

Measuring the Height of a Flagpole

Materials Needed: Meter Sticks, sextants, mirrors and a flagpole
 Group of 4 Students
 Notebooks for recording your measurements

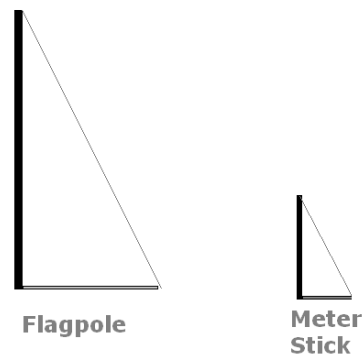
Locate a flagpole. Collect data about the flagpole by using the three techniques. Then calculate the height of short flagpole using proportions.

Technique 1: To measure the height of the short flagpole using shadows and similar triangles

Procedure:

Step 1: Have one person hold a meter stick vertically while someone measures the length of the stick's shadow. Record this data in the table below.

Step 2: Locate the one of the short flagpoles at the end of the football field. Measure the length of flagpole's shadow. Record this data in the table below.



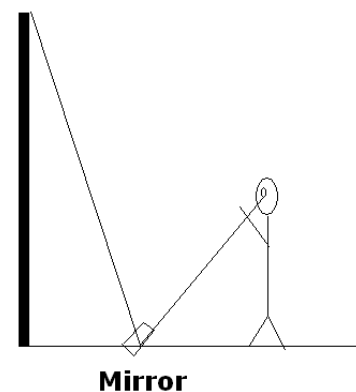
Height of meter stick	Shadow length of meter stick	Shadow of length of flagpole	Calculated height of flagpole

Proportions used to solve problem: :

Technique 2: To measure the height of the short flagpole using mirrors and similar triangles.

Procedure:

Step 1: Place a mirror flat on the ground between an observer and the flagpole to be measured. The observer should move to a point at which he or she can see the top of the object at the cross hair on the mirror. Measure the distance from the observer to the mirror and the distance from the mirror to the base of the object. Measure the height of the observer's eye. Record this data in your table.



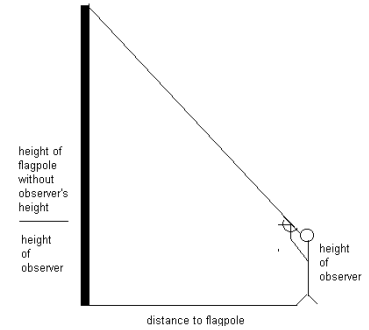
Height of observer's eye	Distance from Observer to mirror	Distance from flagpole to mirror	Calculated height of flagpole

Proportions used to solve problem:

Technique 3: To measure the height of the short flagpole using a sextant and similar triangles.

Procedure:

- Step 1: Use the sextant (a specially designed protractor to measure angles) to measure the angle of incline from your eye to the top of the flagpole. Record this angle in your chart below.
 Step 2: Measure the height the observer's eye from the ground. Record this height in the chart below.
 Step 3: Measure the distance from the observer to the flagpole. Record this in the chart below.



Angle of Incline	Height of observer's Eye	Distance from observer to short flagpole	Height of flagpole without observer's height	Height of short flagpole

Proportions used to solve problem:

Use the three estimates to determine the height of the flagpole. Explain why you believe there was error in using one or more of the techniques to find the height of the flagpole.