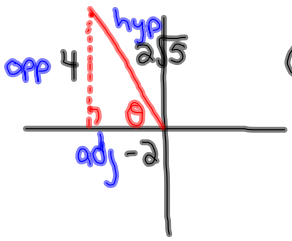
Another example to reinforce angles in all four quadrants

Example:

If the point (−2,4) lies on the terminal arm of an angle θ, determine the six trigonometric ratios of θ as radicals in simplest form.



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

$(-2)^2+(4)^2=c^2$

$20=c^2$

$\pm\sqrt{20}=c$

$2\sqrt{5}=c$

$\sin\theta=\frac{4}{2\sqrt{5}}=\frac{2}{\sqrt{5}}=\frac{2\sqrt{5}}{5}$

$\cos\theta=\frac{-2}{2\sqrt{5}}=\frac{-1}{\sqrt{5}}=-\frac{\sqrt{5}}{5}$

$\tan\theta=\frac{4}{-2}=-2$

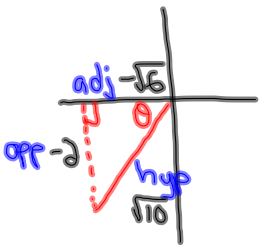
$\csc\theta=\frac{2\sqrt{5}}{4}=\frac{\sqrt{5}}{2}$

$\sec\theta=\frac{2\sqrt{5}}{-2}=-\sqrt{5}$

$\cot\theta=\frac{-2}{4}=\frac{-1}{2}$

Example:

If $\csc\theta=-\frac{\sqrt{10}}{2}$ and $\tan\theta>0$ determine the value of the remaining FIVE trigonometric ratios of angle θ.



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

$a^2+(-2)^2=(\sqrt{10})^2$

$a^2+4=10$

$a^2=6$

$a=\pm\sqrt{6}$

$\sin\theta=\frac{-2}{\sqrt{10}}$

$\cos\theta=\frac{-\sqrt{6}}{\sqrt{10}}$

$\tan\theta=\frac{-2}{-\sqrt{6}}=\frac{2}{\sqrt{6}}$

$\csc\theta=\frac{\sqrt{10}}{-2}$

$\sec\theta=\frac{\sqrt{10}}{-\sqrt{6}}$

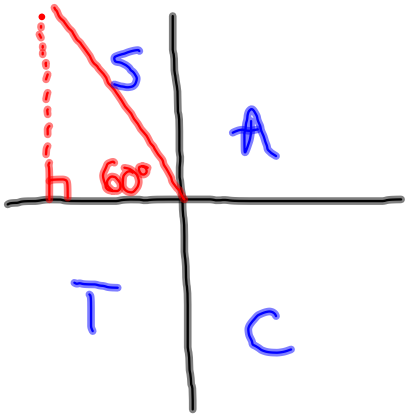
$\cot\theta=\frac{-\sqrt{6}}{-2}=\frac{\sqrt{6}}{2}$

In Simplest form

* $\cos\theta=-\frac{\sqrt{6}}{\sqrt{10}}\cdot\frac{\sqrt{10}}{\sqrt{10}}=\frac{-\sqrt{60}}{10}=\frac{-2\sqrt{15}}{10}=\boxed{\frac{-\sqrt{15}}{5}}$

