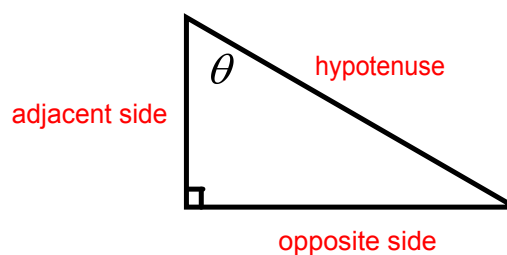


4.3 Right Triangle Trigonometry

- when dealing with a right triangle, we need to identify some things first



- There are six main trigonometric functions that relate an acute angle to a ratio of sides in a right triangle. They are...

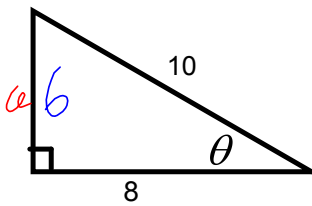
sine	cosine	tangent
cosecant	secant	cotangent

- the functions are written and defined as follows...

$$\sin \theta = \frac{opp}{hyp} \qquad \cos \theta = \frac{adj}{hyp} \qquad \tan \theta = \frac{opp}{adj}$$

$$\csc \theta = \frac{hyp}{opp} \qquad \sec \theta = \frac{hyp}{adj} \qquad \cot \theta = \frac{adj}{opp}$$

notice how the bottom row of equations are the reciprocals of the top row

Examples

$a^2 + 8^2 = 10^2$ $a^2 + 64 = 100$ $a^2 = 36$
 Find the exact values of the six trig. functions of the angle θ . $a = 6$

$$\cos \theta = \frac{8}{10}$$

$$\sec \theta = \frac{10}{8}$$

$$\sin \theta = \frac{6}{10} \quad \tan \theta = \frac{6}{8}$$

$$\csc \theta = \frac{10}{6} \quad \cot \theta = \frac{8}{6}$$

Examples

Sketch a right triangle corresponding to the trigonometric function of the acute angle θ .

$$\tan \theta = .8 = \frac{4}{5} \frac{\text{opp}}{\text{adj}}$$

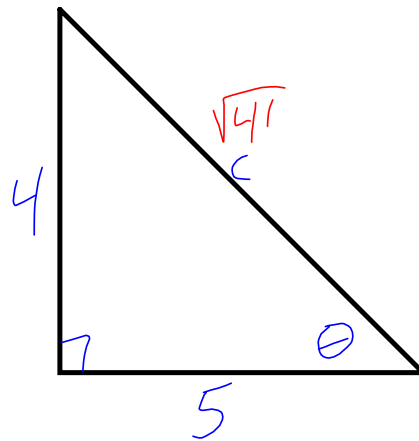
$$\sin \theta = \frac{4}{\sqrt{41}}$$

$$\cos \theta = \frac{5}{\sqrt{41}}$$

$$\sec \theta = \frac{\sqrt{41}}{5}$$

$$| \csc \theta = \frac{\sqrt{41}}{4}$$

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



$$4^2 + 5^2 = c^2$$

$$16 + 25 = c^2$$

$$\sqrt{41} = c$$

Examples

Use a calculator to evaluate each function, round to four decimals.

$$\sin 78^\circ = .9781$$

$$\sin^{-1}(.9781) = 78^\circ$$

$$\tan\left(\frac{\pi}{10}\right) = .3249$$

$$\sec 1.34 = \frac{1}{\cos 1.34} = \frac{1}{.22875} = 4.3715$$