

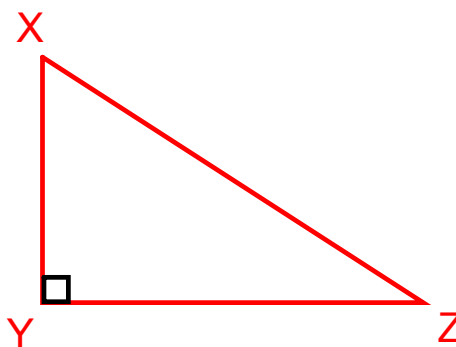
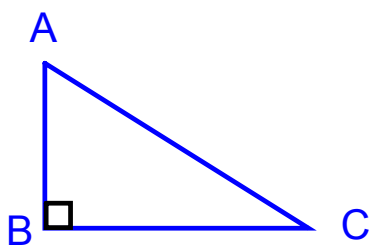
Module 13 - Trigonometry (Today you need your notes)

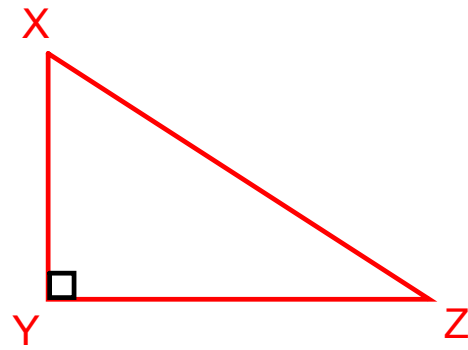
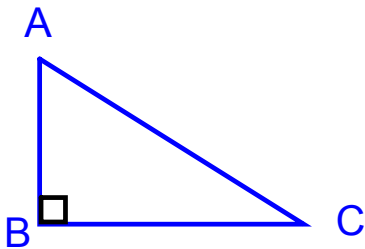
-Question to ponder:

If you are flying a kite, you know the length of the string, and you know the angle that the string is making with the ground, can you figure out how high the kite is?



Picture the following two similar right triangles, ABC and XYZ



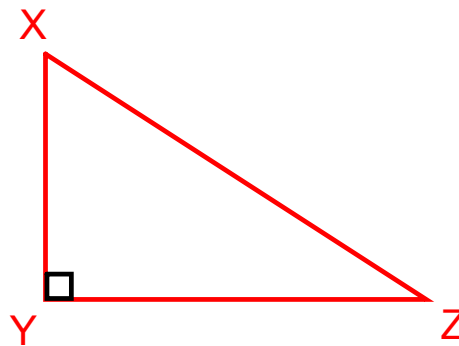
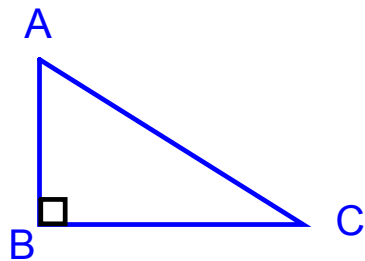


Complete the following proportions:

$$\frac{BC}{AB} =$$

$$\frac{AB}{AC} =$$

$$\frac{BC}{AC} =$$

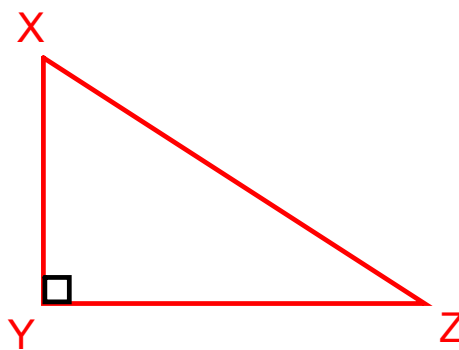
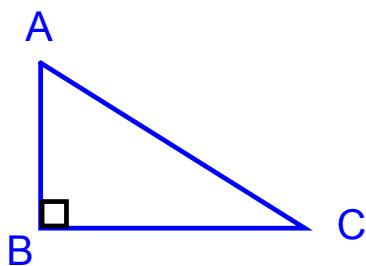


