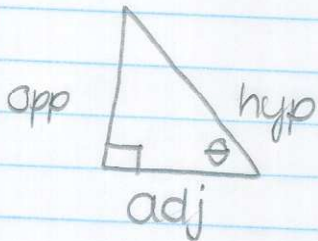


October 24th, 2008

4.2 Reciprocal (Secondary) Trig Ratios



$$\sin \theta = \frac{o}{h} \quad \cos \theta = \frac{a}{h} \quad \tan \theta = \frac{o}{a}$$

Consider $\sin \theta = \frac{5}{x}$ \leftarrow out of denom.

$$\frac{1}{\sin \theta} = \frac{x}{5}$$

$$\begin{array}{lll} \csc \theta = \frac{h}{o} & \sec \theta = \frac{h}{a} & \cot \theta = \frac{a}{o} \\ \text{cosecant} & \text{secant} & \text{cotangent} \end{array}$$

$$\begin{array}{lll} \csc \theta = \frac{1}{\sin \theta} & \sec \theta = \frac{1}{\cos \theta} & \cot \theta = \frac{1}{\tan \theta} \end{array}$$

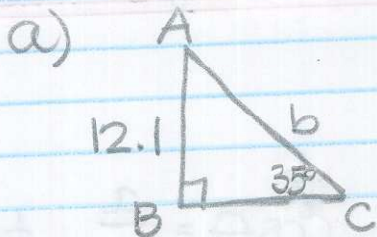
Ex 1. Determine

$$\begin{aligned} \text{a) } \sec 22^\circ &= \frac{1}{\cos 22} \\ &= 1.0785 \end{aligned}$$

-advantage \rightarrow to have the unknown variable in the numerator.

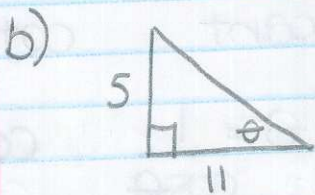
$$\begin{aligned} \text{b) } \csc 13^\circ &= \frac{1}{\sin 13} \\ &= 4.4454 \end{aligned}$$

Ex 2. Determine the unknown.



$$\frac{h}{o} \quad \csc 35 = \frac{b}{12.1}$$

$$\begin{aligned} b &= 12.1 \csc 35 \\ &= 12.1 \frac{1}{\sin 35} \\ &= 21.1 \end{aligned}$$



$$\cot \theta = \frac{11}{5}$$

$$\begin{aligned} \theta &= \cot^{-1} \left(\frac{11}{5} \right) \\ &= \tan^{-1} \left(\frac{5}{11} \right) \\ &= 24^\circ \end{aligned}$$

$$\cot \theta = \frac{11}{5}$$