622-6140 (60-100) Clinometer

Warranty and Parts:
We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

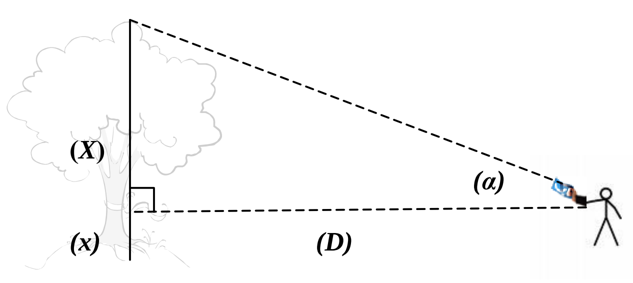
Description:

The clinometer is an apparatus that can be used to measure the angles of slope and height of an object with relation to gravity. It can be very useful when needing to find the height of something that may not be convenient or viably obtainable. It is used in various areas such as surveying, forestry, civil engineering, automotive and even skiing. Some of the factors that can affect the clinometer and its accuracy can range from gravity to temperature to a clear line of eye sight.

How to Use:

1.) Locate an object that you would like to find the height of, such as a tree or building. Make sure that you are on a plane that is parallel with the object and that you are not uphill, nor downhill from it.
2.) Measure the distance from the object's base to your location, making sure that you can see both the base and the top of the object.
3.) Record the distance. ***(D)***
4.) Now measure the distance from the clinometer, at the level at which you will hold it, to the ground.
5.) Record the distance. ***(x)***
6.) At your measured position, using the clinometer's sight, aim it at the top of the object, making sure that you are not too close that the clinometer is completely vertical. (This angle should be ≤ 70º.)
7.) Squeeze the trigger.
8.) Wait for the pointer to come to a rest.
9.) Release the trigger.
10.) Record the measurement in degrees. ***(α)***

See diagram below



11.) Using the tangent ratio, which is $Tan\alpha = \frac{opposite}{adjacent}$, plug in the recorded measurements that you know.

- *Tan **α*** = ***A***
- *Opposite* = ***(X)*** (unknown)
- *Adjacent* = ***D***

For example,

***α** = 41º*
***X** = unknown*
***D** = 20 ft.*
***x** = 5.5 ft.*

$$A = \frac{(X)}{20\,ft.}$$

$$Tan(41^o) = \frac{(X)}{20\,ft.}$$

$(Tan(41^o))\ (20\ ft) = \mathbf{X}$

$(.86929)\ (20\ ft) = \mathbf{X}$

17.4 ft = ***X***

12.) Once you have ***X,*** you can now find the total overall height of the object, using the formula, (***X + x) = Total Height.***

(X + x) = Total Height

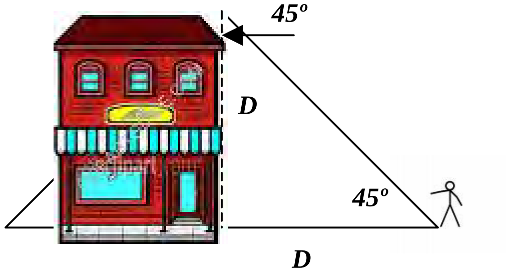
(17.4 ft + 5.5 ft) = ***Total Height***

22.9 ft = ***Total Height of Object***

Alternative Method (Isosceles Triangle):

1.) Locate an object that makes a right angle with the ground. Make sure that you are on a level plane with the object, as well as to not be downhill, nor uphill from it.
2.) Using the sight of the clinometer, sight the top of the object and walk towards the object until the clinometer measures 45º.

See diagram below



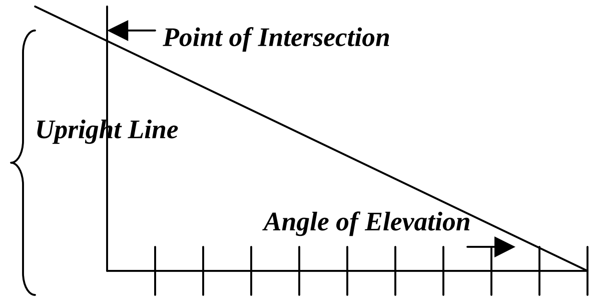
3.) Once the clinometer has reached 45º, release the trigger and mark your destination.
4.) Measure from the base of the object to your marked destination.
5.) Record your measurement. This will be the approximate height of the object.

- Since an Isosceles triangle has two sides that are equal, you can determine that the distance from your marked destination to the base of the object will be equal to the height of the object.

Alternative Method (Scale Drawing):

1.) Locate an object that you want to find the height of, making sure that you are on a parallel plane with the object and that you are neither downhill, nor uphill from it.
2.) Measure off 100 feet from the base of the object.
3.) Use the clinometer's sight to sight in the top of the object, press the trigger, to locate the angle of elevation.
4.) When the top of the object is sighted, release the trigger.
5.) Record this angle measurement.
6.) Make a scaled drawing, where 1 inch is equal to 10 feet. This line drawn should be 10 inches long, because the distance is 100 feet.
7.) From one end of the line draw another line straight up.
8.) Using a protractor, draw the elevation angle from the other end of the original line so that it will intersect the perpendicular line you just drew.
9.) Measure the upright line in inches to the point of intersection and record your answer.
10.) Take your recorded scaled measurement and now multiply it by 10 (feet) and record your calculation.
11.) Measure your own height in feet.
12.) Add your recorded calculation to your height measurement and this will be the actual height of the object.

See example below



Inches

Scale: 1 inch = 10 feet
(drawing not to scale)

4 inches = **point of intersection measurement**
25º = **Angle of Elevation**
6 ft = **Own Height**

4 Inches = 40 feet (scale)
4 inches x 10 = 40 feet

40 feet + **Own Height** = **Approximate Height of the Object**
40 feet + 6 feet = 46 feet

Related Products:

60-010 Distance Measuring Trundle Wheel
Measure great distances with our top quality trundle wheel. This distance counter features a 30cm rubberized wheel. The unit will fold down to be carried in its included soft bag. The five digit counter will light up with a flip of a switch on the handle to illuminate the numbers in low lighting.

40-095 Stringless Pendulum
The stringless pendulum demonstrates simple harmonic motion in a way that doesn't seem so tied down. Students will see the period of an oscillating body from a different perspective than the standard string and ball. The period of the 1 inch steel ball can be measured, and the distance to a focal point can be calculated to compare the demonstration to a classic pendulum.

P/N 24-60100