These ratios MUST be the same

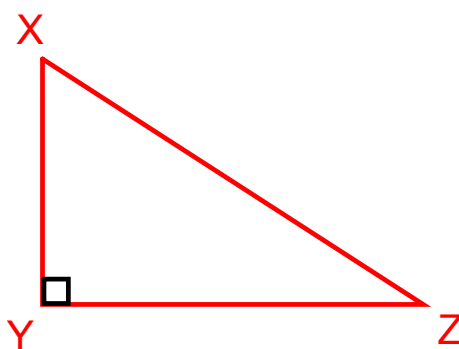
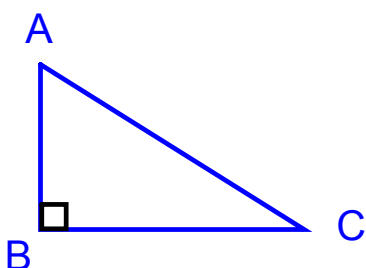
$$\frac{BC}{AB} = \frac{YZ}{XY}$$

$$\frac{AB}{AC} = \frac{XY}{XZ}$$

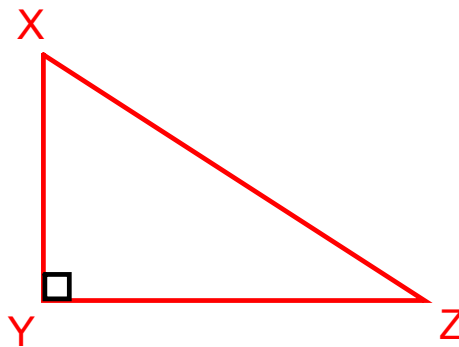
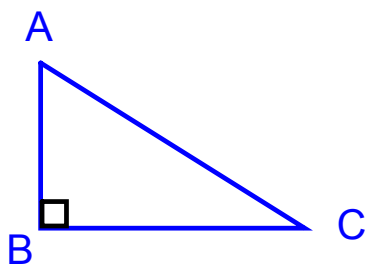
$$\frac{BC}{AC} = \frac{YZ}{XZ}$$



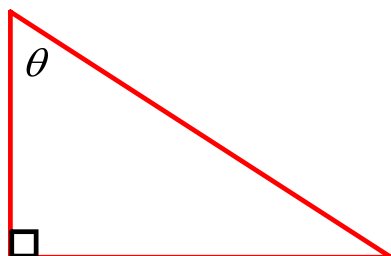
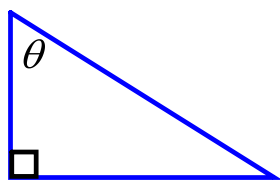
If the two triangles are similar, what can be said about their corresponding angles?



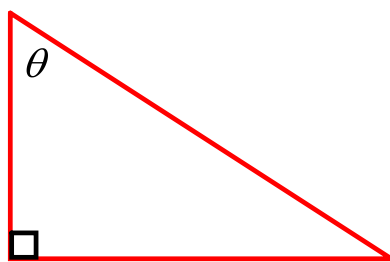
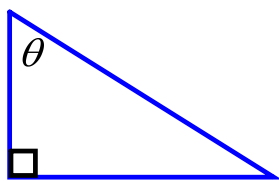
What if you are only told that angle C is congruent with angle Z?
Is this enough to state that the triangles are similar?



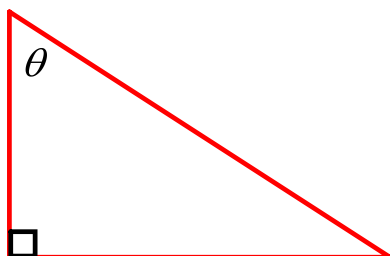
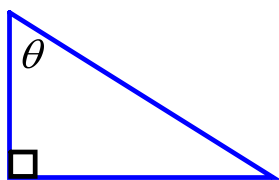
By AA similarity, any two right triangles with one additional congruent angle **MUST** be similar, therefore their sides must be in proportion to each other.



