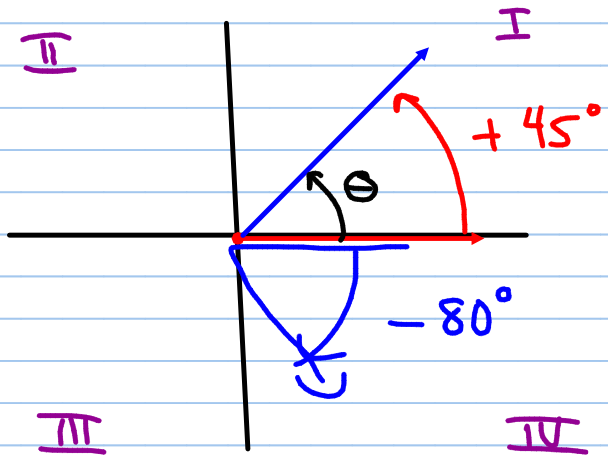
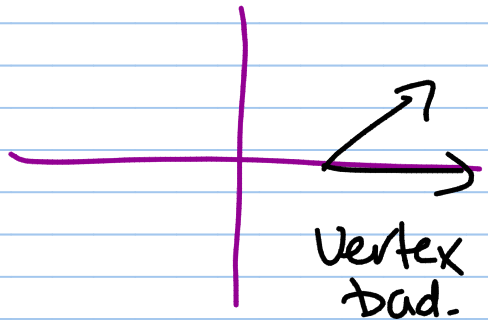
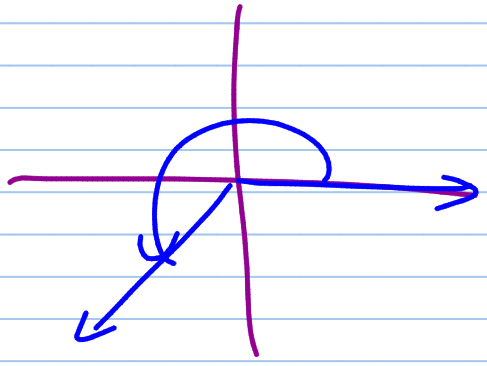
① Angles in Standard Position

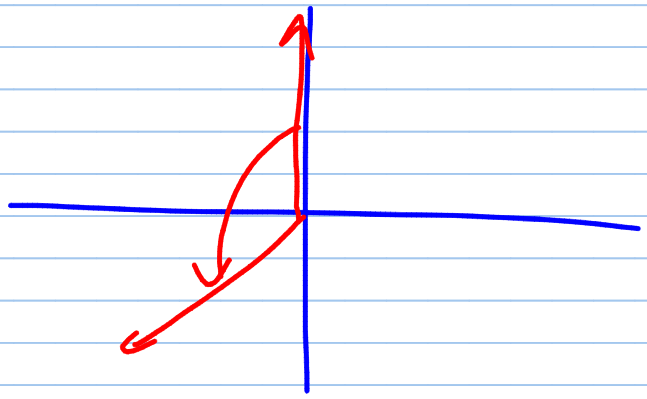
- Initial arm or ray is always the positive x-axis
- VERTEX is always at the origin or (0,0)
- the Terminal arm or ray can be anywhere
- The ANGLE is the distance between the initial arm (x-axis) & the terminal arm



