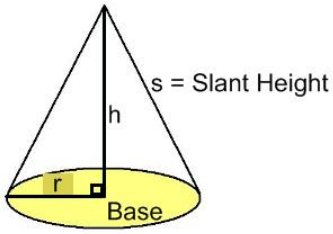
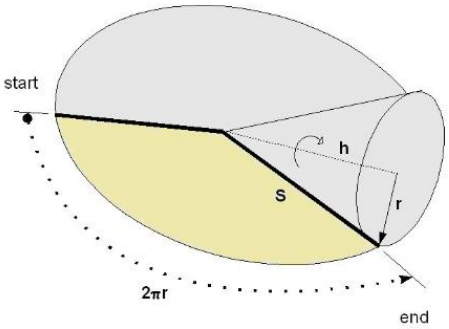
MPM 1DI Unit 9 lesson 3 (8.4) Name:_____

Surface Area of Cones

A *cone* is a three dimensional solid with a circular base. The lateral surface is curved and extends from the base to a point called the vertex.



Developing a formula for surface area of a cone:

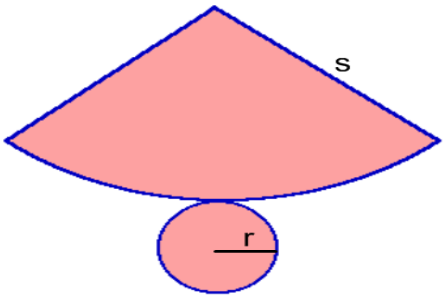


The lateral surface is a circle-sector. This sector is some fraction (one n^{th}) of a circle with radius s.

A_{sector} =

The circumference of the sector is one n^{th} of the circumference of the whole circle with radius s.

C_{sector} =



Since the circumference of the sector wraps around the circumference of the base (which is a circle with radius r), $C_{sector} = C_{base\ circle}$

Substituting **this** into A_{sector} = , we get $A_{lateral\ side}$ =

=

=

So, the formula for **Surface area of a cone** is:

$A_{total} = A_{base} + A_{lateral\ side}$

=

Example 1: Calculate the surface area of a waffle cone (before it is filled with ice cream) with height 4.2 cm and radius 1.8 cm.

Example 2: The slant height of a cone is tripled. Does this triple the surface area of the cone? Explain.

Example 3: A cone is formed from a circle with a 90° sector removed. Another cone is formed from a semicircle with the same radius. How do the two cones differ? How are they the same?

Example 4: The lateral area of a cone with slant height 14 cm is 132 cm^2.

a) Find the radius of the cone, to the nearest cm.

b) Find the height of the cone, to the nearest tenth of a cm.

Example 5: An old construction pylon needs to be painted. The base the pylon sits on is 20cm by 20 cm by 1.5 cm, the radius of the cone is 8 cm and the height of the pylon is 31 cm. If only the part that shows is to be painted, find the surface area to be painted to the nearest hundredth.