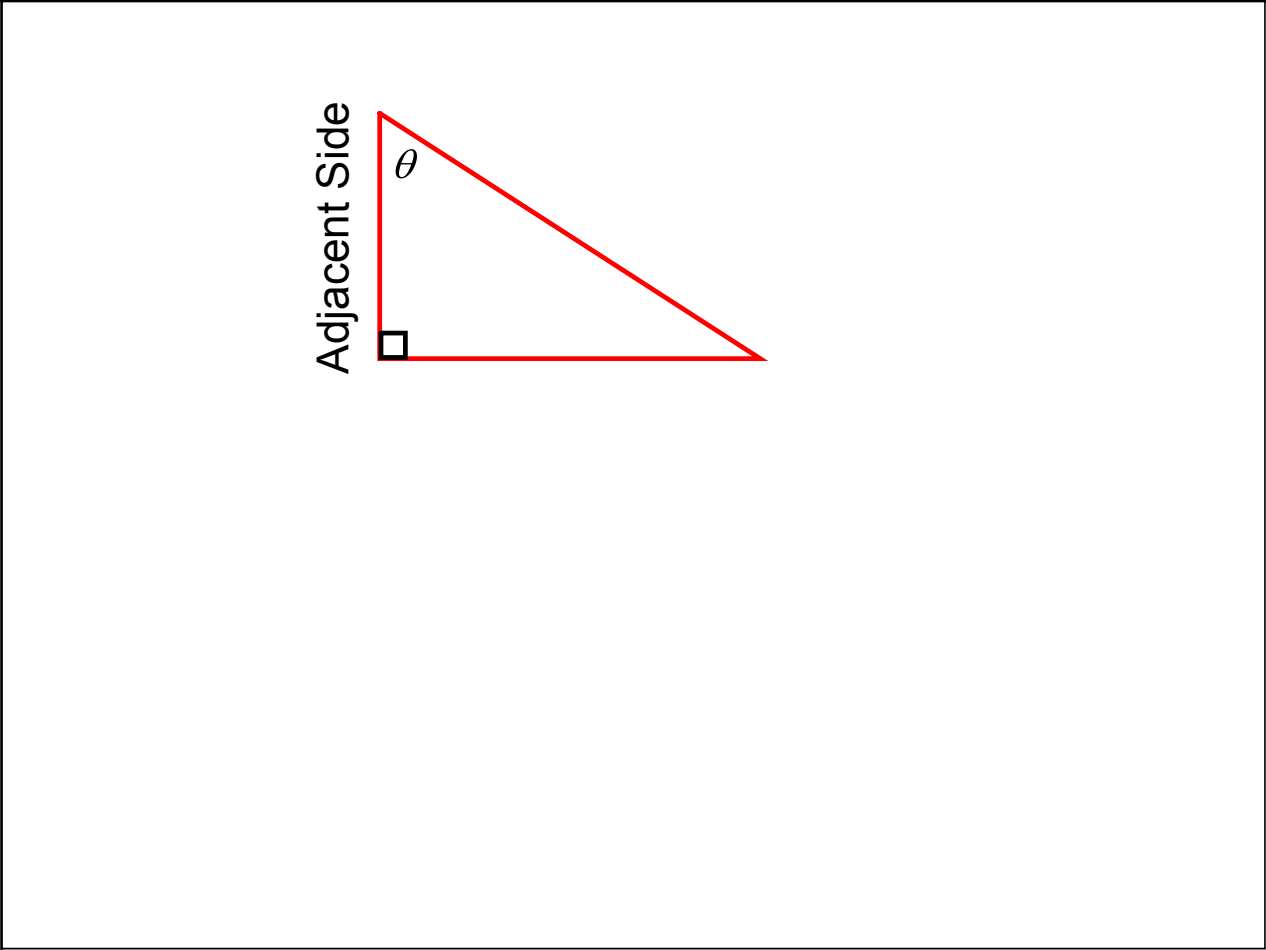
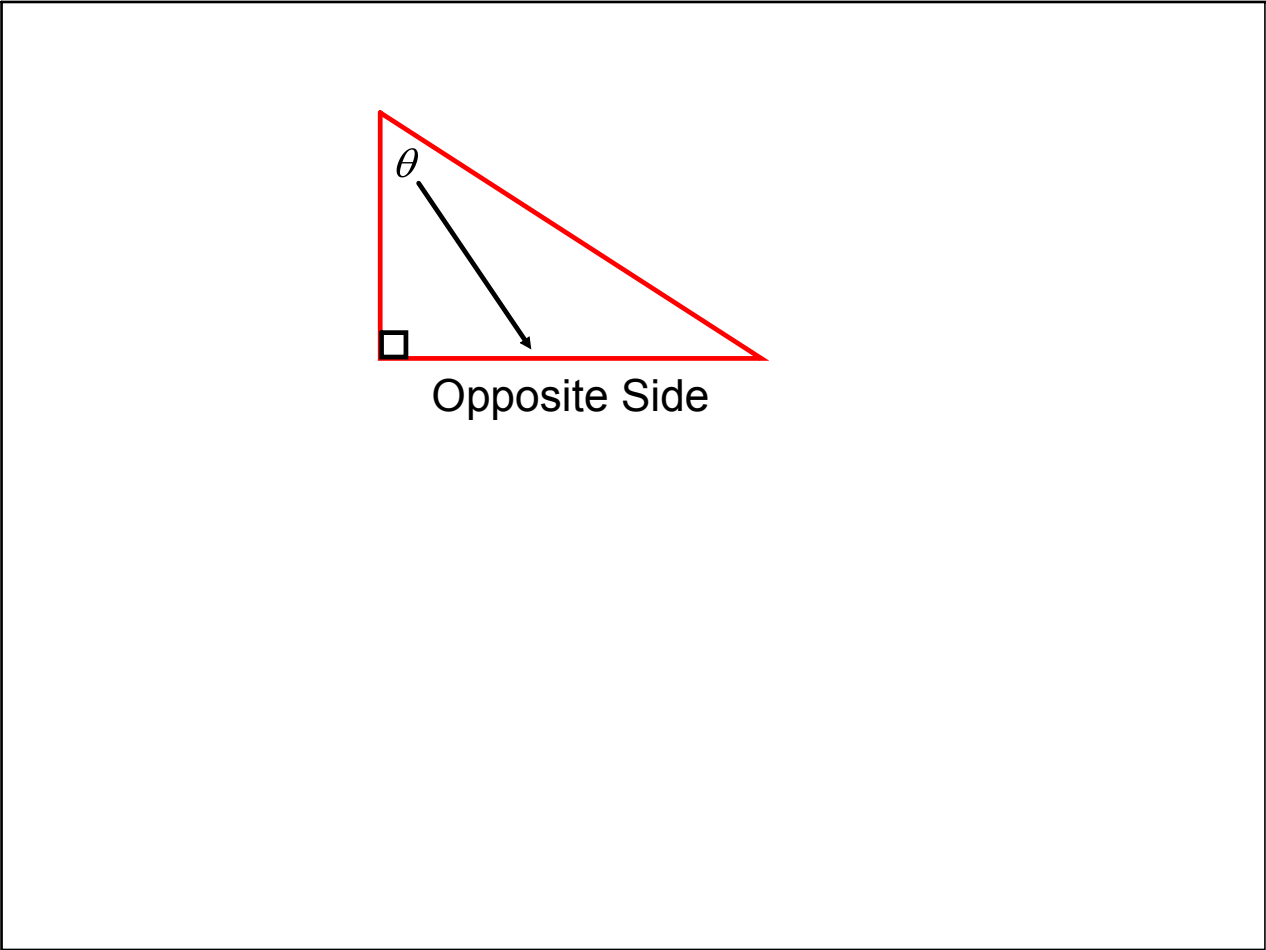
In trigonometry, the variable theta θ is often used to represent a missing angle measure.

