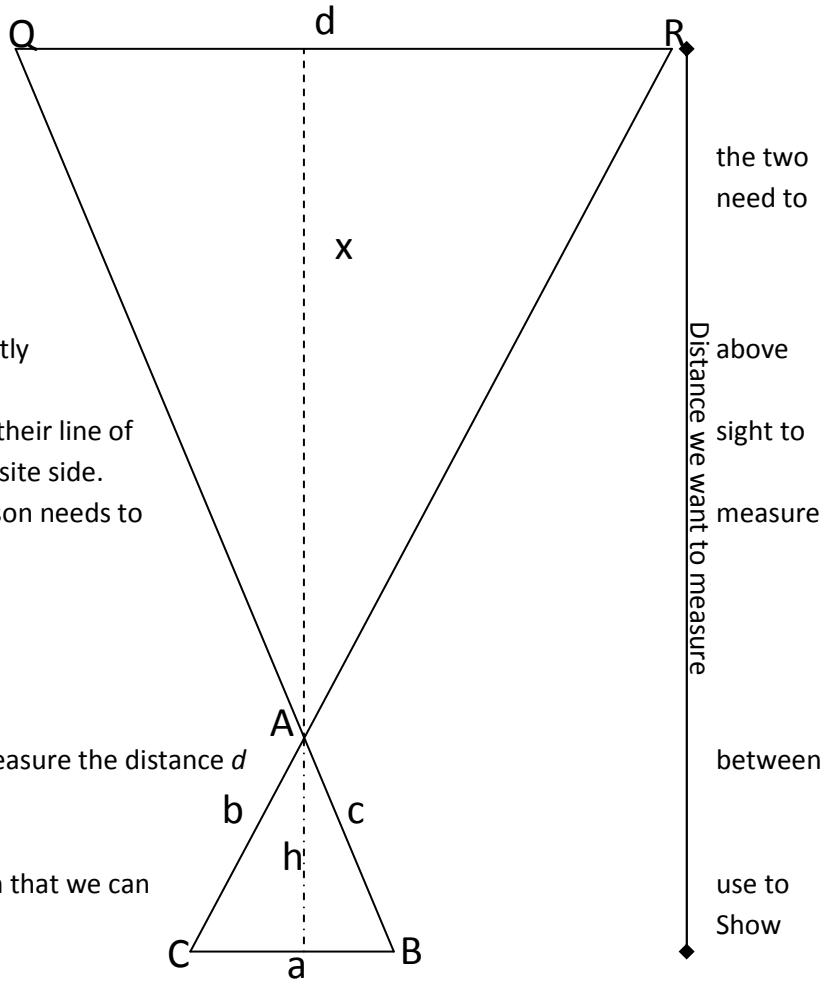
Exploring Indirect Measurement

In this activity, we will be using similar triangles to measure heights and distances that would be difficult to measure directly (for example, with a measuring tape.)

Part 1: Across a great Expanse

We want to measure the distance between the two parallel lines in the drawing. To do so, we need to recreate the small triangle and make some measurements.



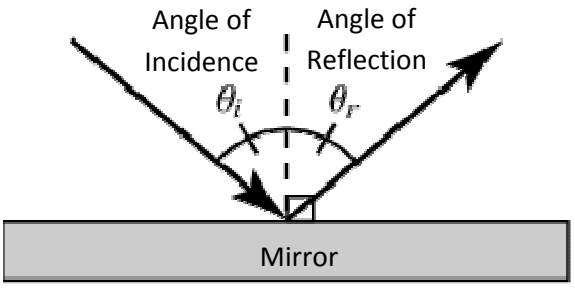
1. Have one person mark a point directly above the ground at point A.
2. Person B and person C need to use their line of sight to identify points Q and R on the opposite side.
3. Before anyone moves, a fourth person needs to measure the lengths *a, b, c,* and*, h*
   a=
   b=
   c=
   h=
4. Now go to the opposite side and measure the distance *d* between points Q and R.
   d =
5. Finally, write and solve a proportion that we can use to find the length *x*. Show your work below.

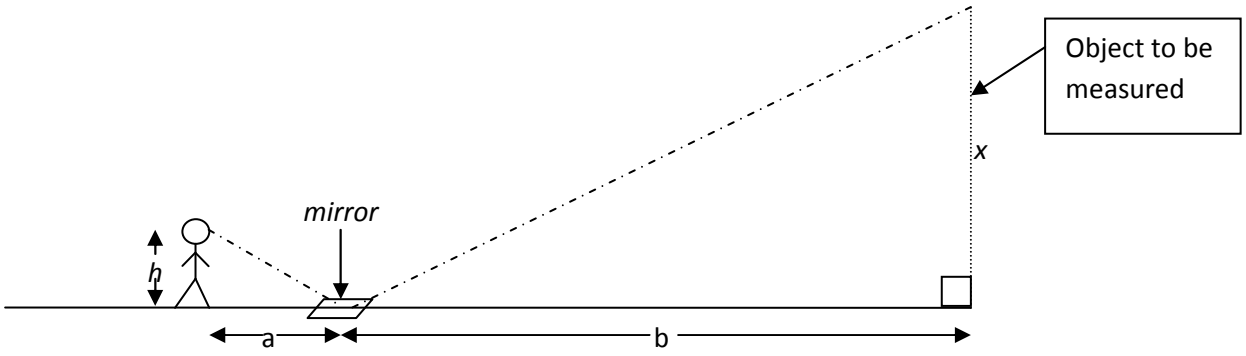
Total distance: _____

Part 2: Reflecting Heights

When light reflects off a mirror, we get two angles: the angle of incidence and the angle of reflection. It turns out that $Angle\ of\ incidence = Angle\ of\ Reflection$.

So, using mirrors, we can get the height of an unreachable object.





1. Find an object that you want to measure the height of (you must be able to reach the point directly below the object to measure *b*.)

   Name of object: _____

2. Measure *h, a,* and *b*

   a = _____ *b* =_____ *h* = _____

3. Write a proportion to find the height *x:*

   Objects final height: _____

4. Now follow the same steps to find the height of another object. Show work here: