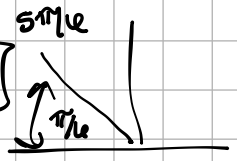
Review for Unit 2 (with extra help)

I made this review with your test in mind. You shouldn't need a calculator for this review, to help you feel prepared.

1. Find the reference angles for each angle

a) $t=\frac{5\pi}{6}$ in QII

$\frac{6\pi}{6}-\frac{5\pi}{6}=\frac{\pi}{6}$



b) $t=\frac{7\pi}{4}$

$\frac{8\pi}{4}-\frac{7\pi}{4}=\frac{\pi}{4}$

c) $t=\frac{3\pi}{4}$

$\frac{4\pi}{4}-\frac{3\pi}{4}\neq\frac{\pi}{4}$

d) $\frac{11\pi}{6}$

$\frac{12\pi}{6}-\frac{11\pi}{6}\neq\frac{\pi}{6}$

2. Find two positive and two negative coterminal angles for each value below

a) $t=\frac{\pi}{3}$ positive: $\frac{7\pi}{3}, \frac{13\pi}{3}$; negative: $-\frac{5\pi}{3}, -\frac{11\pi}{3}$

$\frac{6\pi}{3}+\frac{\pi}{3}=\frac{7\pi}{3}$ $\quad -\frac{6\pi}{3}+\frac{\pi}{3}=-\frac{5\pi}{3}$

$\frac{6\pi}{3}+\frac{7\pi}{3}=\frac{13\pi}{3}$ $\quad -\frac{6\pi}{3}+\left(-\frac{5\pi}{3}\right)=-\frac{11\pi}{3}$

b) $t=\frac{2\pi}{7}$ $\quad \frac{16\pi}{7}, \frac{30\pi}{7}, -\frac{12\pi}{7}, -\frac{26\pi}{7}$

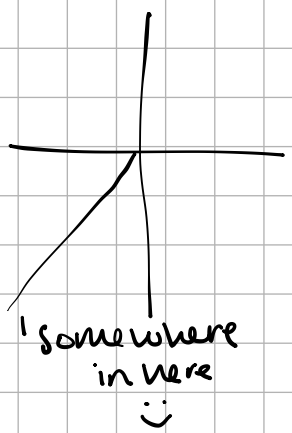
$\frac{14\pi}{7}+\frac{2\pi}{7}=\frac{16\pi}{7}+\frac{14\pi}{7}=\frac{30\pi}{7}$

$\frac{-14\pi}{7}+\frac{2\pi}{7}=-\frac{12\pi}{7}-\frac{14\pi}{7}=-\frac{26\pi}{7}$

3. Find an angle with a measure between $0°$ and $360°$ that is coterminal with the angle of measure $1305°$ in standard position

$$\begin{array}{r} 12 \\ 0 \\ 1305 \\ 360 \\ \hline 945 \end{array} \qquad \begin{array}{r} 8 \\ 945 \\ 360 \\ \hline 585 \end{array} \qquad \begin{array}{r} 585 \\ 360 \\ \hline 225 \end{array}$$

$225°$



4. Define all 6 trig functions in terms of opposite, adjacent and hypotenuse. Your angle should be θ

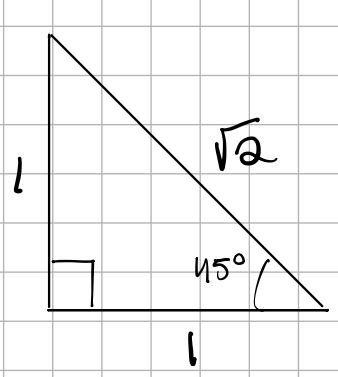
Ex: $\sin\theta = \frac{opp}{hyp}$ → Now, you only have 5 more :)

