

## # 67 How Big is Your Tree

### Estimating Board Feet in a Tree

#### Determine the number board feet in your tree

The forester measures the tree diameter and the tree height. From these two measurements a forester can determine how much lumber is in a tree, and thereby predict how much wood is in a particular timber area. The unit of wood that a forester wants to know is called a 'board foot'. A board foot is one foot by one foot by one inch thick.

#### Vocabulary

board foot (BF): a piece of wood one foot by one foot by one inch.

cubic foot (sq.ft.): a piece of wood one foot by one foot by one foot.

DBH: tree diameter at breast height considered to be 4.5 feet from the ground.

circumference (C): length around a circle.

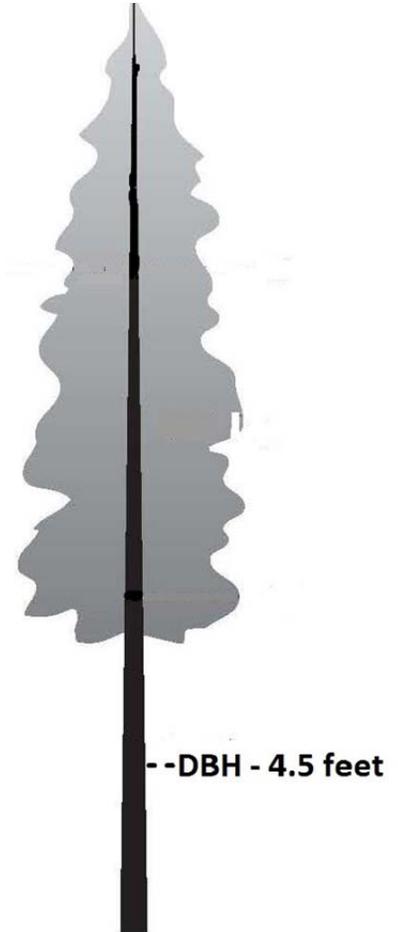
diameter (D): measure of a straight line segment that passes through the center of a circle.

radius (r): one half the diameter of a circle.

pi ( $\pi$ ): The mathematical constant that is the ratio of the circle's circumference to its diameter or 3.14.

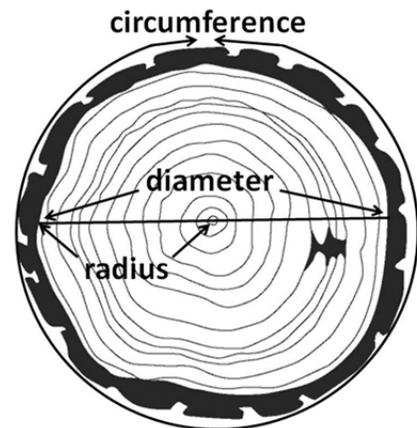
area (A): measurement of a surface.

volume (V): the amount of 3-dimensional space an object occupies.



#### Procedure

1. Measure the DBH of your tree. Circumference in inches divided by pi ( $\pi = 3.14$ ) or use a diameter tape ( $C/\pi = \text{DBH}$ ).
2. Measure the height of your tree in feet.
3. Find the radius of the tree ( $r = \text{DBH}/2$ ). Divide the DBH by 2. Convert the units from inches into feet by dividing by 12 ( $r = \text{DBH}/2/12$ ).
4. Find the area of the cross-section of your tree at DBH ( $A = \pi r^2$ ).
5. Find the volume of the tree in cubic feet ( $V = A \times \text{height}/4$ ). Note: 4 is used to account for the taper of the tree.
6. Find the board foot volume of the tree. Divide the cubic feet by 12 ( $\text{BF} = V/12$ ). Note: Foresters usually use a conversion factor of 6 or 7 instead of 12 to provide for kurl, loss from saw dust, etc., during the cutting process.



## Board Footage Data Sheet

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Tree # \_\_\_\_\_

Tree species: \_\_\_\_\_

1. Height \_\_\_\_\_ feet.
  2. DBH \_\_\_\_\_ inches:  $(DBH=C\pi) = \text{circumference} \text{ \_\_\_\_ inches} \times 3.14 = \text{ \_\_\_\_ inches DBH.}$
  3. Radius in feet:  $DBH \text{ \_\_\_\_ inches} \text{ \_\_\_\_} / 2 = \text{ \_\_\_\_ inch radius} / 12 = \text{ \_\_\_\_ foot radius.}$
  4. Area of tree cross-section:  $(A=\pi r^2) = 3.14 \times (\text{ \_\_\_\_ foot radius} \times \text{ \_\_\_\_ foot radius}) = \text{ \_\_\_\_ sq.ft. radius.}$
  5. Volume of tree in cubic feet:  $(V=Ah/4) \text{ \_\_\_\_ sq. ft. radius} \times \text{ tree height} / 4 = \text{ \_\_\_\_ cu.ft.}$
  6. Volume of tree in board feet:  $(V/12) = \text{ \_\_\_\_ cu.ft.} \times 12 = \text{ \_\_\_\_ board feet.}$
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