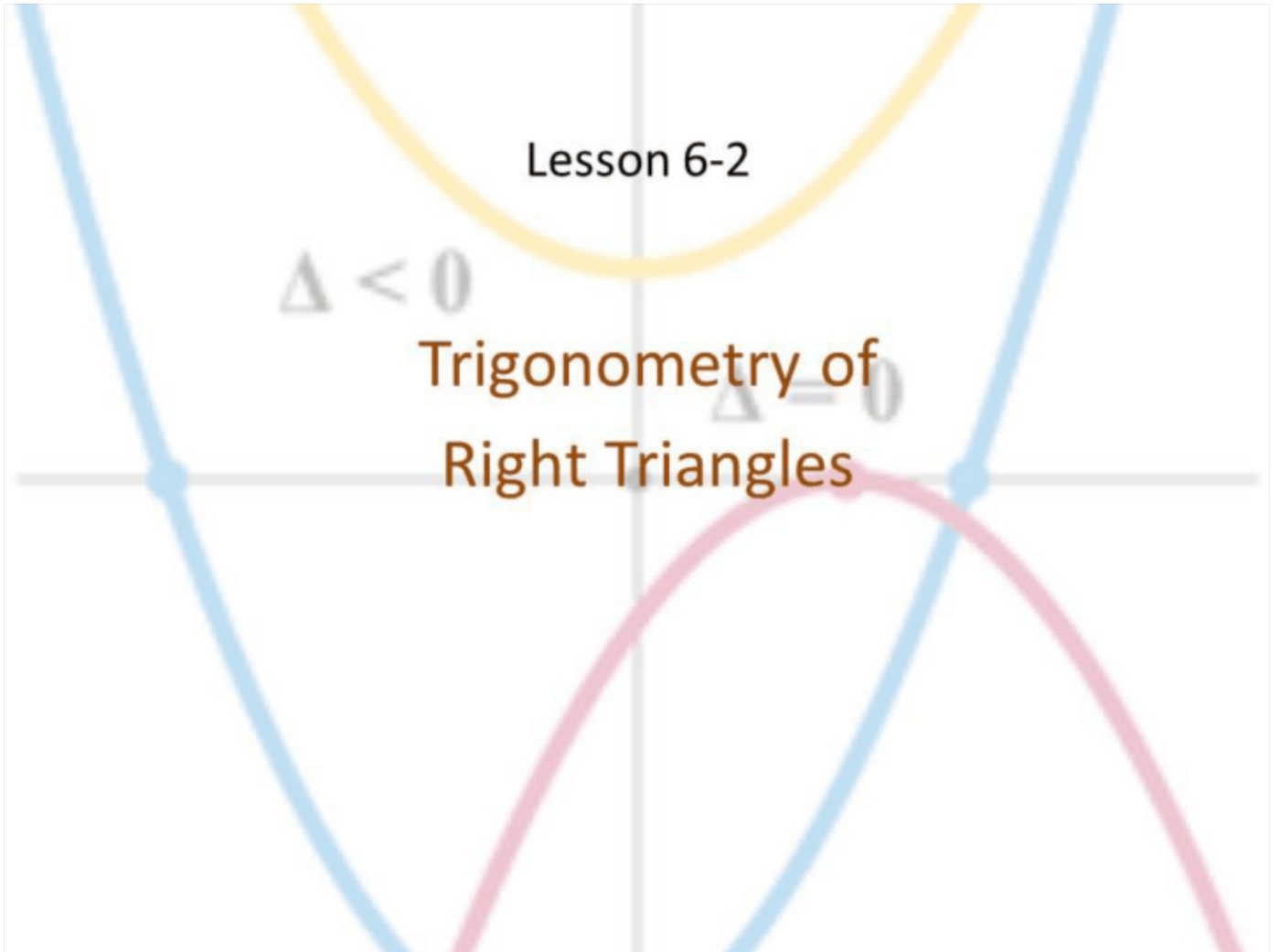


Lesson 6-2

$\Delta < 0$

Trigonometry of
Right Triangles

$\Delta = 0$



Objective

Students will...

