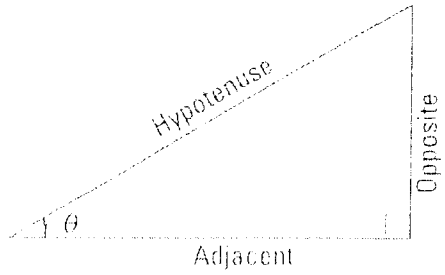
Reciprocal Trigonometric Ratios



$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} \qquad \csc\theta = \frac{\text{hypotenuse}}{\text{opposite}}$$

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} \qquad \sec\theta = \frac{\text{hypotenuse}}{\text{adjacent}}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} \qquad \cot\theta = \frac{\text{adjacent}}{\text{opposite}}$$

So...the reciprocal trig ratios are:

$$\cot\theta = \frac{1}{\tan\theta} = \frac{A}{O}$$

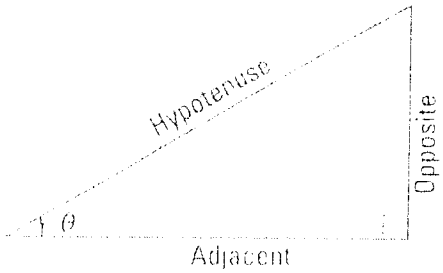
$$\sec\theta = \frac{1}{\cos\theta} = \frac{H}{A}$$

$$\operatorname{cosec}\theta = \frac{1}{\sin\theta} = \frac{H}{O}$$

Determine all 6 Trigonometric Ratios, given that:

$$csc\theta = \frac{13}{12}$$

Reciprocal Trigonometric Ratios



So...the reciprocal trig ratios are:

$$\cot\theta = \frac{1}{\tan\theta} = \frac{A}{O}$$

$$\sec\theta = \frac{1}{\cos\theta} = \frac{H}{A}$$

$$\operatorname{cosec}\theta = \frac{1}{\sin\theta} = \frac{H}{O}$$

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} \qquad \csc\theta = \frac{\text{hypotenuse}}{\text{opposite}}$$

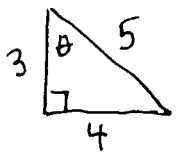
$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} \qquad \sec\theta = \frac{\text{hypotenuse}}{\text{adjacent}}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} \qquad \cot\theta = \frac{\text{adjacent}}{\text{opposite}}$$

primary ratios
"sine"
"Cosine"
"tangent"

reciprocal ratios
"cosecant"
"secant"
"Cotangent"

Example



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

$\cos\theta = \frac{3}{5}$ $\sec\theta = \frac{5}{3}$

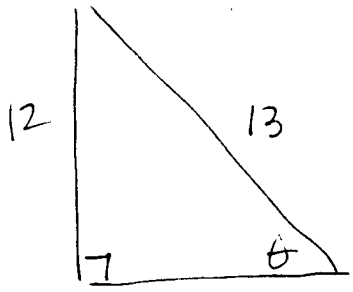
$\tan\theta = \frac{4}{3}$ $\cot\theta = \frac{3}{4}$

Determine all 6 Trigonometric Ratios, given that:

$$\csc\theta = \frac{13}{12}$$

hypotenuse

opposite



5

$13^2 = 12^2 + a^2$

$169 = 144 + a^2$

$25 = a^2$

$5 = a$

$\sin\theta = \frac{12}{13}$ $\csc\theta = \frac{13}{12}$

$\cos\theta = \frac{5}{13}$ $\sec\theta = \frac{13}{5}$

$\tan\theta = \frac{12}{5}$ $\cot\theta = \frac{5}{12}$