

4A.3 Right Triangle Trigonometry SOH-CAH-TOA

$$\underline{\sin} \theta = \frac{O}{H}$$

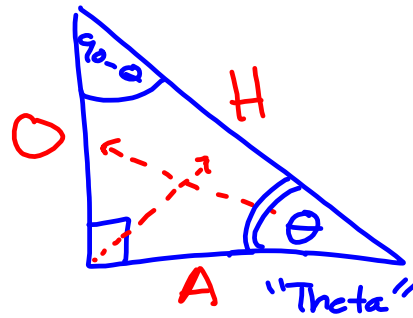
$$\underline{\cos} \theta = \frac{A}{H}$$

$$\underline{\tan} \theta = \frac{O}{A}$$

$$\underline{\csc} \theta = \frac{H}{O}$$

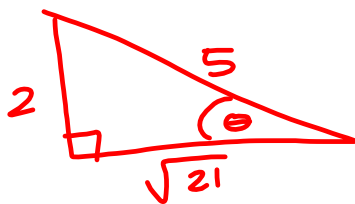
$$\underline{\sec} \theta = \frac{H}{A}$$

$$\underline{\cot} \theta = \frac{A}{O}$$



EX1 Find the exact values of the 6 trig functions of θ .

$$\sin \theta = \frac{2}{5}$$



$$2^2 + b^2 = 5^2$$

$$4 + b^2 = 25$$

$$b^2 = 21 \rightarrow b = \sqrt{21}$$

$$\sin \theta = \frac{2}{5}$$

$$\csc \theta = \boxed{\frac{5}{2}}$$

$$\cos \theta = \boxed{\frac{\sqrt{21}}{5}}$$

$$\sec \theta = \frac{5\sqrt{21}}{\sqrt{21}\sqrt{21}} = \boxed{\frac{5\sqrt{21}}{21}}$$

$$\tan \theta = \frac{2}{\sqrt{21}} = \boxed{\frac{2\sqrt{21}}{21}}$$

$$\cot \theta = \boxed{\frac{\sqrt{21}}{2}}$$

(EX2) Sketch a right triangle corresponding to the trig function of θ . Find the 3rd side and the other 5 trig functions.

$$\sin \theta = \frac{5}{6}$$



$$\begin{aligned} 25 + b^2 &= 36 \\ b^2 &= 11 \\ b &= \sqrt{11} \end{aligned}$$

$$\sin \theta = \frac{5}{6}$$

$$\csc \theta = \frac{6}{5}$$

$$\cos \theta = \frac{\sqrt{11}}{6}$$

$$\sec \theta = \frac{6}{\sqrt{11}} = \frac{6\sqrt{11}}{11}$$

$$\tan \theta = \frac{5}{\sqrt{11}} = \frac{5\sqrt{11}}{11} \quad \cot \theta = \frac{\sqrt{11}}{5}$$