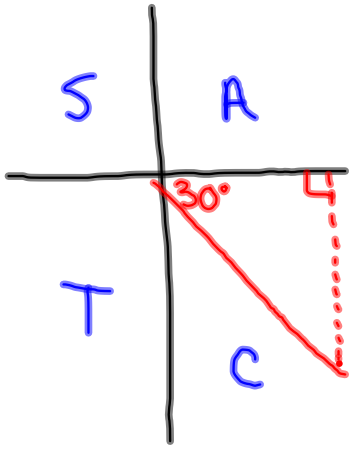
Questions from homework

② a) $\cos 120° = -\frac{1}{2}$



e) $\tan(-30°) = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

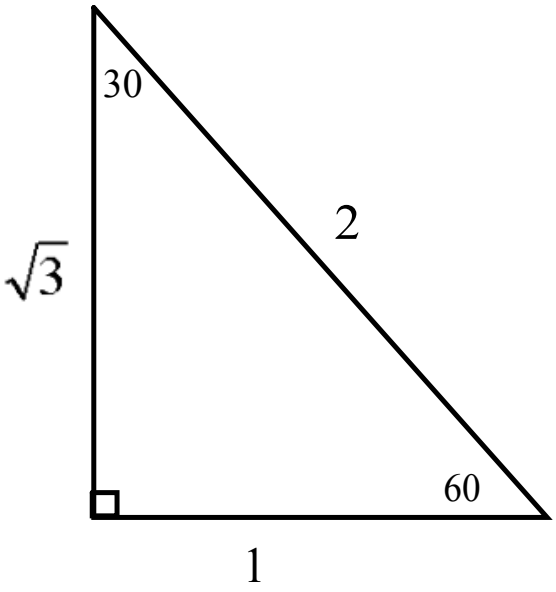
$330°$



Special Angles

I. 30° *and* 60°

MEMORIZE THESE DIAGRAMS!!!

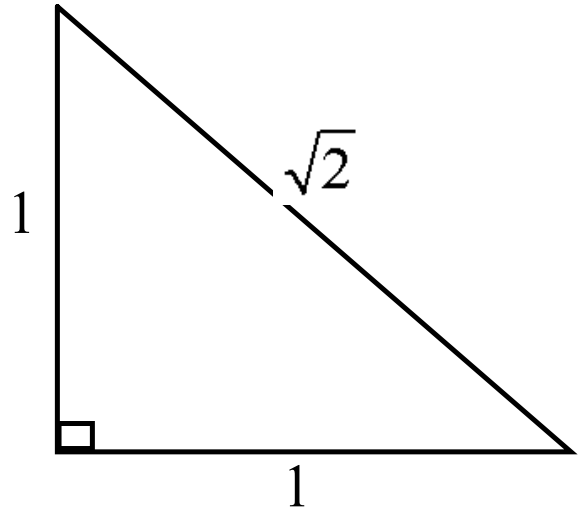


	30	60
Sin		
Cos		
Tan		

Special Angles

II. 45°

MEMORIZE THESE DIAGRAMS!!!

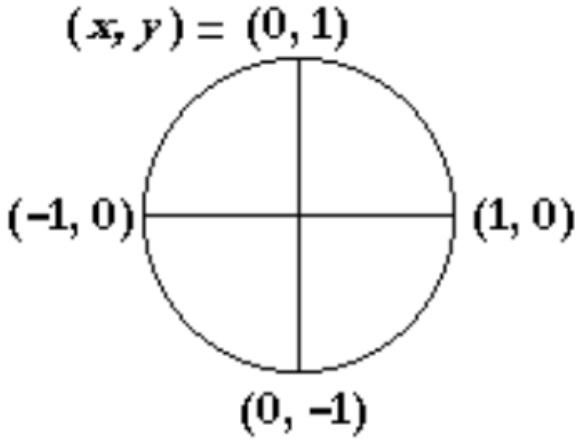


	45
Sin	
Cos	
Tan	

MEMORIZE THESE DIAGRAMS!!!

