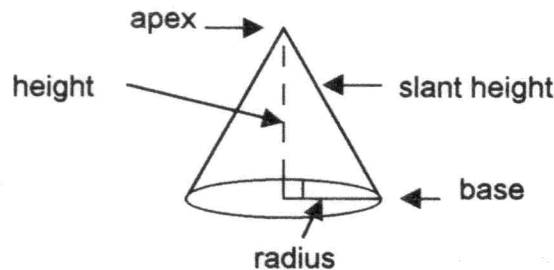


A right circular cone is a 3-dimensional figure with a circular base and an apex, such that the line segment, called the height, joining the apex and the center of the base is perpendicular to the plane of the base.



Write a C++ program that when given the diameter of the base, the height of the cone, and the unit of measurement, will compute the volume (in cubic units) and surface area (in square units) of the cone.

Surface Area = $A + \frac{1}{2} Cs$
Volume = $\frac{1}{3} Ah$

A = area of base = πr^2
 C = circumference of base = $2\pi r$
 s = slant height
 r = radius = $\frac{1}{2}$ diameter
 h = height
 $\pi = 3.14159$ (use a named constant)

$$SA = \pi \left(\frac{1}{2}d\right)^2 + \frac{1}{2}(2\pi \frac{1}{2}d)s$$

$$Vol = \frac{1}{3}(\pi (\frac{1}{2}d)^2)h$$

Your program must prompt for and read the diameter and height (both float) of the cone. It must also prompt for and read the measurement unit (string). Then compute the volume and surface area of the cone. As output, the program should print the 2 input values (2 digits to the right of the decimal) and the 2 computed values (4 digits to the right of the decimal) with appropriate labels that include the unit of measurement (see example below).

Example: if height = 10.0 and diameter = 15.0 and unit is meters, then output should look like

A cone with a height of 10.00 meters and diameter of 15.00 meters will have
volume of 589.0482 cubic meters
surface area of 471.2385 square meters

Run the program twice using the following data sets:

height	diameter	unit
4.0	6.0	inches
15.5	7.25	centimeters

MINIMUM PROGRAM DOCUMENTATION REQUIRED.

DESIGN DOCUMENT

Before writing this program, create a design document that illustrates the algorithm your program will use. This document should provide enough detail so that another programmer could translate your algorithm into a working program. (3 points)