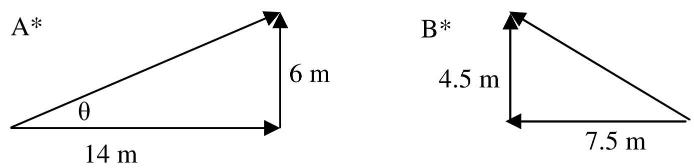
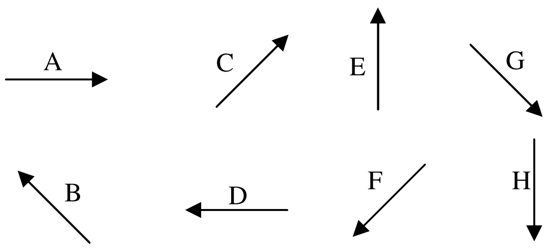
Due Mon., Sept 24

2012 PreAP Two Dimensions 2

1. Being sure to use correct directions (not just angles). Find the x and y components for the following vectors.

2. Given the following x and y components, calculate the magnitude (hypotenuse) and direction of the vector. (*BIG TANGENT HINT: remember to figure out what quadrant your arrow should be in. Add 180° if necessary.*)





3. Use the arrows at the left to answer the following.
   A. ____ * Which arrow has + x and –y components? (*which is pointing in the +x and –y directions?)*
   B. ____ * Which arrow has –x and +y components?
   C. ____ Which arrow has +x and no y component?
   D. ____ Which arrow/s have no x component?
   E. ____ Which arrow is the negative of A?
   F. ____ Which arrow = -B?
   G. ____ Which arrow has –x and –y components?
   H. What does A + D equal? (*If you walked the direction of A and then the direction of D, what would be your total displacement?)*

Still using the A-H arrows as displacement vectors (distances with directions)….

4. A. A strange person (named "Crazy") walks the direction of A, then C, then E, then 2D (D twice). Starting at the point marked "start" draw Crazy's path.

   B. A second person, standing at the same starting point, watches Crazy walk his crazy path, but being Lazy, walks to Crazy in a straight line. Use an arrow to show Lazy's path. Label this arrow "R" for the resultant (the result of all of Crazy's path).

5. * Using the same story of Crazy and Lazy above…
   A. At the left draw Cray's path: G + F + 2E −2A [opposite of A, twice]. (*It's OK if the path crosses, since he's Crazy.)*

