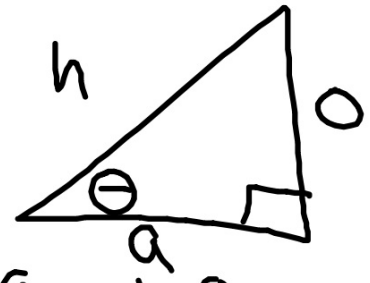
Trig Review

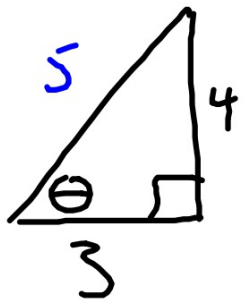
A. The basics



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

$\csc\theta = \frac{h}{O}$ $\sec\theta = \frac{h}{a}$ $\cot\theta = \frac{a}{O}$

Ex.



$a^2+b^2=c^2$

$3^2+4^2=c^2$

$9+16=25$

$25=c^2$

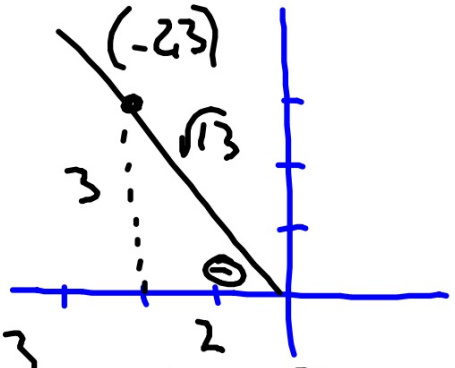
$5=c$

$\sin = \frac{4}{5}$ $\csc = 5/4$

$\cos = 3/5$ $\sec = 5/3$

$\tan = 4/3$ $\cot = 3/4$

Ex.



$a^2+b^2=c^2$

$2^2+3^2=c^2$

$4+9=c^2$

$\sqrt{13}=c$

$\sin=\frac{3}{\sqrt{13}}$ $\quad \csc=\frac{\sqrt{13}}{3}$

$\cos=\frac{-2}{\sqrt{13}}$ $\quad \sec=\frac{\sqrt{13}}{-2}$

$\tan=\frac{-3}{2}$ $\quad \cot=\frac{-2}{3}$

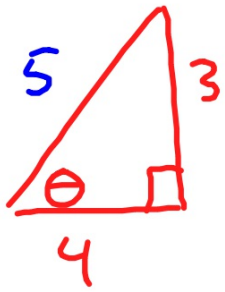
B. $\frac{1}{\sin^2 x}\left(\sin^2 x + \cos^2 x = 1\right)$

$$\frac{\sin^2 x}{\sin^2 x} + \frac{\cos^2 x}{\sin^2 x} = \frac{1}{\sin^2 x}$$

$$1 + \cot^2 x = \csc^2 x$$

$$\frac{1}{\cos^2 x}\left(\frac{\sin^2 x}{\cos^2 x} + \frac{\cos^2 x}{\cos^2 x} = \frac{1}{\cos^2 x}\right)$$

$$\tan^2 x + 1 = \sec^2 x$$



$$\left(\frac{5}{\sqrt{7}}\right)^2 = \frac{25}{7}$$

Prove $\sin^2 x + \cos^2 x = 1$

$$\left(\frac{3}{5}\right)^2 + \left(\frac{4}{5}\right)^2 = 1$$

$$\frac{9}{25} + \frac{16}{25} = 1$$

$$\frac{25}{25} = 1$$

Sin $\frac{1}{2}$

Cos $\frac{\sqrt{3}}{2}$

tan $\frac{1}{\sqrt{3}}$

$$\frac{\frac{1}{2} \cdot \frac{2}{\sqrt{3}}}{\frac{\sqrt{3}}{2} \cdot \frac{2}{\sqrt{3}}} = \frac{\frac{1}{\sqrt{3}}}{1}$$