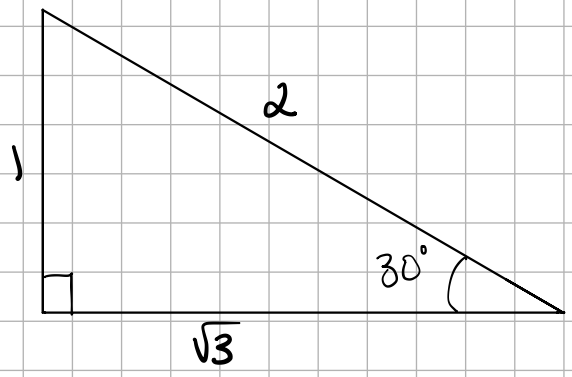
$\cos\theta = \frac{adj}{hyp}$ $\quad$ $\csc\theta = \frac{hyp}{opp}$

$\tan\theta = \frac{opp}{adj}$ $\quad$ $\sec\theta = \frac{hyp}{adj}$

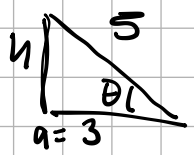
$\cot\theta = \frac{adj}{opp}$

5. Label each side of the special triangles with either $1, \sqrt{3}, \sqrt{2}$, or 2.





6. If $\sin\theta = \frac{4}{5}$, sketch a right triangle with acute angle θ, and find the other 5 trig ratios of θ.



$\cos\theta = \frac{3}{5}$ $\quad$ $\csc\theta = \frac{5}{4}$

$\tan\theta = \frac{4}{3}$ $\quad$ $\sec\theta = \frac{5}{3}$

$\cot\theta = \frac{3}{4}$

$a^2 + 4^2 = 5^2$

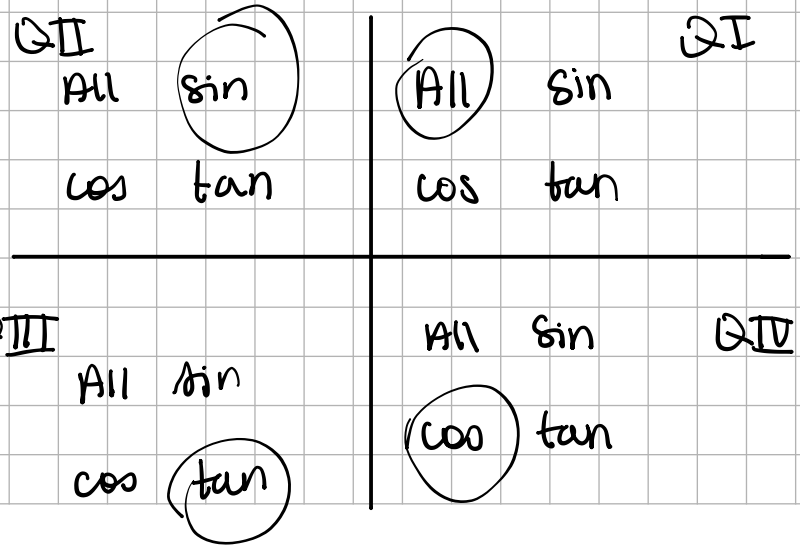
$a^2 + 16 = 25$

$-16 \quad -16$

$\sqrt{a^2} = \sqrt{9}$

$a = 3$

7. Circle each trig value that is positive in the quadrants below



8. Determine what quadrant each angle is in

a) $\frac{\pi}{4}$ QI

c) $\frac{11\pi}{6}$ QIV

b) $\frac{5\pi}{4}$ QIII

d) $\frac{9\pi}{4}$ QI

9. Define each value (try to do this question without your unit circle)

a) $\tan\frac{\pi}{4} = 1$

b) $\cos(120°)$ $-1/2$

c) $\sin\left(\frac{5\pi}{6}\right) = \frac{1}{2}$

d) $\sin(300°) = -\frac{\sqrt{3}}{2}$

10. Find the terminal point of the following values

a) $\frac{-\pi}{2}$ $(0,-1)$

b) $\frac{\pi}{4}$ $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

c) $\frac{3\pi}{2}$ $(0,-1)$

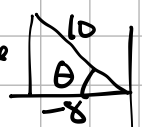
d) $\frac{5\pi}{3}$ $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