   B. Draw Lazy's path, labeling it "R".

6. Let me walk you thru the logic of trigonometry one more time, using the 45° triangle drawn below.

   A. Measure the length of the hypotenuse up to the first arrow. This is H_1 (hypotenuse 1). Use the obvious number.

   B. X_1 is the x-component of H_1, which ends directly below the end of H_1. Measure the length of x_1.

   C. Calculate the ratio of x_1 to H_1: $\frac{x_1}{H_1} =$

   D. Realizing that as a 45° triangle, $x_1 = y_2$, calculate the ratio of y_1 to H_1:

   $\frac{y_1}{H_1} =$

   E. Measure H_2 (end of the meter stick [oops, I gave it away]).

   F. Measure x_2 (and, therefore y_2).

   G. Calculate the following ratios:

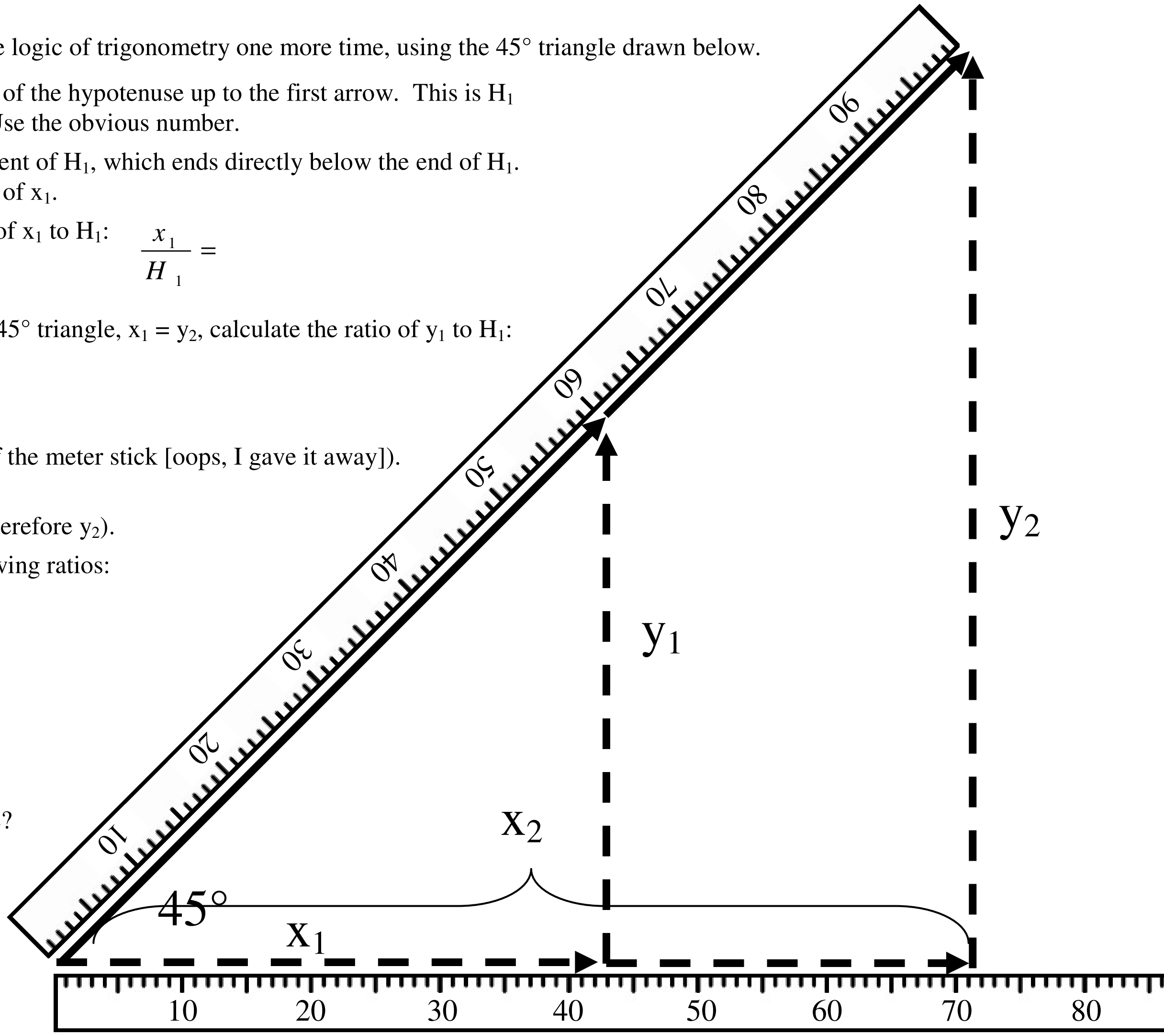
   $\frac{x_2}{H_2} =$

   $\frac{y_2}{H_2} =$

   H. What do you notice?

   I. Being sure your calculator is in degrees, give the following:

   Cos 45° =
   Sin 45° =



Tan, Cos, and Sin are the RATIO of two sides. They give the percentage of how big they are in relation to each other. Sin30° = 0.5 MEANING: the side opposite to a 30° angle will ALWAYS be 1/2 the length of the hypotenuse. For a 45° triangle the sides are both 71% of the hypotenuse. (This was discovered by the ancient Greeks thousands of years ago. Kinda makes ya wanna wear a toga, huh?!?)

1A. x = −24.5 m; y = −20.6m 1B. x = 0m; y = −8m. 2A. H = 15.2 m; θ = 23.2°;

2B. H = 8.7 m; θ = 149° (must be in 2nd quadrant (to the left and up); tan gives −31° so add 180°);

3A) G (+x means to the right; −y means down) 3B) B

5)