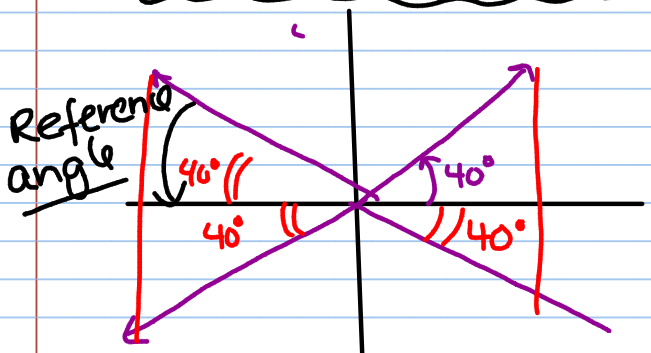
Examples Angle in S.P. → y or N



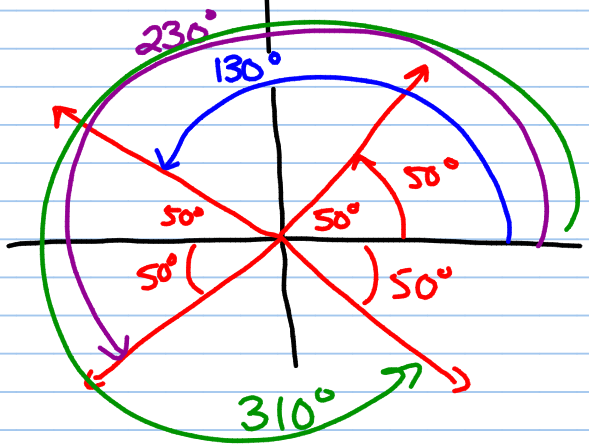




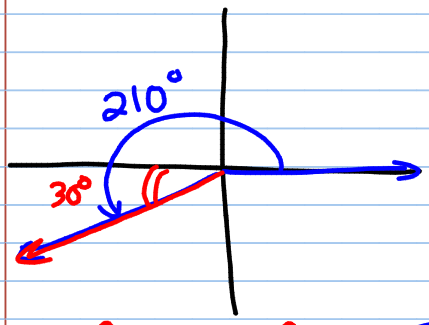
② Reference Angles (Bowtie Angles)



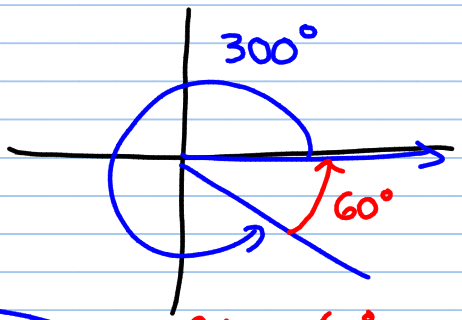
- The Reference Angle is the angle between the terminal arm and the closest x-axis.



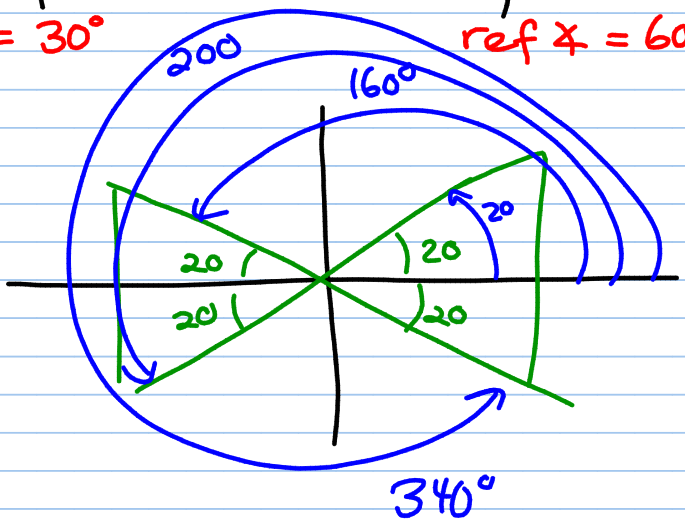
$\sin 50 = .766$
$\sin 130 = .766$
$\sin 230 = -.766$
$\sin 310° = -.766$



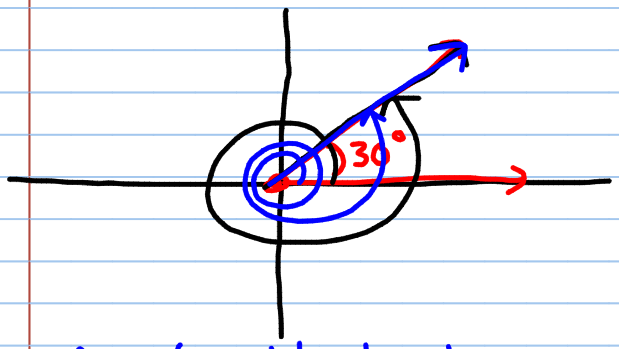
ref ∠ = 30°



ref ∠ = 60°



③ Coterminal ∠'s



390° (360+30)

