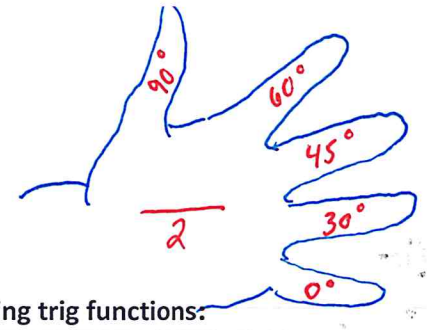
Exact Value sign

sin +	sin +
cos −	cos +
tan −	tan +
sin −	sin −
cos −	cos +
tan +	tan −

$\sin = \frac{\sqrt{\text{Fingers below}}}{2}$

$\cos = \frac{\sqrt{\text{Fingers Above}}}{2}$

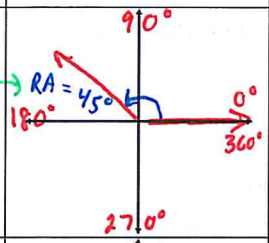
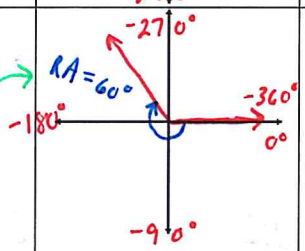
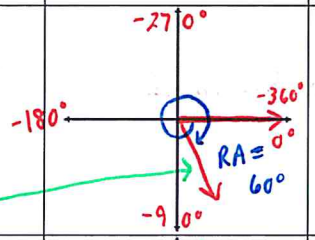
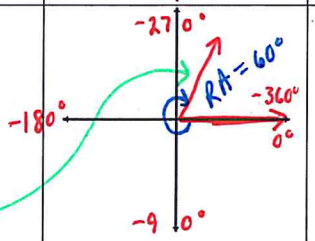
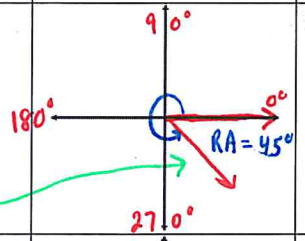
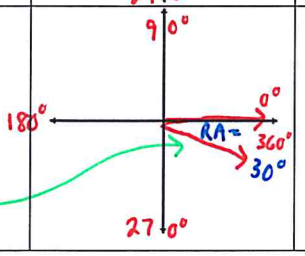
$\tan = \frac{\sqrt{\text{Below}}}{\sqrt{\text{Above}}}$

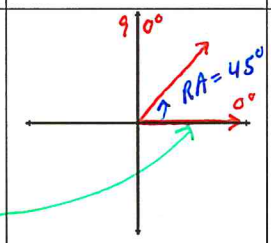
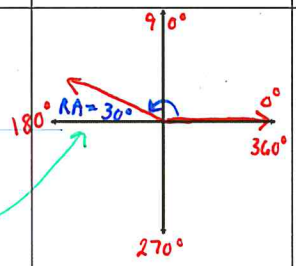
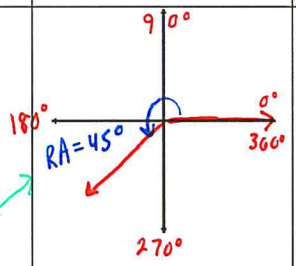
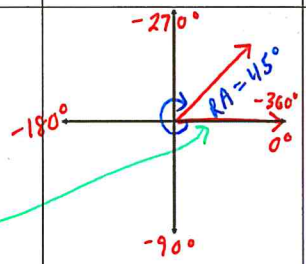
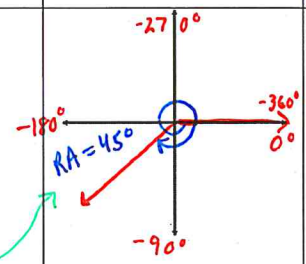
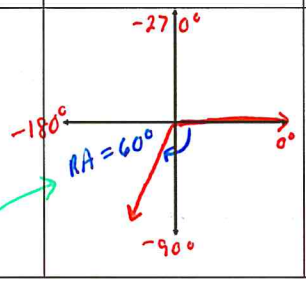


