

## How to use a clinometer

*Minnesota Project Learning Tree*

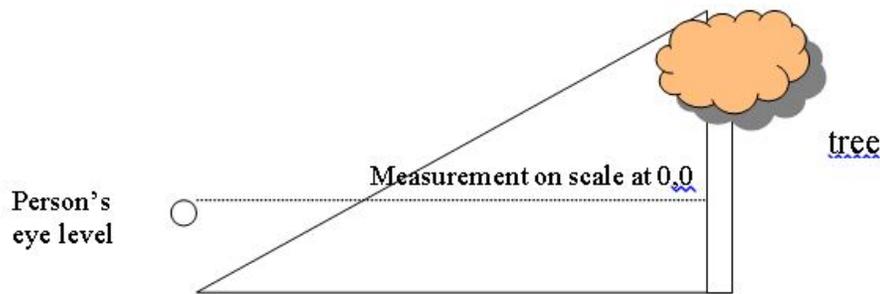
*www.mndnr.gov/plt*

### What they're used for:

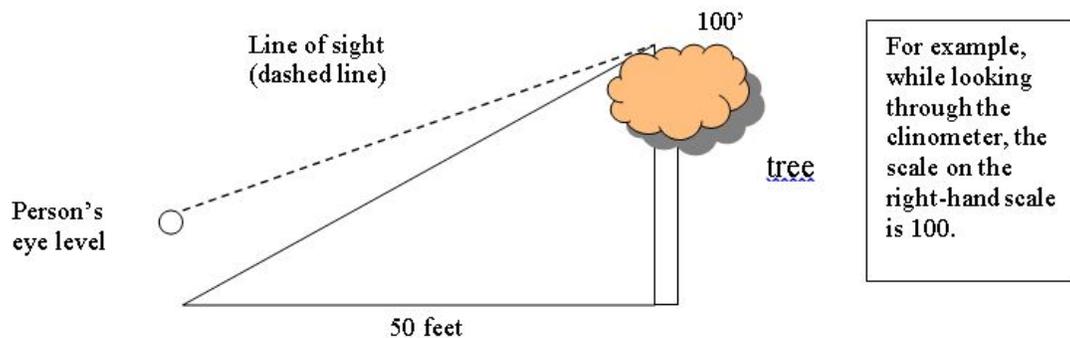
Foresters use clinometers to quickly determine a tree's height or percent grade on a slope.

### To determine a tree's height:(when your eye level is higher than the base of the tree.)

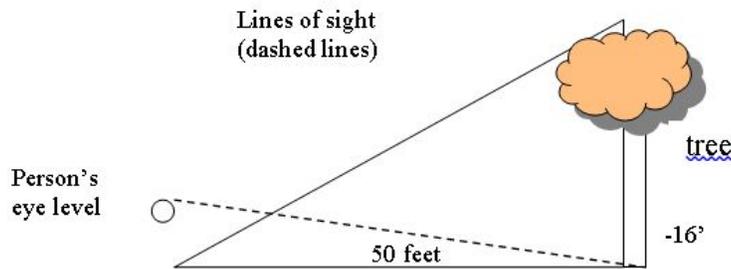
1. Hold the clinometer with the red dot pointing away from you. The red dot marks your line of sight between your eye and the object you are measuring.
2. Look through the glass meter. The glass meter contains a dial with two rows of measurements, a left-hand scale and a right-hand scale. Keep BOTH EYES OPEN.
3. Walk away from tree 50 feet. (Use a measuring tape.)
4. Face tree. Hold the clinometer near your eye with red dot pointing away from you. (You may want to put a finger on the red dot to remind you that this is the line of sight you are following to the top and bottom of tree.)
5. Look through the level clinometer until you see the scale reads "0" on both sides.



Point the clinometer at the top of the tree. Record the number from the right-hand scale that corresponds with your line of sight at the top of the tree.



Without moving your head, tilt the clinometer down to the base of the tree. Try to keep the glass eyepiece steady in at the same point from where you took the top reading. Record the number from the right-hand scale that corresponds with your line of sight at the bottom of the tree.



For example, while looking through the clinometer, the scale on the right-hand scale is -16.

Add the numbers. For example:

top measurement	100
bottom measurement	<u>16</u> (ignore the negative sign)
	116

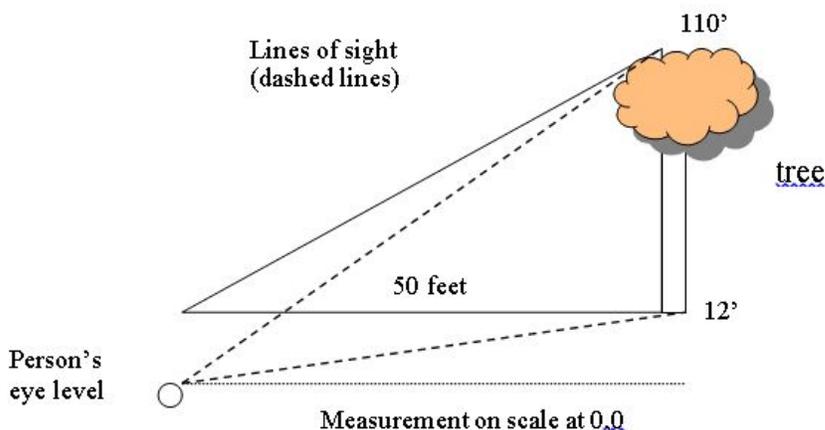
**116'** is the estimated height of the tree using the clinometer.

Since you took the measurements at 50 feet away, you will have to divide your total by 2. For example, 116 feet divided by 2 is 58 feet. The tree is actually 58 feet tall.

#### Other notes:

- If the forest is not too dense, you can also take measurements at 100 feet away, and get more accurate readings. If you are able to take measurements 100 feet from the tree, then you will not need to divide numbers.
- Foresters use the left-hand scale when they want to take measurements at 33 feet or 66 feet away from the tree.
- In surveyor's terms, 66 feet = 1 chain.
- Clinometers can also be used to determine grade or slope in an area.

#### How to measure tree height if standing on a slope.



If you are standing on a slope below the tree, then you subtract the number on the scale taken at the bottom of the tree from the number on the scale taken at the top of the tree.

For example,  
 $110 - 12 = 98$  feet

98 feet divided by 2 = 49 feet

The tree is 49 feet tall.