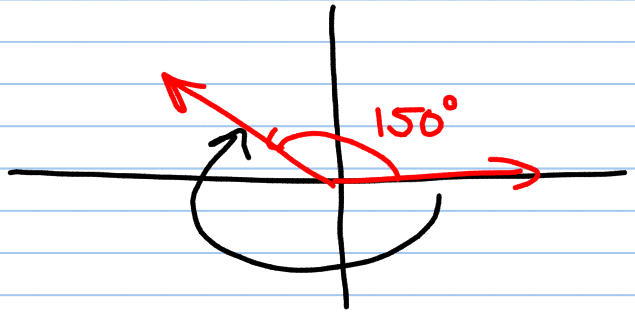
750° (360+360+30)

sin 30 = .5

sin 390 = .5

sin 750 = .5

Angles that share the same terminal arm but are "full circles" apart are called COTERMINAL



Next coterminal ∠:

150 + 360 = 510°

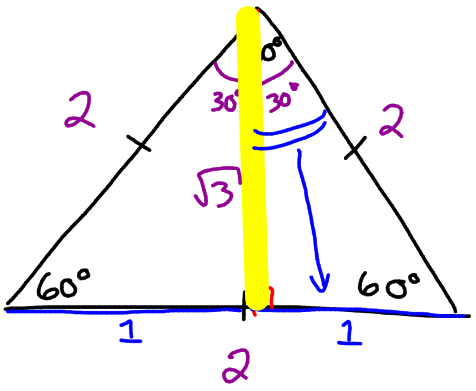
OR -210°

④ Special Δ's ← are used to get EXACT values for trig ratios

→ Mathematicians like to be PERFECT! We like EXACT answers.

Math	Science
$\frac{1}{3}$	.33
$\sqrt{2}$	1.41
π	3.14

① Equilateral Δ



$x^2 + 1^2 = 2^2$

$x^2 + 1 = 4$

$x^2 = 3$

$x = \sqrt{3}$

Exact value:

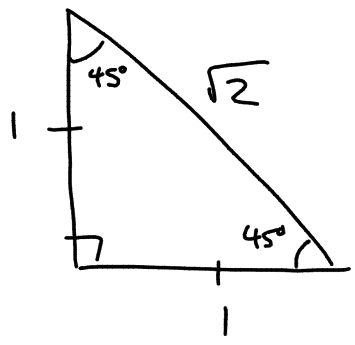
$\sin 60° = \frac{\sqrt{3}}{2}$

$\sin 10 = \cos 80$

$\sin 22 = \cos 68$

$\sin 30$	$\frac{1/2}{\sqrt{3}/2}$	$\sin 60 = \frac{\sqrt{3}}{2}$	
$\cos 30$		$\cos 60 = \frac{1/2}{}$	
$\tan 30$	$\frac{1/\sqrt{3}}{}$	$\tan 60 = \frac{\sqrt{3}/1}{}$ or $\sqrt{3}$	

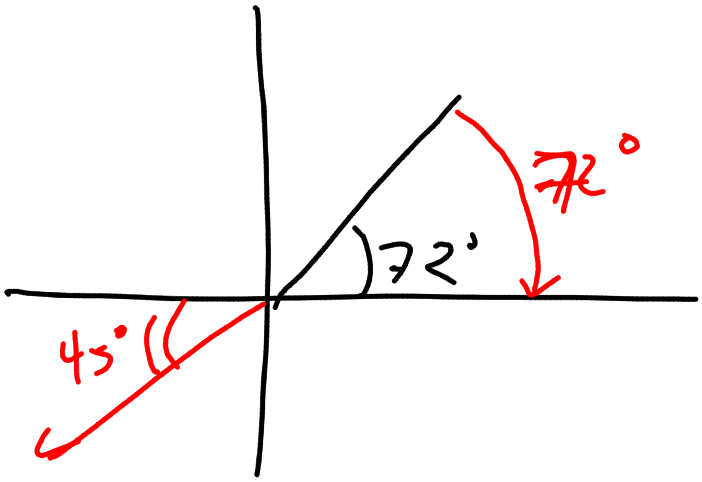
②



$\sin 45 = \frac{1/\sqrt{2}}{}$

$\cos 45 = \frac{1/\sqrt{2}}{}$

$\tan 45 = \frac{1}{}$


72°
72°
45°