- Be able draw, set up, and solve right triangles using trigonometric ratios.
- Be able to understand solve word problems involving right triangles using trigonometric ratios.

Trigonometric Ratios

Recall the trigonometric ratios we've learned in the past.

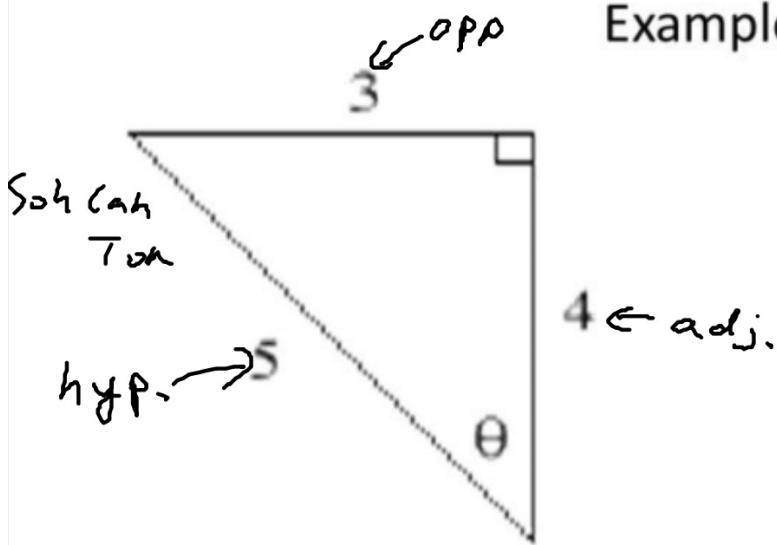
Trigonometric Ratios "Soh Cah Toa"

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}} \quad \cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}} \quad \tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

$$\csc \theta = \frac{\textit{hypotenuse}}{\textit{opposite}} \quad \sec \theta = \frac{\textit{hypotenuse}}{\textit{adjacent}} \quad \cot \theta = \frac{\textit{adjacent}}{\textit{opposite}}$$

Remember, these ratios only apply to **right** triangles.

Example



$$\sin \theta = \frac{3}{5}$$

$$\cos \theta = \frac{4}{5}$$

$$\tan \theta = \frac{3}{4}$$

$$\csc \theta = \frac{5}{3}$$

$$\sec \theta = \frac{5}{4}$$

$$\cot \theta = \frac{4}{3}$$

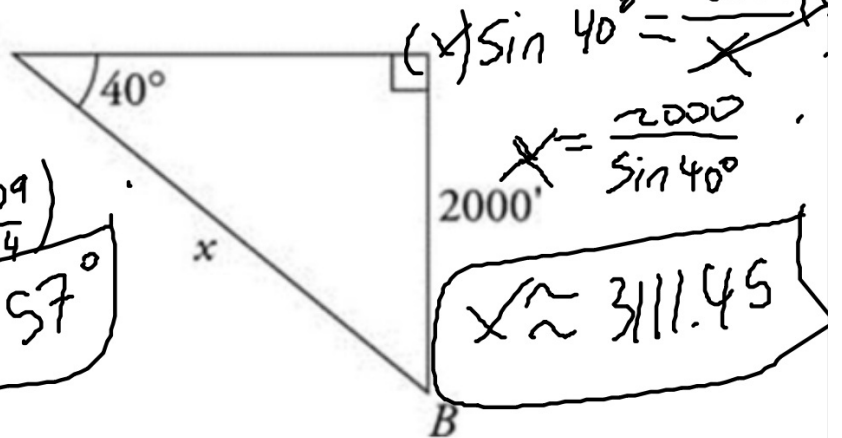
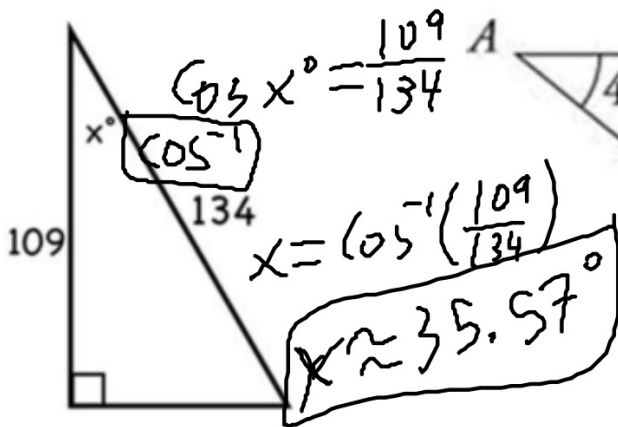
~~cos~~