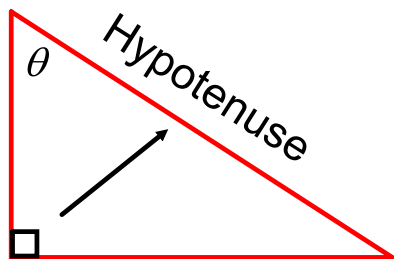


If the two right triangles also have the angle theta in common, then the triangles must be similar by AA.

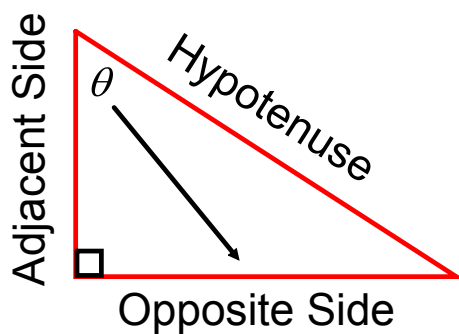


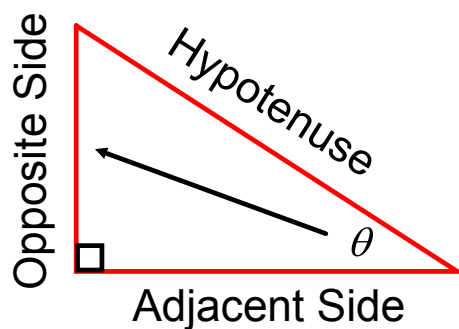
The sides of the right triangle can be named based on their relationship to a particular angle (in this case theta)



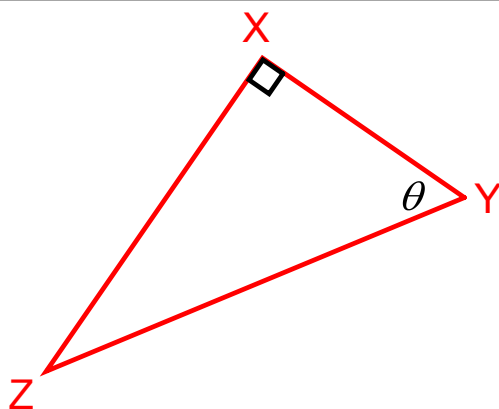


(The hypotenuse is always the largest side of a right triangle, across from the right angle, regardless of where angle theta is being defined)

