Name:_____   Date:_____

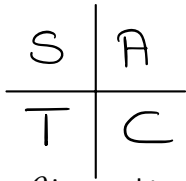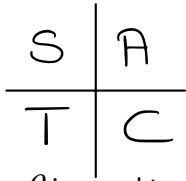## HW PC 11 Ch 2 HW Lesson 4 Solving for Angles in All Four Quadrants

1. If $\sin\theta$ is equal to a negative ratio, then which quadrants will the angle be? What if the ratio is positive, which quadrant is it in?

$$\frac{S \mid A}{T \mid C}$$

Quadrant 1 & 2 → positive
Quadrant 3 & 4 → negative

2. If $\cos\theta$ is equal to a negative ratio, then which quadrants will the angle be? What if the ratio is positive, which quadrant is it in?

$$\frac{S \mid A}{T \mid C}$$
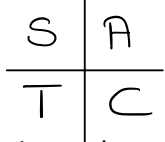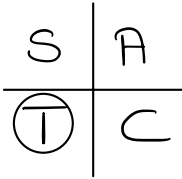
Quadrant 1 & 4 → positive
Quadrant 2 & 3 → negative

3. If $\tan\theta$ is equal to a negative ratio, then which quadrants will the angle be? What if the ratio is positive, which quadrant is it in?
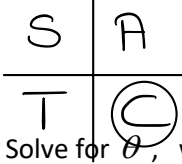
$$\frac{S \mid A}{T \mid C}$$

Quadrant 1 & 3 → positive
Quadrant 2 & 4 → negative

4. If θ is in quadrant 3, then which trig ratio will be negative? $\sin\theta$ $\cos\theta$ or $\tan\theta$?

$$\frac{S \mid A}{\boxed{T} \mid C}$$

~ sinθ and cosθ → negative

5. If θ is in quadrant 4, then which trig ratio will be negative? $\sin\theta$ $\cos\theta$ or $\tan\theta$?

$$\frac{S \mid A}{T \mid \boxed{C}}$$
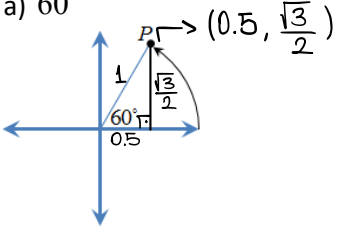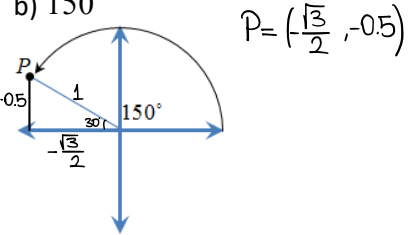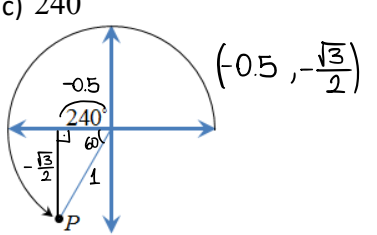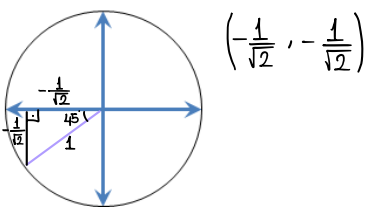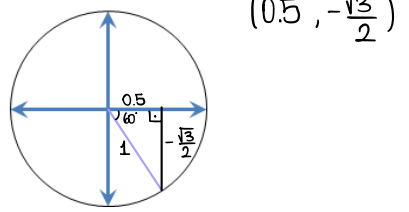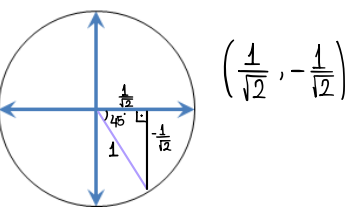
~ sinθ and tanθ → negative

