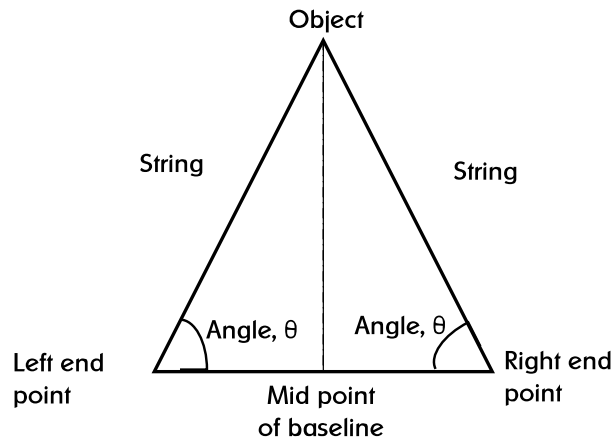


TRIANGULATION EXPERIMENT

Purpose: To determine the distance to a far away object using triangulation and trigonometry. These techniques allow you to determine the distance without actually going to the object.

Method A: Triangulation (Refer to Figure 15.3 on pg. 489 and Fig. 15.4 on pg. 490)

1. Choose a far away object that you wish to determine the distance to.
2. Using the metre stick, create a baseline that is quite far from your object by marking off a long, straight line several metres long. Make sure your object is directly across from the mid point of your baseline. Place sticks to indicate the end points of your baseline.
(Length of Baseline = _____)



3. Kneel at the right end point of your baseline, facing the object in the distance. Imagine a straight line from you to the object. Use a piece of string wrapped around the stick and lying on a protractor to measure the angle between the baseline and the imaginary line to the object. (Angle at right end = _____, θ)
4. Repeat this at the left end point of the baseline and record the angle. (Angle at left end = _____, θ)
5. Use the metre stick to measure your average stride. (Stride = _____)
6. Starting at the mid point of your baseline, walk slowly towards the object and count the number of steps it takes to reach it. Multiply your average stride x number of steps to determine the actual distance to the object. (Actual distance = _____)
7. Make a scale drawing of the triangle (two angles and baseline) with your object at the top of the triangle. Choose an appropriate scale (1 m = 1 cm). Use a ruler and draw the baseline. Then use a protractor and ruler to draw a line from each end point on the baseline using the angles you recorded. The point at which these two lines meet is the position of the object. Draw a dotted line directly down from the object to the baseline (perpendicular) to represent the closest distance between the two.
8. Use a ruler to measure the length of this line and convert back to metres. This is the experimental distance to the object. (Experimental distance = _____)

Method B: Trigonometry

1. Determine as accurately as possible, the mid point of your baseline and measure the distance from the mid point to the right end point.
(Mid point to right end point = _____, label B)
2. Kneel at the left end point of your baseline, facing the object in the distance. Imagine a straight line from you to the object. Use a piece of string wrapped around the stick and lying on a protractor to measure the angle between the baseline and the imaginary line to the object. (Angle at right end = _____, θ)
3. Use the triangle and equation below to solve for the distance to the object (label A). Show all your work.