11. If $\csc\theta = \frac{10}{6}$ and $\cos\theta < 0$, find $\sec\theta$ and $\cot\theta$. Give exact values

$\sec\theta = \frac{-10}{8}$

$\cot\theta = \frac{-8}{6}$

$\csc\theta = \frac{10 \text{ hyp}}{6 \text{ opp}}$



-8 because x-coordinate is negative

$6^2 + b^2 = 10^2$

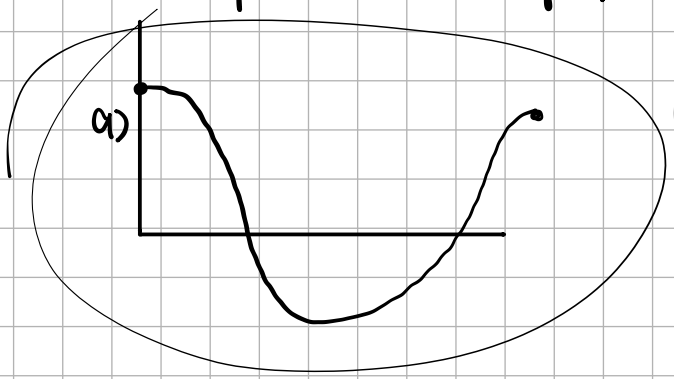
$36 + b^2 = 100$

$\sqrt{b^2} = \sqrt{64}$

$b = 8$

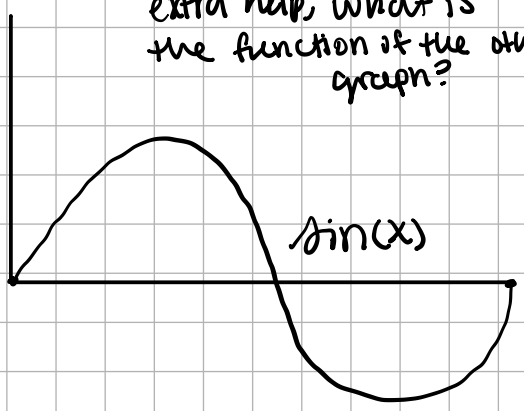
12. Which graph is a cos graph?

a)



b)

extra help, what is the function of the other graph?



13. Find the amplitude of the following functions

a) $y = 2\cos(x)$

$a = 2$

c) $y = \tan(x - \frac{\pi}{6})$

$a = 1$

b) $y = \frac{1}{3}\sin(x - \frac{\pi}{4})$

$a = \frac{1}{3}$

d) $y = -\cos 3x$

$a = 1$

14. Find the period and horizontal shift of the following functions

a) $y = 3\cos(3x - \frac{\pi}{4})$

period $= \frac{2\pi}{3}$

$\frac{\frac{\pi}{4}}{3}$ $\quad \frac{\pi}{4} \cdot \frac{1}{3}$

$\frac{\pi}{12}$

c) $y = 2\tan(\pi x - \frac{\pi}{3})$

period $= \frac{\pi}{\pi}$ or 1

$\frac{\frac{\pi}{3}}{\pi}$ $\quad \frac{\pi}{3} \cdot \frac{1}{\pi} = \frac{1}{3}$

b) $y = \sin(2\pi x - \frac{\pi}{6})$

period $= \frac{2\pi}{2\pi}$ or 1

$\frac{\frac{\pi}{6}}{2\pi}$ $\quad \frac{\pi}{6} \cdot \frac{1}{2\pi}$ $\quad \frac{1}{12}$