6. Solve for θ, with $0 \le \theta \le 360°$. [REMEMBER: There are TWO answers!]
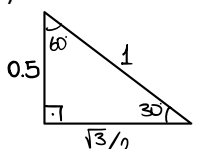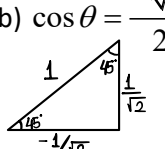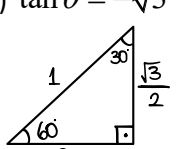
a) $\sin\theta = 0.8$ Q1 and Q2 $\sin^{-1}.(0.8) = 53.130°$ $\theta = 53.130°, 126.870°$	b) $\cos\theta = 0.85$ Q1 and Q4 $\cos^{-1}.(0.85) = 31.788°$ $\theta = 31.788°, 328.212°$	c) $\tan\theta = 0.3$ Q1 and Q3 $\tan^{-1}.(0.3) = 16.699°$ $\theta = 16.699°, 196.699°$
a) $\sin\theta = -0.9$ Q3 and Q4 $\sin^{-1}.(-0.9) = -64.158°$ $-64.158° = 295.842°$ $\theta = 244.158°, 295.842°$	b) $\cos\theta = 0.125$ Q1 and Q4 $\cos^{-1}.(0.125) = 82.819°$ $\theta = 82.819°, 277.181°$	c) $\tan\theta = 0.25$ Q1 and Q3 $\tan^{-1}.(0.25) = 14.036°$ $\theta = 14.036°, 194.036°$
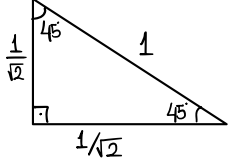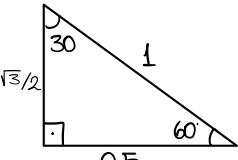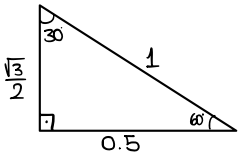
g) $3\sin\theta+5=4$ Q3 and Q4	h) $\tan^2\theta-5=0$ Q1 and Q3	i) $9\cos^2\theta-3=1$ Q1 and Q4
$\sin\theta=-\frac{1}{3}=-19.450$ Reference angle: 19.450 $\theta=199.450°, 340.550°$	$\sqrt{\tan^2\theta}=\sqrt{5}$ $=\tan\theta=\sqrt{5}$ $\theta=65.904°$ $\theta=65.904°, 245.904°$	$\sqrt{\cos^2\theta}=\sqrt{\frac{4}{9}}$ $=\cos\theta=\frac{2}{3}$ $\theta=48.189°$ $\theta=48.189°, 311.811°$
j) $(\cos\theta+1)(3\sin\theta-2)=0$	k) $3\sin\theta=4\cos\theta$	L) $\sin\theta=\cos\theta$
$\cos\theta=-1$ $\sin\theta=\frac{2}{3}$ $\theta=180$ $\theta=41.810°, 138.190°$	$\frac{3\sin\theta}{\cos\theta}=\frac{4\cos\theta}{\cos\theta}$ $=3\tan\theta=4$ $\theta=53.130°$ $\theta=53.130°, 233.130°$	$\frac{\sin\theta}{\cos\theta}=\frac{\cos\theta}{\cos\theta}$ $=\tan\theta=1$ $\theta=45°$ $\theta=45°, 225°$

7. A point ``P`` created by the endpoint of a terminal arm is on the circumference of an unit circle of radius 1. Given the angle in standard position, find the coordinates of point `P`.

a) 60°	b) 150°	c) 240°
$P\rightarrow (0.5, \frac{\sqrt{3}}{2})$ 	$P=(-\frac{\sqrt{3}}{2}, -0.5)$ 	$(-0.5, -\frac{\sqrt{3}}{2})$
d) 225°	e) 300°	f) 315°
$(-\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}})$ 	$(0.5, -\frac{\sqrt{3}}{2})$ 	$(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}})$

