1. **Definition for sin and cos of an angle**

   As we discussed, for any angle α, we can find invarians : (sine) $sin\alpha$ and (cosine) $cos\alpha$

In general, for a right-angle triangle with hypothenuse not equal to 1, the *sina* and *cosa* of the angle are defined as:

$$sina = \frac{\text{opposite side}}{\text{hypothenuse}}$$
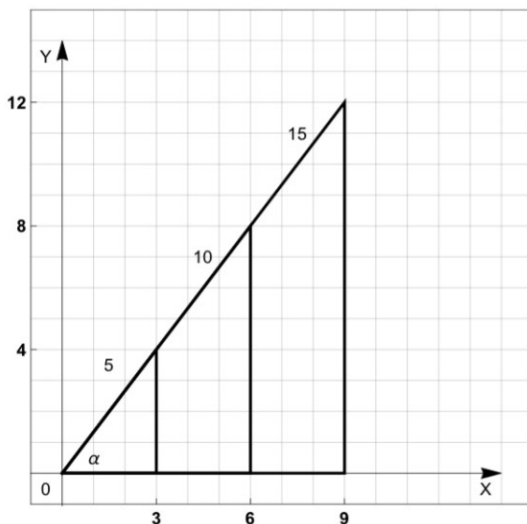
$$cosa = \frac{\text{adjacent side}}{\text{hypothenuse}}$$

This is because the definitions on **sin** and **cos** do not really depend on size of the triangle, but only the angle itself. Since any two right triangles with the same angles are similar, it shows that if we have a right triangle with angle **α** and hypotenuse **c**, then the sides will be *c sin α* and *c cos α*:

$$sina = \frac{\text{opposite side}}{\text{hypothenuse}} = \frac{c\ sina}{c}$$
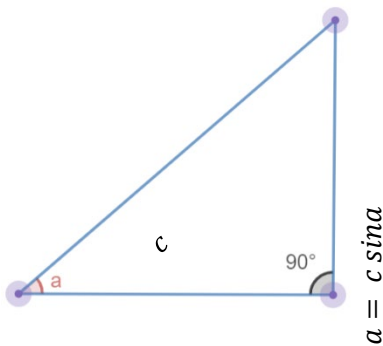
$$cosa = \frac{\text{adjacent side}}{\text{hypothenuse}} = \frac{c\ cosa}{c}$$
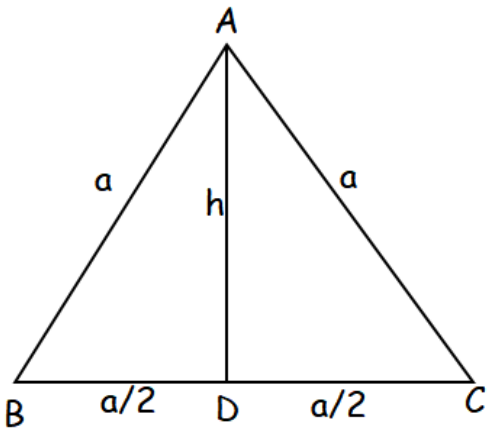
Example: Consider the angle a in the following triangles:

$$sina = \frac{\text{opposite side}}{\text{hypothenuse}} = \frac{4}{5} = \frac{8}{10} = \frac{12}{15}$$

$$cosa = \frac{\text{adjacent side}}{\text{hypothenuse}} = \frac{3}{5} = \frac{6}{10} = \frac{9}{15}$$

1. As we discussed in class, please find

$sin(\angle B)$,

$cos\ (\angle B)$,

$sin(\angle BAD)$,

$cos(\angle BAD)$

2. Plot these functions, clearly define asymptotes:

    a. $y = \frac{1}{x+3} - 3$

    b. $y = \frac{1}{3-x} - 3$

    c. $y = x - \frac{1}{x}$