Solving Right Triangles

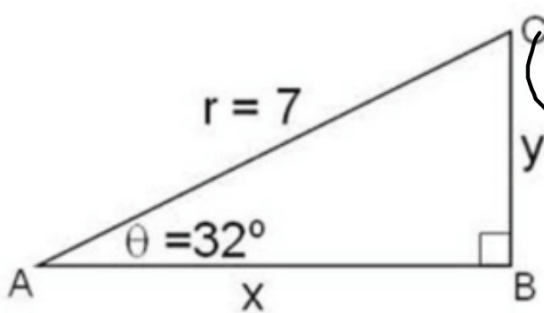
$\boxed{\arccos}$

Using these ratios, we can solve for missing angles or sides of right triangle. (Be sure to identify whether the angles are in **radian** or **degree**)

Find x .



Find x and y.



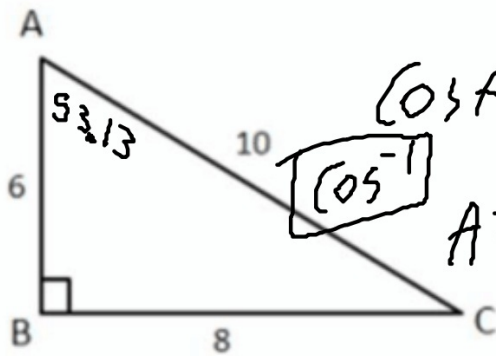
$$(\cancel{7}) \sin 32^\circ = \frac{y}{\cancel{7}}$$

$$3.71 \approx y$$

$$(\cancel{7}) \cos 32^\circ = \frac{x}{\cancel{7}}$$

$$5.94 \approx x$$

Find the missing angles.



$$\cos A^\circ = \frac{6}{10}$$

$$\boxed{\cos^{-1}}$$

$$A = \cos^{-1}\left(\frac{6}{10}\right)$$

$$\approx 53.13^\circ$$

$$C = 180 - (90 + 53.13)$$

$$= \boxed{36.87^\circ}$$

Sketch a triangle that has acute angle θ , and find the other five trigonometric ratios of θ .

a) $\cos \frac{61}{80}$

b) $\tan \frac{373}{100}$

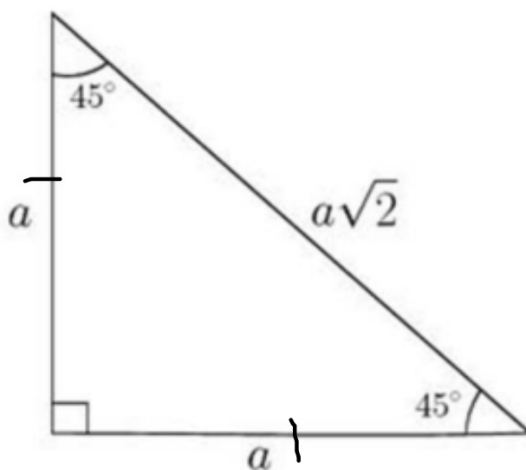
c) $\sin \frac{2}{3}$

Special Right Triangles

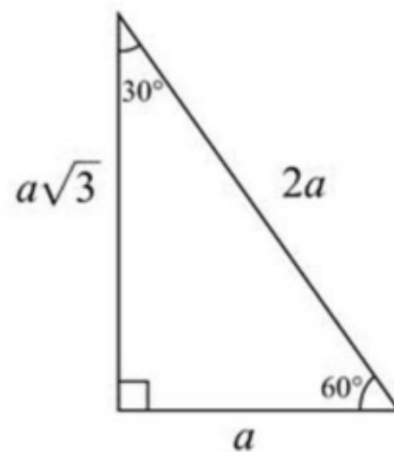
Also resulting from applying trigonometric ratios, we have what are called, "**Special**" right triangles.