Trigonometry

Emphasis on the Hand Trick – Original 3 Functions

Using the hand trick discussed in class, give the exact value of each of the following trig functions:

Given Angle	Reference Angle	Quadrant Terminal Side is located in	Exact Value
1. sin 135° 180 −135		Quadrant II Only sin is positive in II	$\frac{\sqrt{2}}{2}$ so $\boxed{\frac{\sqrt{2}}{2}}$
2. cos −240° 240 −180		Quadrant II Only sin is positive in II	$\frac{\sqrt{1}}{2} = \frac{1}{2}$ so $\boxed{-\frac{1}{2}}$
3. tan −420° 420 −360		Quadrant IV Only cos is positive in IV	$\frac{\sqrt{3}}{\sqrt{1}} = \frac{\sqrt{3}}{1}$ so $\boxed{-\sqrt{3}}$
4. sin −300° 360 −300		Quadrant I All functions are positive in I	$\frac{\sqrt{3}}{2}$ so $\boxed{\frac{\sqrt{3}}{2}}$
5. cos 315° 360 −315		Quadrant IV Only cos is positive in IV	$\frac{\sqrt{2}}{2}$ so $\boxed{\frac{\sqrt{2}}{2}}$
6. tan 330° 360 −330		Quadrant IV Only cos is positive in IV	$\frac{\sqrt{1}}{\sqrt{3}} = \frac{1 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{\sqrt{3}}{3}$ so $\boxed{-\frac{\sqrt{3}}{3}}$

Given Angle	Reference Angle	Quadrant Terminal Side is located in	Exact Value
7. $\sin\frac{\pi}{4}$ $45 - 0$		Quadrant I All Functions are positive in I	$\frac{\sqrt{2}}{2}$ So $\boxed{\frac{\sqrt{2}}{2}}$
8. $\cos\frac{5\pi}{6}$ $180 - 150$		Quadrant II Only sin is positive in II	$\frac{\sqrt{3}}{2}$ So $\boxed{-\frac{\sqrt{3}}{2}}$
9. $\tan\frac{5\pi}{4}$ $225 - 180$		Quadrant III Only tan is positive in III	$\frac{\sqrt{2}}{\sqrt{2}} = 1$ So $\boxed{1}$
10. $\sin -\frac{7\pi}{4}$ $360 - 315$		Quadrant I All Functions are positive in I	$\frac{\sqrt{2}}{2}$ So $\boxed{\frac{\sqrt{2}}{2}}$
11. $\cos -\frac{11\pi}{4}$ -495 $+360$ -135 So $180 - 135$		Quadrant III Only tan is positive in III	$\frac{\sqrt{2}}{2}$ So $\boxed{-\frac{\sqrt{2}}{2}}$
12. $\tan -\frac{2\pi}{3}$ $180 - 120$		Quadrant III Only tan is positive in III	$\frac{\sqrt{3}}{\sqrt{1}} = \frac{\sqrt{3}}{1} = \sqrt{3}$ So $\boxed{\sqrt{3}}$

$\frac{\pi}{4} \cdot \frac{180}{\pi} = \frac{180}{4} = 45°$

$\frac{5\pi}{6} \cdot \frac{180}{\pi} = \frac{900\pi}{6\pi} = 150°$

$\frac{5\pi}{4} \cdot \frac{180}{\pi} = \frac{5(180)}{4} = 225°$

$-\frac{7\pi}{4} \cdot \frac{180}{\pi} = -\frac{1260\pi}{4\pi} = -315°$

$-\frac{11\pi}{4} \cdot \frac{180}{\pi} = -\frac{1980\pi}{4\pi} = -495°$

$-\frac{2\pi}{3} \cdot \frac{180}{\pi} = -\frac{360\pi}{3\pi} = -120°$