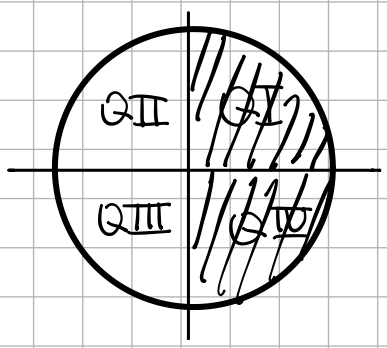
d) $\frac{1}{2}\tan(2x - \frac{\pi}{6})$

period $= \frac{\pi}{2} = \frac{\pi}{2}$

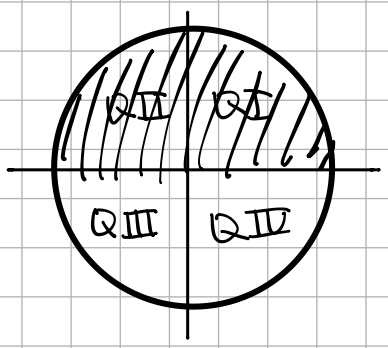
$\frac{\frac{\pi}{6}}{2}$ $\quad \frac{\pi}{6} \cdot \frac{1}{2}$ $\quad \frac{\pi}{12}$

15. Highlight or circle the following quadrants that we evaluate sin, cos and tan inverse in

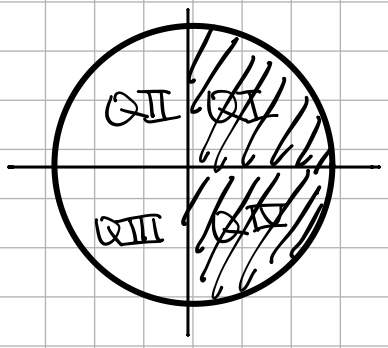
$\sin^{-1}(x)$



$\cos^{-1}(x)$



$\tan^{-1}(x)$



16. Evaluate the following trig functions

a) $\text{Arccos}\left(\frac{1}{2}\right)$

$\cos\theta = 1/2$

$\boxed{\theta = \pi/3}$

b) $\sin^{-1}\left(\cos\left(\frac{5\pi}{6}\right)\right)$ $\quad \cos\frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$

$\sin^{-1}(-\sqrt{3}/2)$

$\sin\theta = -\sqrt{3}/2 \qquad \theta = -\frac{\pi}{3}$

c) $\text{Arctan}(\sin(\pi/2))$

$\sin\pi/2 = 1$

$\tan\theta = 1 \quad \boxed{\theta = \pi/4}$

d) $\cos^{-1}(-\sqrt{3}/2)$

$\cos\theta = -\sqrt{3}/2$

$\theta = \frac{5\pi}{6}$

17. A clock has a minute hand only which has a length of 8 cm. If it starts in the 12 O'Clock position as pictured, write the function describing the distance, d, of the tip of the minute hand from the horizontal diameter of the clock after t minutes.

$k = 8\text{cm}$ $\qquad y = k\cos(\omega t)$

$\boxed{y = 8\cos\left(\frac{\pi}{30}t\right)}$

$\text{period} = \frac{2\pi}{\omega}$

$\omega \cdot 60 = 2\pi$

$\omega = \frac{2\pi}{60} \rightarrow \boxed{\frac{\pi}{30} = \omega}$

Dampening harmonic motion

$y = ke^{-ct}\sin \omega t$ — depends on problem

or

$y = ke^{-ct}\cos \omega t$ $\quad c > 0$

$\text{period} = \frac{2\pi}{\omega}$

$\text{amplitude} = k$

$\text{Frequency} = \frac{\omega}{2\pi}$

$\text{dampening constant} = c$

18. A mass is attached to the end of a spring. The mass is pulled down from equilibrium by 30.1 cm and released. The dampening constant is $c = 1.5$ and the period is $p = 3$. Find the model of the mass.

$y = ke^{-ct}\sin \omega t$

$k = 30.1 \text{ cm} \qquad c = 1.5 \qquad \text{period} = 3$

$\omega = \frac{2\pi}{3}$

$\omega \cdot 3 = \frac{2\pi}{\omega} \cdot \omega$

$\frac{\omega \cdot 3}{3} = \frac{2\pi}{3}$

$\omega = \frac{2\pi}{3}$

$y = 30.1e^{-1.5t}\sin\left(\frac{2\pi}{3}t\right)$