$$\sqrt{2a^2} = \sqrt{2} \cdot \sqrt{a^2}$$

45-45-90 Triangle



30-60-90 Triangle



Example

Find x and y.

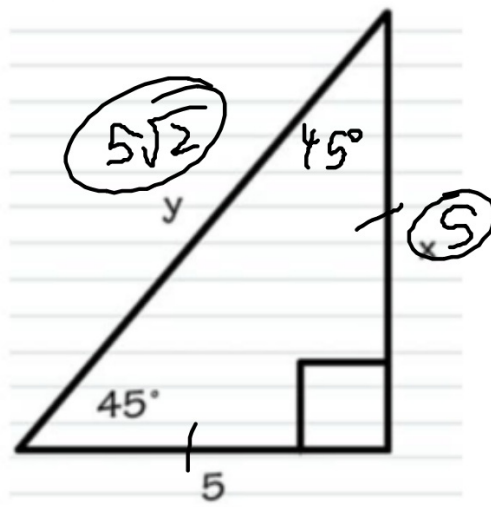
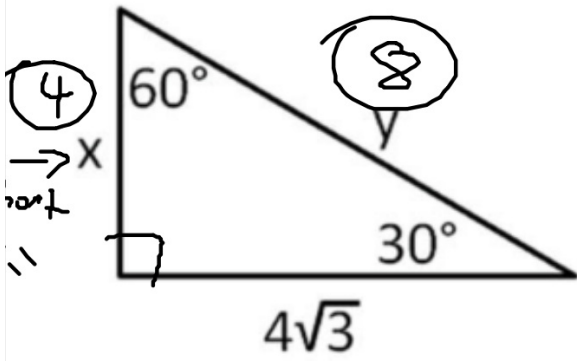


Fig.
Not
Drawn
to
Scale

Application of Trigonometric Ratios

We can also solve word problems using these ratios.

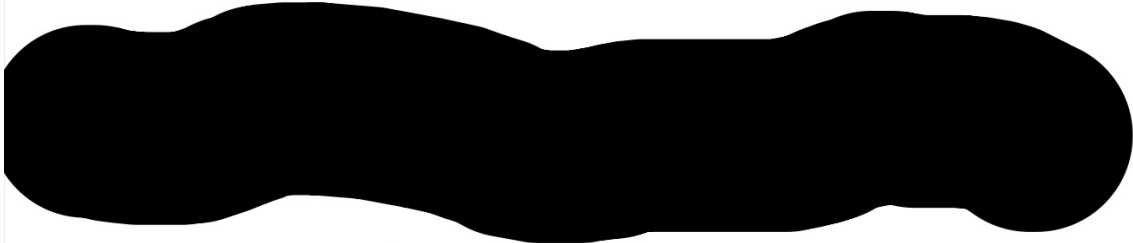
A giant redwood tree casts a shadow that is 532ft long. Find the height of the tree if the angle of elevation of the sun is 25.7° .

A giant redwood tree has a height of 176ft. If the angle of elevation of the sun is 12.3° , what is the length of the tree's shadow?

A 40ft ladder leans against a building. If the base of the ladder is 6ft from the base of the building, what is the angle formed by the ladder and the building?

A 50ft ladder leans against a building. If the base of the ladder is 7ft from the base of the building, what is the angle formed by the ladder and the ground?

Homework ~~#~~ 1/23



WKSH T

$$\sin 71^\circ = \frac{x}{24}$$

