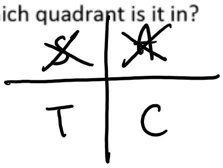
Name:_____________________________ Date:___________________________

HW PC 11 Ch 2.2 Trig Ratios of Sine Cosine and Tangent Functions

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?



Q3, Q4 } Q1, Q2
−ve } +ve

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?

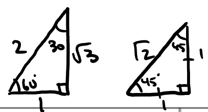
3. If $\tan\theta$ is equal to a negative ratio, then which quadrants will the angle be? What if the ratio is positive, which quadrant is it in?

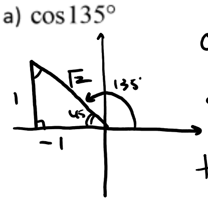
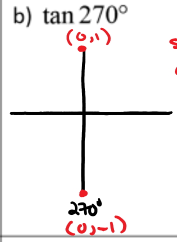
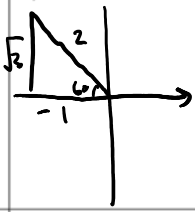
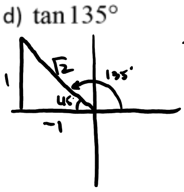
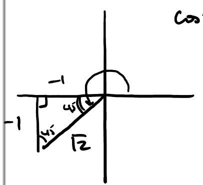
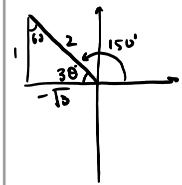
4. If θ is in quadrant 3, then which trig ratio will be negative? $\sin\theta$ $\cos\theta$ or $\tan\theta$?

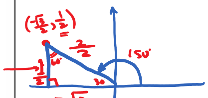
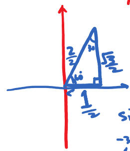
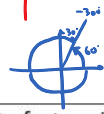
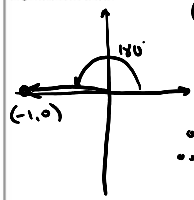
5. If θ is in quadrant 4, then which trig ratio will be negative? $\sin\theta$ $\cos\theta$ or $\tan\theta$?

~~6.~~

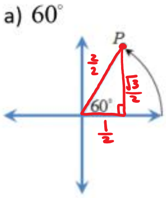
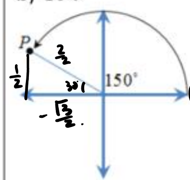
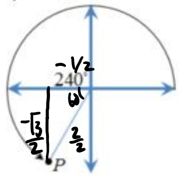
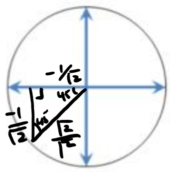
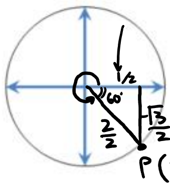
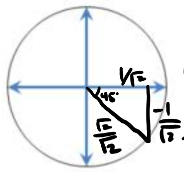
7. Determine each trig ratio without using a calculator.



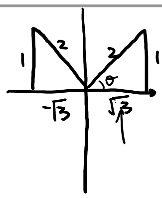
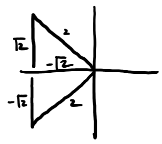
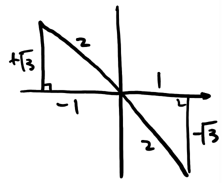
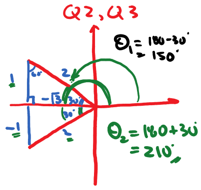
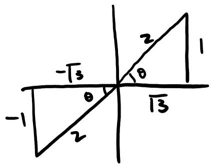
a) $\cos 135°$  $\cos 135° = \frac{-1}{\sqrt{2}}$ $\sin 135° = \frac{1}{\sqrt{2}}$ $\tan 135° = -1$	b) $\tan 270°$  $\sin 270° = -1$ $\cos 270° = 0$ $\boxed{\tan\theta = \frac{\sin\theta}{\cos\theta}}$ $\tan 270° = \frac{-1}{0}$ UNDEFINED	c) $\sin 120°$  $\sin 120° = \frac{\sqrt{3}}{2}$
d) $\tan 135°$  $\tan 135° = \frac{opp}{adj}$ $= -1$	e) $\cos 225°$  $\cos 225° = \frac{-1}{\sqrt{2}}$	f) $\sin 150°$  $\sin 150° = \frac{opp}{Hyp}$ $= \frac{1}{2}$

g) $\tan 150°$  $\sin 150° = \frac{1}{2}$ $\cos 150° = -\frac{\sqrt{3}}{2}$ $\tan 150° = \frac{1}{2} \div \frac{-\sqrt{3}}{2}$ $= -\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-\sqrt{3}}{3}$	h) $\sin(-300°)$ $x^2+y^2=r^2$  $\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $r\sin\theta = y$ $r\cos\theta = x$ $\sin(-300°) = \sin 60° = \frac{\sqrt{3}}{2}$ 	i) $\cos 180°$  @ $\cos 180°$, the x-coord is -1. $\therefore \cos 180° = -1$