III. Quadrantal Angles (Multiples of 90^o)

Unit Circle

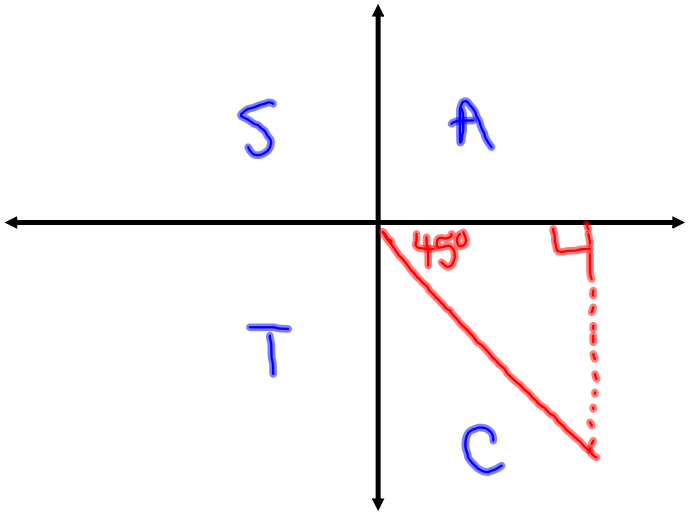


	0^0	90^0	180^0	270^0	360^0
sin	0	1	0	-1	0
cos	1	0	-1	0	1
tan	0	undefined	0	undefined	0

Extend the special angles into all FOUR quadrants

Without a calculator determine the value of $\tan 315° = \frac{-1}{1} = -1$

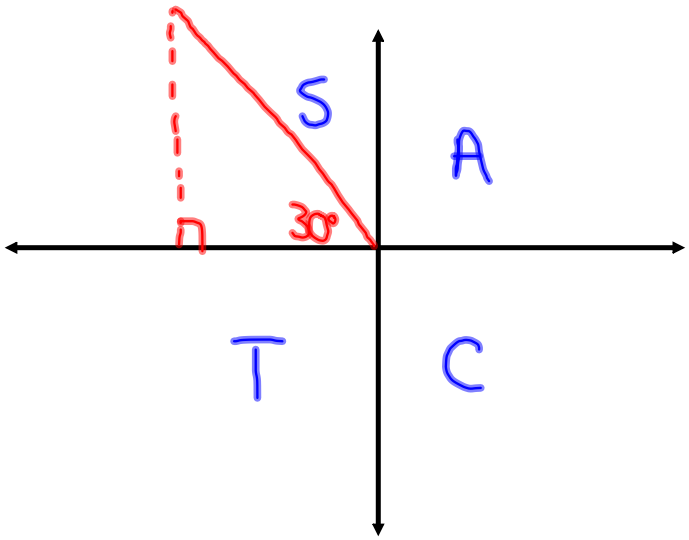
1. Start by sketching the angle



Extend the special angles into all FOUR quadrants

Without a calculator determine the value of sin150 $= +\frac{1}{2}$

1. Start by sketching the angle

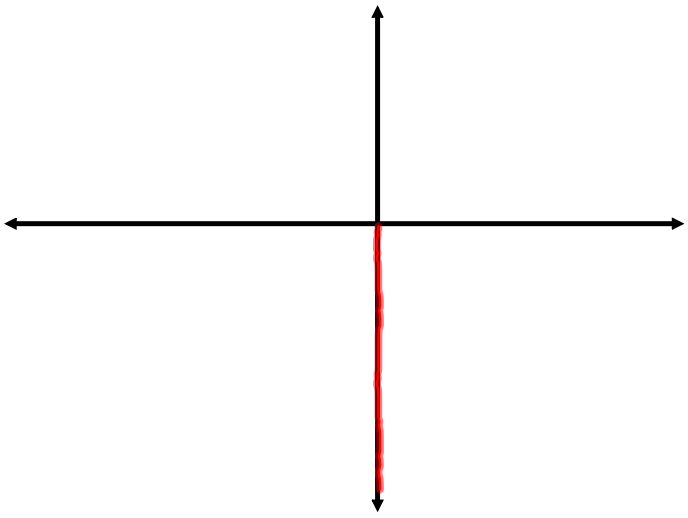


Extend the special angles into all FOUR quadrants

Without a calculator determine the value of csc630 $= \frac{1}{-1} = -1$

630°

1. Start by sketching the angle



Homework

Quiz:

① Principal Angles

② Coterminal Angles

③ Solving Trig Expressions (ie. $\tan 315^\circ$)