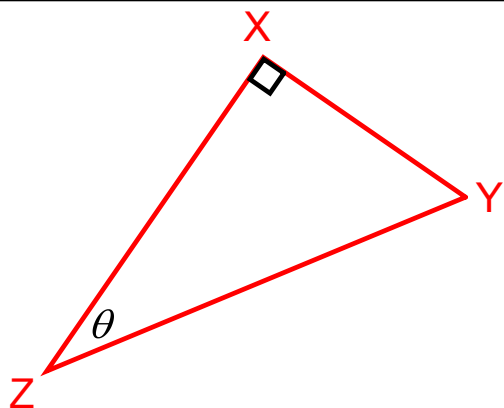




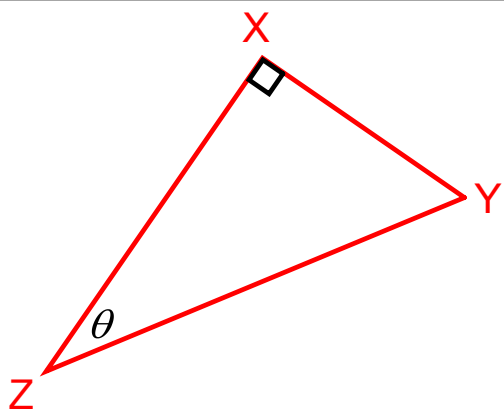
-Notice that if the angle in question is switched, the sides defined as opposite and adjacent switch as well.



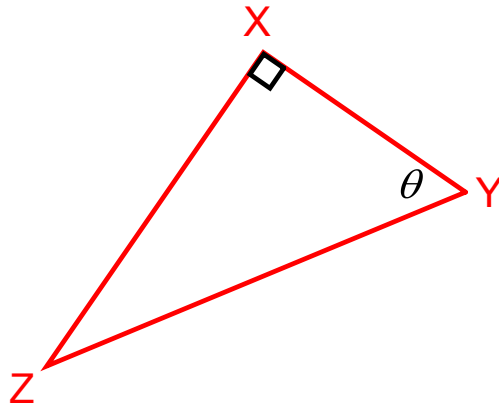
What is the opposite side to theta?



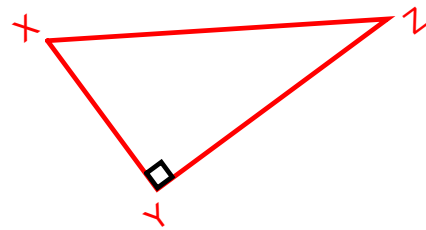
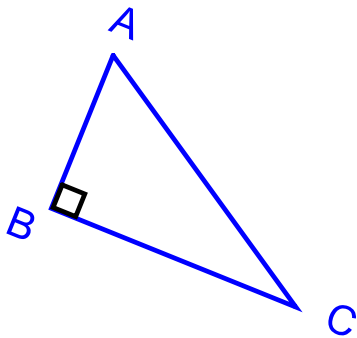
What is the opposite side to theta?



What is the adjacent side to theta?



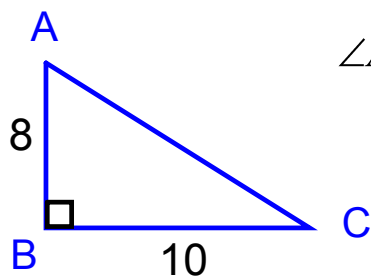
What is the adjacent side to theta?



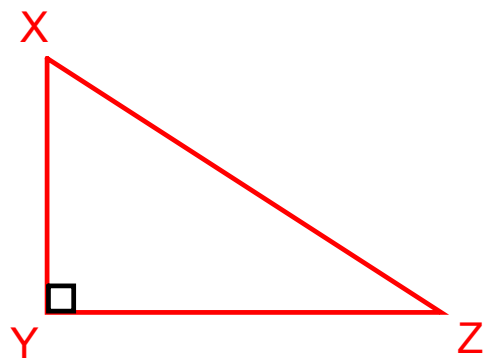
What is the opposite side to angle A?

What is the adjacent side to angle Z?