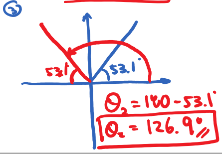
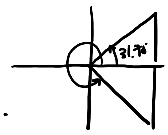
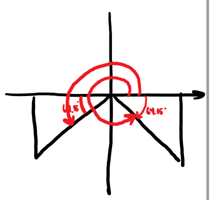
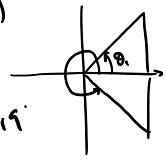
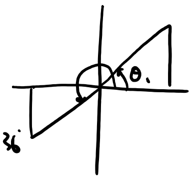
8. A point ``P`` created by the endpoint of a terminal arm is on the circumference of an unit circle of $\boxed{\text{radius 1.}}$ Given the angle in standard position, find the coordinates of point `P`.

a) $60°$  ① special triangle x coord : $\frac{1}{2}$ y coord : $\frac{\sqrt{3}}{2}$ $P\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$	b) $150°$ ① $P\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ or  ② x-coord = $\cos 150°$ $= -\frac{\sqrt{3}}{2}$ y coord = $\sin 150°$ $= \frac{1}{2}$.	c) $240°$ ① $P\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ or  $P(\cos 240°, \sin 240°)$ $P\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$
d) $225°$ ① $P\left(-\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ or  ② $P(\cos 225°, \sin 225°)$ $P\left(-\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$	e) $300°$ ② $P(\cos 300°, \sin 300°)$ EXACT VALUE  $P\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$	f) $315°$ ① $P\left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ or  ② $P(\cos 315°, \sin 315°)$ $P\left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

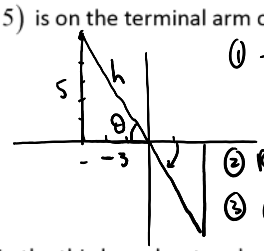
9. Given each trig ratio, find the specified trig ratio without using a calculator:

a) $\sin\theta = 0.5$ $= \frac{1}{2}$  $\cos\theta = \frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}$ $\tan\theta = \frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}$	b) $\cos\theta = \frac{-\sqrt{2}}{2}$  $\sin\theta = \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}$ $\tan\theta = -1, 1$	c) $\tan\theta = -\frac{\sqrt{3}}{1}$ ① Q 2, 4  $\cos\theta = \pm\frac{1}{2}$ $\sin\theta = \pm\frac{\sqrt{3}}{2}$
d) $\sin\theta = \frac{1}{\sqrt{2}}$ $\cos\theta =$ $\tan\theta =$	e) $\cos\theta = \frac{-\sqrt{3}}{2}$ ① Quadrants Q2, Q3 $\theta_1 = 180-30 = 150°$  $\theta_2 = 180+30 = 210°$ Q2 Q3 $\sin\theta = \frac{1}{2}, \frac{-1}{2}$ $\tan\theta = \frac{1}{-\sqrt{3}}, \frac{-1}{-\sqrt{3}} = \frac{1}{\sqrt{3}}$.	f) $\tan\theta = \frac{1}{\sqrt{3}}$  $\cos\theta = \pm\frac{\sqrt{3}}{2}$ $\sin\theta = \pm\frac{1}{2}$

10. Solve for θ , with $0 \le \theta \le 360°$.

a) $\sin\theta = 0.8$ ① Quadrant? ② $\sin\theta = 0.8$ $\sin^{-1}(\sin\theta) = \sin^{-1}(0.8)$ $\theta = \sin^{-1}(0.8)$ $\boxed{\theta_1 = 53.1°}$ S A Q1, Q2 ③  $\theta_2 = 180 - 53.1°$ $\boxed{\theta_2 = 126.9°}$ Check $\sin 53.1° = 0.799 \approx 0.8$ $\sin 126.9° = 0.799 \approx 0.8$	b) $\cos\theta = 0.85$ ① Quadr. 1, 4. $\theta = \cos^{-1}(0.85)$ $\theta_1 = 31.788°$ $\theta_2 = 360 - 31.788°$ $= 328.21°$ 	c) $\tan\theta = 0.3$
a) $\sin\theta = -0.9$ Q3, Q4 $\sin\theta = -0.9$ $\theta = \sin^{-1}(-0.9)$ $\theta = -64.15°$  $\theta_1 = 360 - 64.15°$ $= 295.85°$ $\theta_2 = 180 + 64.15°$ $= 244.15°$ $\sin 295.85° = -0.9$ $\sin 244.15° = -0.9$	b) $\cos\theta = 0.125$ ① Q1, Q4 $\theta_1 = \cos^{-1}(0.125)$ $\theta_1 = 82.819°$  $\theta_2 = 360° - 82.819°$ $= 277.18°$	c) $\tan\theta = 0.25$ ① Q1, Q3 $\theta_1 = \tan^{-1}(0.25)$ $\theta_1 = 14.036$  $\theta_2 = 180 + 14.036°$ $= 194.036°$

11. The point $(-3, 5)$ is on the terminal arm of angle θ in standard position. Find the angle ~~in radians~~ to one decimal place.



