAPTER 8: Measurement Relationships
8.4 Surface Area of a Cone
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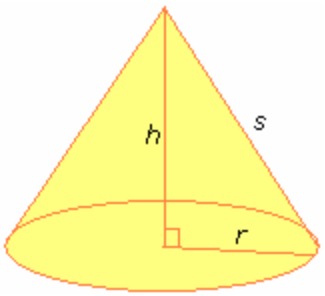
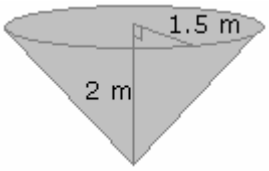


The slant height s of a cone can be determined from the height h and the radius r using the Pythagorean theorem.

The formula for the surface area of a cone is $SA = \pi rs + \pi r^2$.

Example:

a) Sawdust from a woodworking shop is blown into a conical hopper for recycling into other products. The hopper has a radius of 1.5 m and a height of 2 m. Find the area of aluminum needed to make the sides and top of the hopper.



b) The sides of the hopper will be painted to make it more attractive. A can of spray paint covers 3 m^2. How many cans are required to paint the sides of the hopper?

Solution:

a) $s^2 = h^2 + r^2$
$= 2^2 + 1.5^2$
$= 6.25$
$s = 2.5$ m
$SA = \pi rs + \pi r^2$
$= \pi \times 1.5 \times 2.5 + \pi \times 1.5^2$
$= 18.8$ m^2

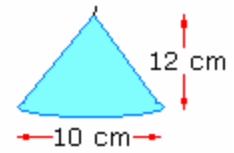
The area of aluminum needed to make the hopper is 18.8 m^2.

b) $A = \pi rs$
$= \pi \times 1.5 \times 2.5$
$= 11.8$ m^2

The lateral area is 11.8 m^2. Therefore, $\frac{11.8}{3} \doteq 4$ cans of spray paint will be needed to paint the sides.

Practice:

1. a) A decorative candle was made in the shape of a cone with a base diameter of 10 cm and a height of 12 cm. Find the surface area of the candle.



b) The sides of the candle will be brushed with liquid sparkle. If a 10 mL bottle of liquid sparkle covers 50 cm^2, how many bottles are required?

Answers:

1. a) 282.7 cm^2 b) 5