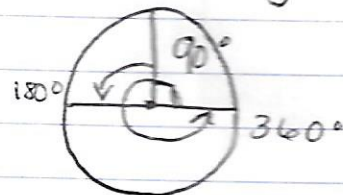


4.3 Right Triangle Trigonometry

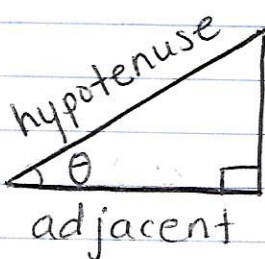
Angles

$1^\circ = \frac{1}{360}$ of a Circle

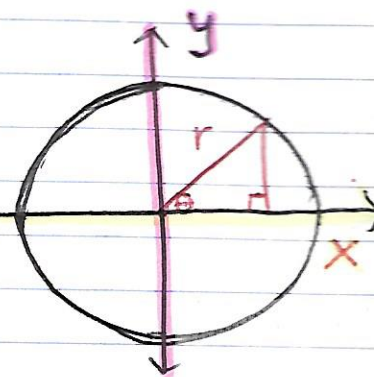


Circle = 360°
 half Circle = 180°
 right angle = 90°

Right Triangles :



opposite



Trig Functions

Sine (SOH)	Cosine (CAH)	Tangent (TOA)
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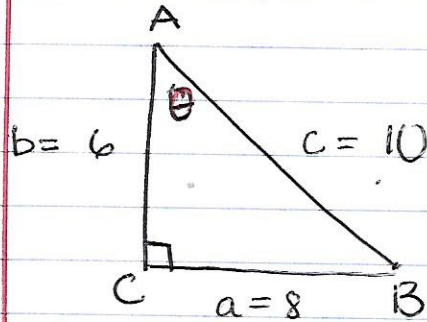
O-opposite
 a-adjacent
 h-hypotenuse

Inverses :

csc	sec	cot
$\frac{1}{\sin}$	$\frac{1}{\cos}$	$\frac{1}{\tan}$

Soh cah toa

Ex. 1 Find all 6 Trig. ratios



(You need to have ALL sides of a triangle)

FIND HYP:

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

$$6^2 + 8^2 = c^2$$

$$100 = c^2$$

$$10 = c$$

$$\sin \theta = \frac{8}{10} = \frac{4}{5}$$

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

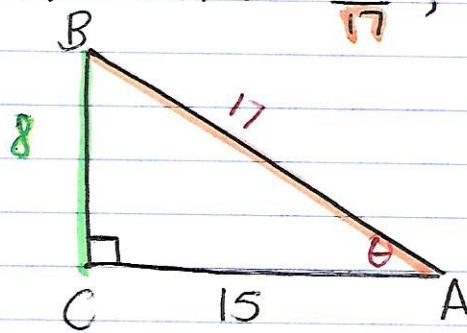
$$\cos \theta = \frac{6}{8} = \frac{3}{4}$$

$$\sec \theta = \frac{4}{3}$$

$$\tan \theta = \frac{8}{6} = \frac{4}{3}$$

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

Ex. 2 If $\sin \theta = \frac{8}{17}$, find the other 5 trig. func.



$$\sin \theta = \frac{8}{17} = \frac{o}{h}$$

$$8^2 + b^2 = 17^2$$

$$b^2 = 225$$

$$b = 15$$

$$\sin \theta = \frac{8}{17}$$

$$\csc \theta = \frac{17}{8}$$

$$\cos \theta = \frac{15}{17}$$

$$\sec \theta = \frac{17}{15}$$

$$\tan \theta = \frac{8}{15}$$

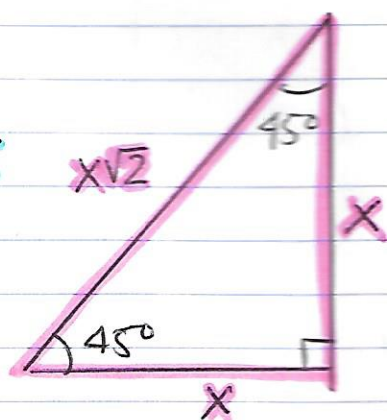
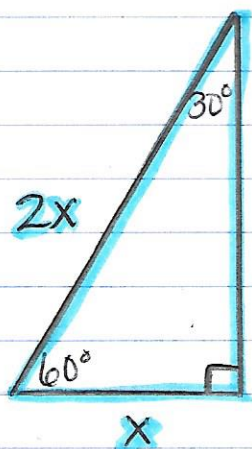
$$\cot \theta = \frac{15}{8}$$

Soh-cah-toa

30°-60°-90°

45°-45°-90°

Special
Right
Triangles



$$\sin 30^\circ = \frac{x}{2x} = \frac{1}{2}$$

$$\csc 30^\circ = \frac{2x}{x} = 2$$

$$\cos 30^\circ = \frac{x\sqrt{3}}{2x} = \frac{\sqrt{3}}{2}$$

$$\sec 30^\circ = \frac{2x}{x\sqrt{3}} = \frac{2}{\sqrt{3}}$$

$$\tan 30^\circ = \frac{x}{x\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\cot 30^\circ = \frac{x\sqrt{3}}{x} = \sqrt{3}$$

$$\sin 60^\circ = \frac{x\sqrt{3}}{2x} = \frac{\sqrt{3}}{2}$$

$$\csc 60^\circ = \frac{2x}{x\sqrt{3}} = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$\cos 60^\circ = \frac{x}{2x} = \frac{1}{2}$$

$$\sec 60^\circ = \frac{2x}{x} = 2$$

$$\tan 60^\circ = \frac{x\sqrt{3}}{x} = \sqrt{3}$$

$$\cot 60^\circ = \frac{x}{x\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\sin 45^\circ = \frac{x}{x\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\csc 45^\circ = \frac{x\sqrt{2}}{x} = \sqrt{2}$$

$$\cos 45^\circ = \frac{x}{x\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\sec 45^\circ = \frac{x}{2x} = \frac{1}{2}$$

$$\tan 45^\circ = \frac{x}{x} = 1$$

$$\cot 45^\circ = \frac{x\sqrt{3}}{x} = \sqrt{3}$$