A triangle is a right triangle if one of its angles is a right angle.

\[
\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}
\]

The next three are the reciprocal of the first three.

\[
\csc \theta = \frac{1}{\sin \theta} \quad \sec \theta = \frac{1}{\cos \theta} \quad \cot \theta = \frac{1}{\tan \theta}
\]

\[
\sin \theta = \frac{1}{\csc \theta} \quad \cos \theta = \frac{1}{\sec \theta} \quad \tan \theta = \frac{1}{\cot \theta}
\]
Since the hypotenuse is always the largest side of a right triangle, \( \sin \theta < 1, \cos \theta < 1 \) and \( \csc \theta > 1, \text{ and } \sec \theta > 1 \)

Find the exact values of the six trigonometric functions for the angle \( \theta \).
Think of sine and $y$ as linked together

Think of cosine and $x$ as linked together.

Tangent is sine/cosine or $y/x$ or *slope*. 

\[ \begin{array}{c|c|c|c|c}
 & \text{I} & \text{II} & \text{III} & \text{IV} \\
\hline
\text{sin} & \text{cos} & \text{tan} & \text{sin} & \text{cos} \\
\hline
\text{cos} & \text{sin} & \text{tan} & \text{cos} & \text{tan} \\
\hline
\text{tan} & \text{tan} & \text{tan} & \text{tan} & \text{tan} \\
\end{array} \]
Find the exact value of the trigonometric functions

\[ \sin \theta = \frac{5}{7} \text{ in Quadrant I} \quad \tan \theta = \frac{-5}{7} \text{ in Quadrant IV} \]

\[ \cot \theta = \frac{5}{7} \text{ in Quadrant III} \quad \csc \theta = 8 \text{ in Quadrant II} \]
Determine the quadrant which would contain the angle $\theta$ with the following conditions.

(a) $\sin \theta > 0$ and $\cos \theta < 0$  
(b) $\sec \theta < 0$ and $\tan \theta > 0$

(c) $\csc \theta < 0$ and $\cos \theta > 0$

Find the exact value of the remaining trigonometric functions

$\sin \theta = \frac{-5}{8}$ and $\cos \theta < 0$  
$\cot \theta = -4$ and $\sin \theta > 0$