8. Given each trig ratio, find the specified trig ratio without using a calculator:

a) $\sin\theta=0.5$	b) $\cos\theta=\frac{-\sqrt{2}}{2}=\frac{-1}{\sqrt{2}}$	c) $\tan\theta=-\sqrt{3}$
  $\cos\theta=\pm\frac{\sqrt{3}}{2}$ $\tan\theta=\pm\frac{1}{\sqrt{3}}$	 $\sin\theta=\pm\frac{1}{\sqrt{2}}$ $\tan\theta=\pm1$	 $\cos\theta=\pm\frac{1}{2}$ $\sin\theta=\pm\frac{\sqrt{3}}{2}$

d) $\sin \theta = \dfrac{1}{\sqrt{2}}$	e) $\cos \theta = \dfrac{-\sqrt{3}}{2}$	f) $\tan \theta = \dfrac{1}{\sqrt{3}}$
$\cos \theta = \pm \dfrac{1}{\sqrt{2}}$ $\tan \theta = \pm 1$	$\sin \theta = \pm \dfrac{1}{2}$ $\tan \theta = \pm \dfrac{1}{\sqrt{3}}$	$\cos \theta = \pm \dfrac{1}{2}$ $\sin \theta = \pm \dfrac{\sqrt{3}}{2}$

9. If the point P(3,-5) is on the terminal arm of an angle in standard position. What is the value of $\sin \theta \times \cos \theta$? Note: This point is not on the circumference of an unit circle.

$$\sin \theta = \frac{-5}{\sqrt{34}}$$

$$\cos \theta = \frac{3}{\sqrt{34}}$$

$$\frac{-5}{\sqrt{34}} \times \frac{3}{\sqrt{34}} = \frac{-15}{34}$$
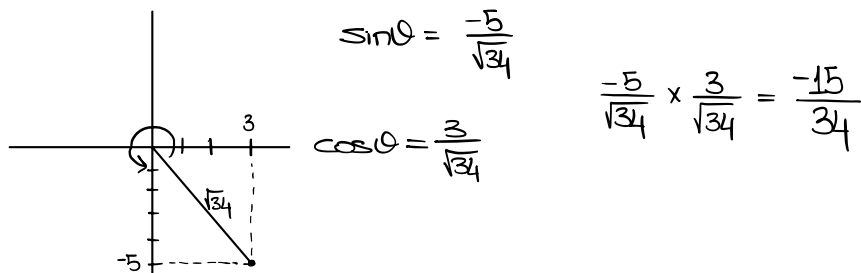
10. What is the value of $\sin \theta \times \tan \theta$ if point P(1.957, -0.412) is on the terminal arm of a circle with a radius of 2 units long?

$$\frac{1.957}{2} = 0.9785 \rightarrow x\text{-coor} \rightarrow \cos \theta$$

$$\frac{-0.412}{2} = -0.206 \rightarrow y\text{-coor} \rightarrow \sin \theta$$

$$\sin \theta \times \tan \theta = -0.206 \cdot \frac{-0.206}{0.9785} = 0.04336$$
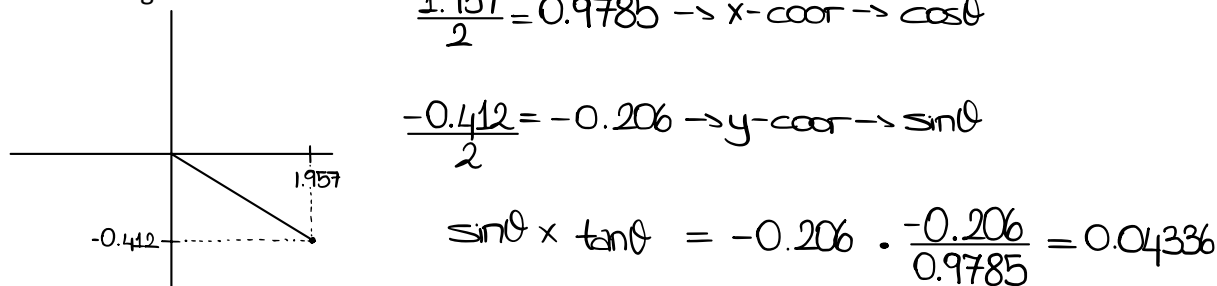
11. If $\cos \theta = \dfrac{2a}{3}$, then what is the value of $\tan \theta$ in terms "a"?

$$\tan \theta = \frac{2a}{\sqrt{9-4a^2}}$$