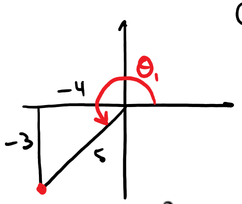
① $\tan\theta = \frac{5}{-3}$

$\theta = -59.036°$

② Ref Angle $= 59.036$

③ $\theta_1 = 180° - 59.036 = 120.96°$

12. The angle θ is in the third quadrant and $\cos\theta = -\frac{4}{5}$. Draw a diagram to show the angle in standard position and then find the coordinates for "P"



① $\cos\theta = \frac{-4}{5} \begin{matrix} \leftarrow \text{Adj} \\ \leftarrow \text{Hyp} \end{matrix}$

② Coord for "P"

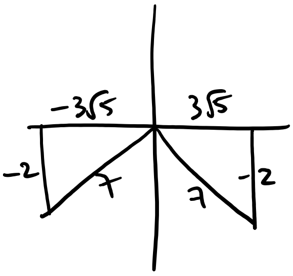
$P(-4, -3)$ or

③ If it's an unit circle, then $P\left(-\frac{4}{5}, -\frac{3}{5}\right)$

13. If $\tan\theta = -\frac{2}{\sqrt{7}}$, angle θ is in standard position, and its terminal arm is in quadrant II. What is the exact value of $\cos\theta$?

①

14. If $\sin\theta = -\frac{2}{7}$, draw a diagram to show the angle(s) in standard position and the possible coordinates for point "P". Then determine the value(s) of $\cos\theta$ and $\tan\theta$



$x^2+(-2)^2=7^2$

$x^2+4=49$

$x^2=45$

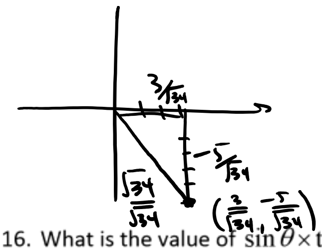
$x=\sqrt{45}$

$x=\pm3\sqrt{5}$

$\cos\theta = \frac{3\sqrt{5}}{7}, \frac{-3\sqrt{5}}{7}$

$\tan\theta = \frac{2}{3\sqrt{5}}, \frac{-2}{3\sqrt{5}}$

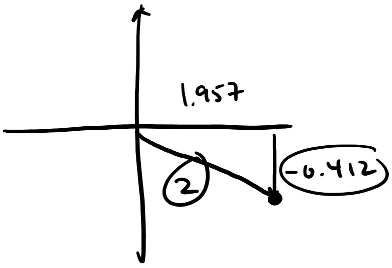
15. Point P(3,-5) is on the terminal arm of an angle in standard position. What is the value of $\sin\theta\times\cos\theta$?



$\sin\theta \times \cos\theta$

$\frac{-5}{\sqrt{34}} \times \frac{3}{\sqrt{34}} = \frac{-15}{34}$ //

16. 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?

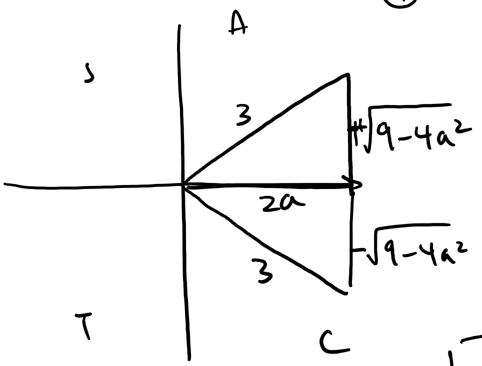


$\sin\theta = \left(\frac{-0.412}{2}\right)$

$\tan\theta = \left(\frac{-0.412}{1.957}\right) = \frac{\left(\frac{-0.412}{2}\right)}{\left(\frac{1.957}{2}\right)}$

17. If $\cos\theta = \frac{2a}{3}$, then what is the value of $\tan\theta$ in terms "a"?

①



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

$(2a)^2+h^2=3^2$

$4a^2+h^2=9$

$h^2=9-4a^2$

$h=\sqrt{9-4a^2}$

$(2a)(2a)$

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