"Are You Ready" Quiz

Lab 4: Volume
Tree Volumes

Instructions: **Read Part I: Introductory Material before attempting this quiz.** Then take the quiz and check your answers at the on-line help site for Lab 4. The answers will be useful to you throughout the rest of the lab.

1. The volume of a circular cylinder (constant radius \( r \) and height \( \Delta h \)) is given by

\[
V = \pi r^2 \Delta h
\]

2. The volume of a vertical object with circular cross sections of varying radius \( r(h) \), from height \( h = a \) to height \( h = b \) is given by

\[
V = \int_a^b \pi (r(h))^2 \, dh
\]

(If you need a reminder, see your notes from Lesson 17.)

3. The breast height for trees is defined as \( h = \_4.5\_ \) feet. The value for diameter, \( d \), at this height is called \( \_\text{diameter at breast height}\_ \), and labeled \( B \). The total height of the tree is denoted \( \_H\_ \).

4. Suppose the diameter of a circle is 6 inches. Convert this value to the radius of the circle in feet:

This answer for radius in feet is found by the following:

\[
\frac{6}{??} = \frac{6}{24} = \frac{1}{4}
\]

What constant should be filled in for the missing value "??" in the denominator of the above fraction? Put this constant into the first fraction below. Then complete the simplification to get the second fraction written below.

\[
r^2 = \left( \frac{d}{24} \right)^2 = \frac{d^2}{576}
\]

You have now figured out how to convert \( d^2 \) in inches into \( r^2 \) in feet. You will need to use this conversion factor in the lab.