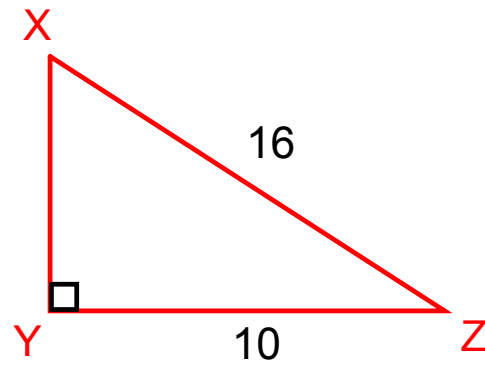
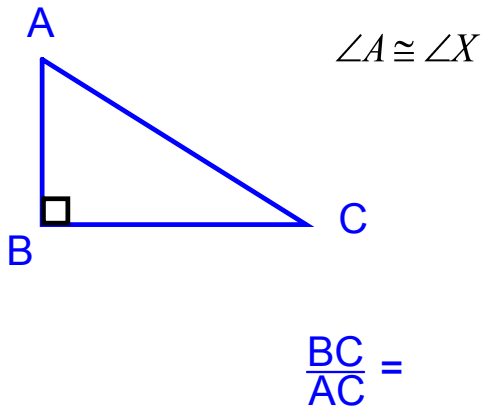
Since we know that two right triangles with one congruent non-right angle must be similar, calculating the ratio of one side of the first triangle to another side of the first triangle should give us a proportion that will be true for the other triangle, or for ANY right triangle with the same measure!



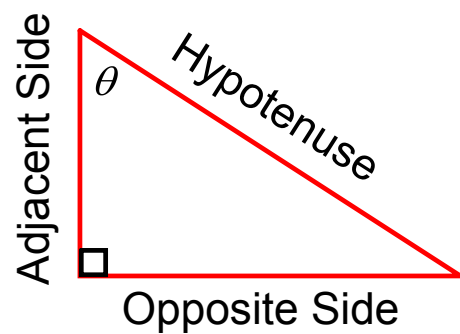
$$\angle A \cong \angle X$$



$$\frac{YZ}{XY} =$$

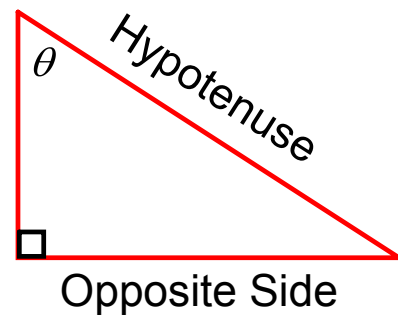


Trigonometric ratios are defined as the proportions created when one angle of the right triangle is known. The proportions will be the same no matter the size of the right triangle, because any right triangle with that angle measure will be similar.



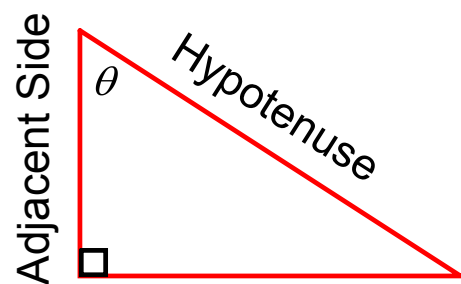
The **sine** ratio (abbreviated sin) is defined as the opposite side to the angle in question divided by the hypotenuse:

$$\sin \theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$$



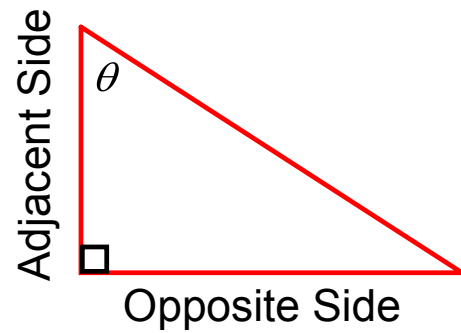
The **cosine** ratio (abbreviated cos) is defined as the adjacent side to the angle in question divided by the hypotenuse:

$$\cos \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$



The **tangent** ratio (abbreviated tan) is defined as the opposite side to the angle in question divided by the adjacent:

$$\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}}$$



A common acronym to remember these three ratios is:

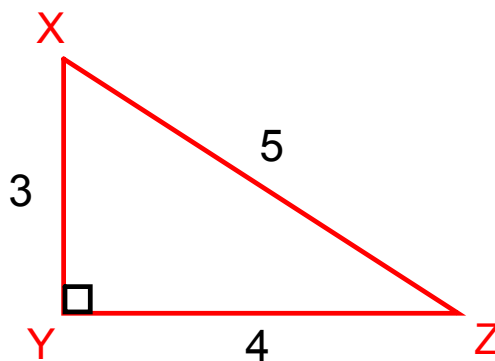
S in
O pposite
H ypotenuse
C os
A djacent
H ypotenuse
T an
O pposite
A djacent

Determine the following:

$$\sin x =$$

$$\cos x =$$

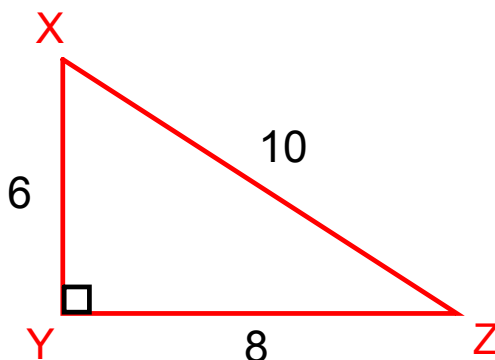
$$\tan x =$$

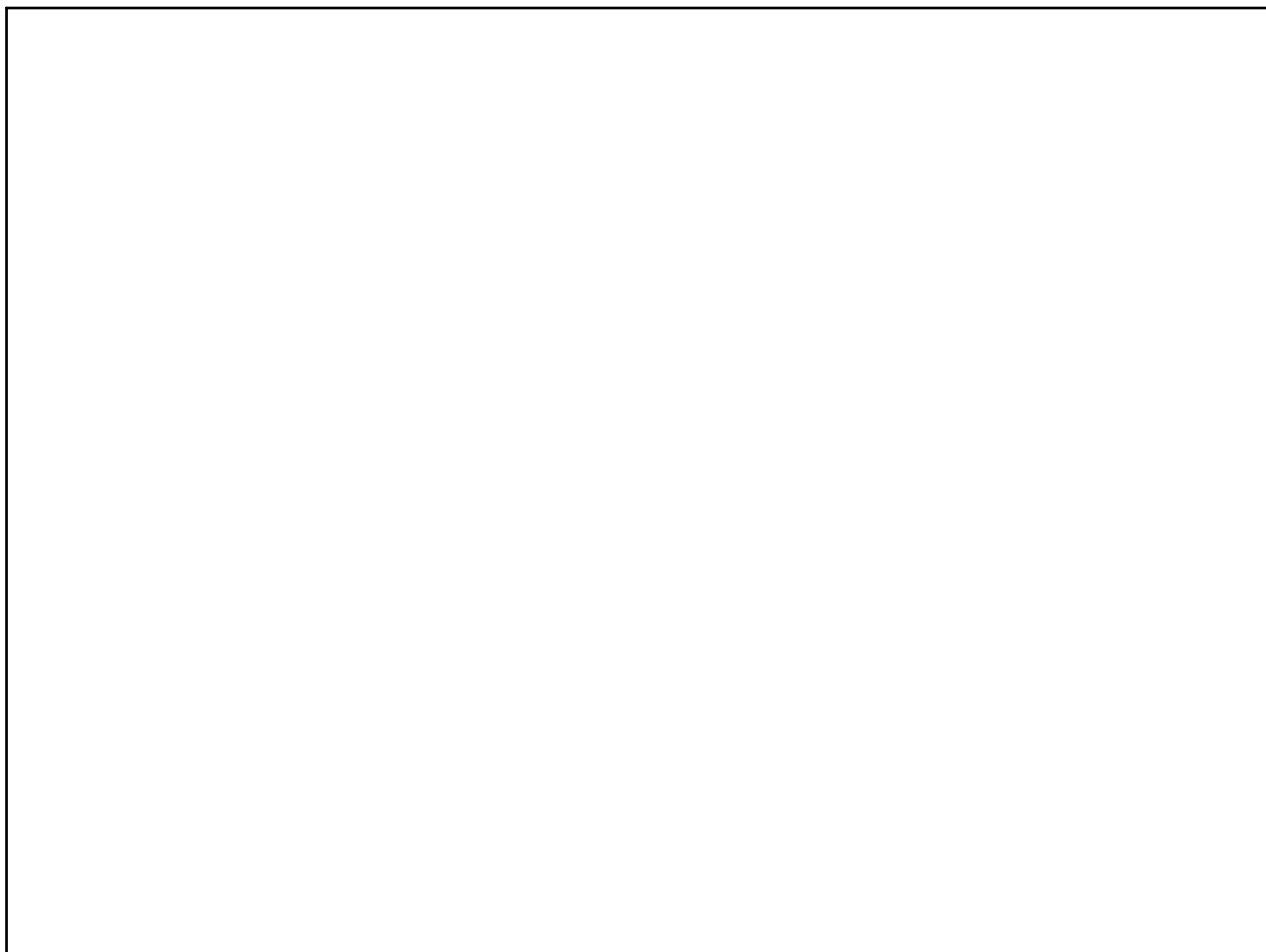
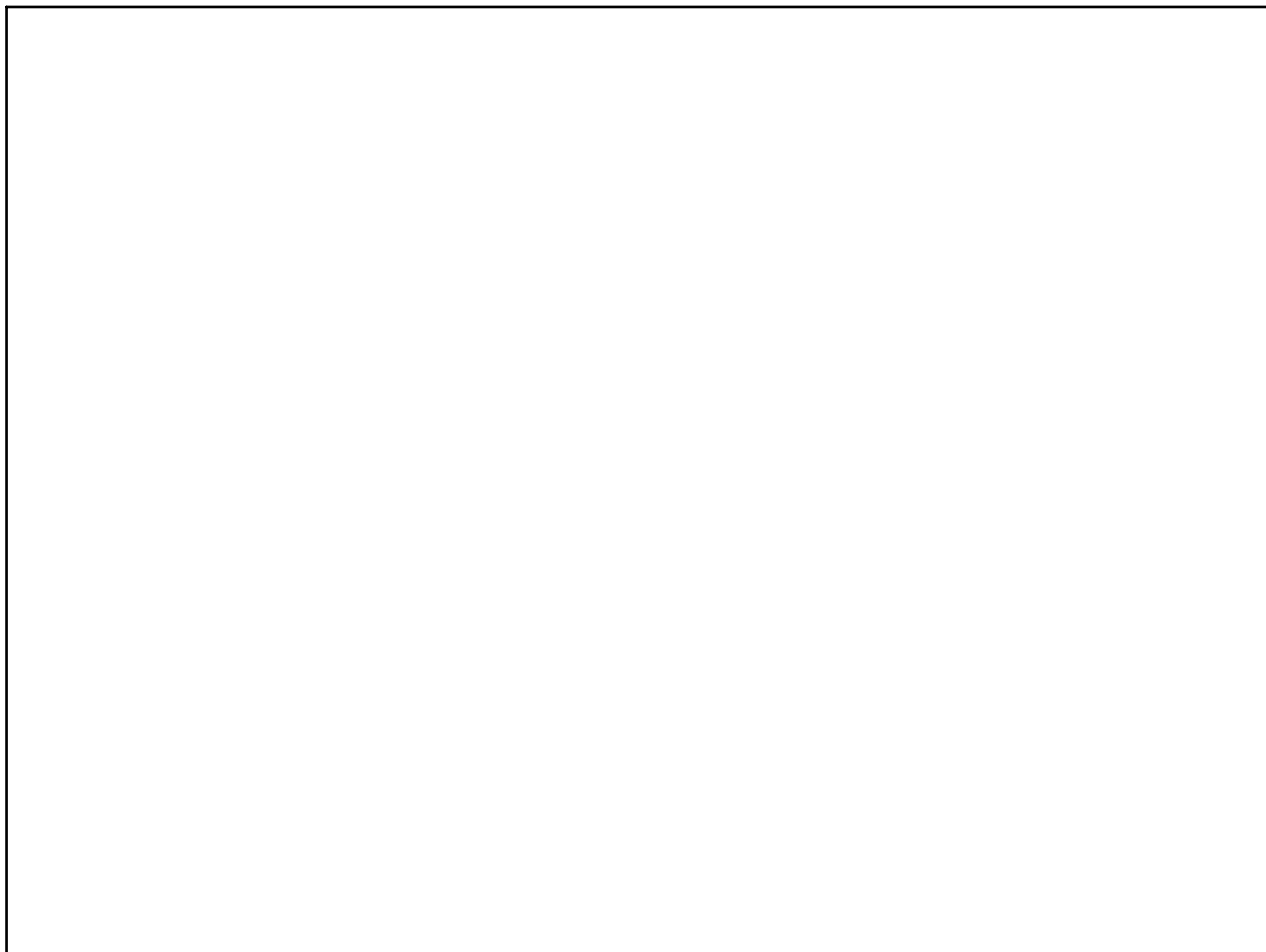


Determine the following:

$$\sin x =$$

$$\cos Z =$$





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