1. Prove the identity.

$$\cos x\left(1+\tan^2 x\right)=\sec x$$

$$\begin{aligned}&\cos x\left(1+\tan^2 x\right) && \text{pythagorean}\\ &=\cos x\left(\sec^2 x\right) && \text{reciprocal}\\ &=\frac{1}{\sec x}\left(\sec^2 x\right) && \text{algebra}\\ &=\sec x\end{aligned}$$

3. Find the phase shift, amplitude, and period of the function.

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

$\frac{\pi}{12}$ $=0$

Give the exact values, not decimal approximations.

phase shift: 3x-pi/4=0 so x = pi/12

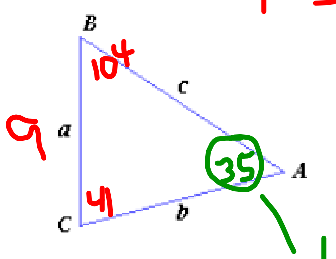
amplitude: 4

period: 2pi/B = 2pi/3

4. Consider a triangle ABC like the one below. Suppose that $B = 104°$ $C = 41°$ and $a = 9$ (The figure is not drawn to scale.) Solve the triangle.

Round your answers to the nearest tenth.

ASA



$180 - 145$

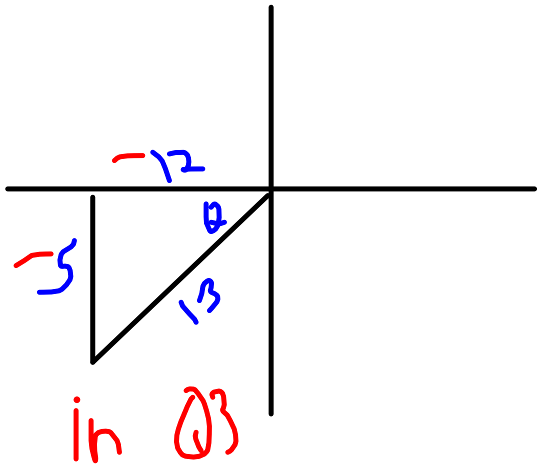
$$\frac{9}{\sin 35°} = \frac{b}{\sin 104°} \qquad b = 15.22$$

$$\frac{9}{\sin 35} = \frac{c}{\sin 41°} \qquad c = 10.29$$

5. Let θ be an angle in quadrant III such that $\cot\theta = \frac{12}{5} = \frac{A}{O}$

Find the exact values of $\sin\theta$ and $\sec\theta$

$\frac{O}{H} = \frac{-5}{13}$ $\quad$ $\frac{H}{A} = \frac{13}{-12}$

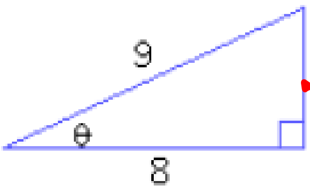


$\sqrt{5^2 + 12^2}$

$\sqrt{25 + 144} = 13$

Find $\sec\theta$ $\cot\theta$ and $\cos\theta$ where θ is the angle shown in the figure.

Give exact values, not decimal approximations.



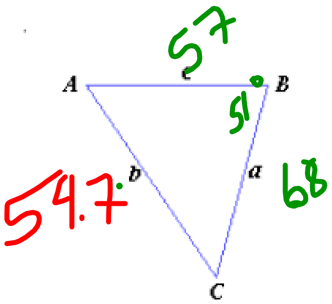
$\sqrt{81-64} = \sqrt{17}$

$\frac{H}{A} = \frac{9}{8}$

$\frac{A}{O} = \frac{8}{\sqrt{17}}$

7. Consider a triangle ABC like the one below. Suppose that $B = 51^\circ$ $a = 68$ and $c = 57$ (The figure is not drawn to scale.) Solve the triangle.

Carry your intermediate computations to at least four decimal places, and round your answers to the nearest tenth.



SAS

$$b^2 = 68^2 + 57^2 - 2 \cdot 68 \cdot 57 \cdot \cos(51^\circ)$$

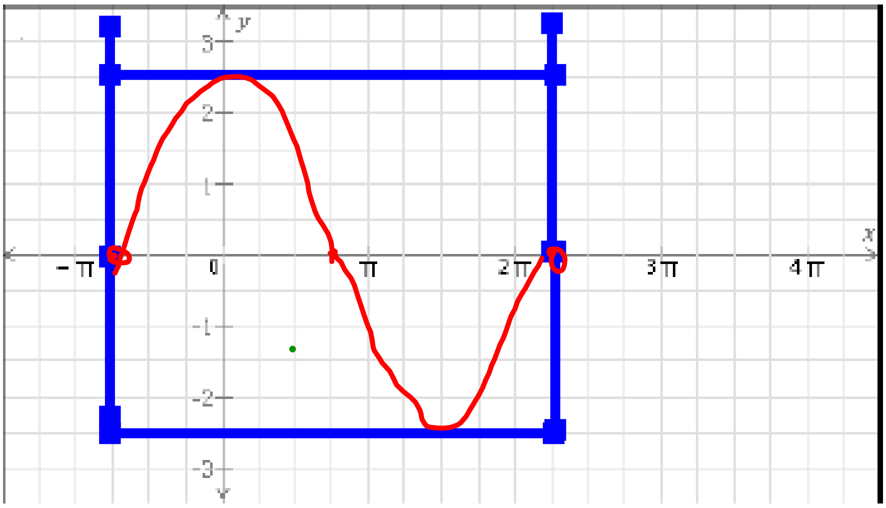
$$b = \sqrt{[illegible].4} = 54.7$$

$$\frac{54.7}{\sin 51^\circ} = \frac{68}{\sin A} \qquad \sin A$$

$$A = 74.9$$

$$C = 180 - 74.9 - 51 = 54.1$$

8. Graph the function $y=\frac{5}{2}\sin\left(\frac{2}{3}x+\frac{\pi}{2}\right)$



ampl=5/2=2.5

period=2pi/(2/3)=3pi

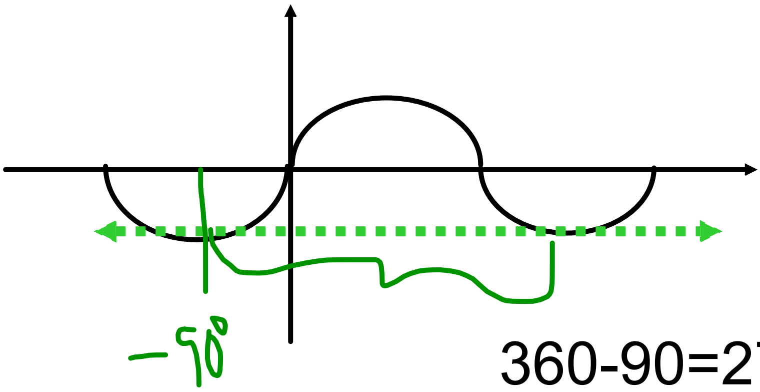
PS=-3pi/4 -pi/2 over 2/3

9. Find all solutions of the equation

$\sin \theta + 1 = 0$

sinx=-1 x=$\sin^{-1}$(-1) =-90°

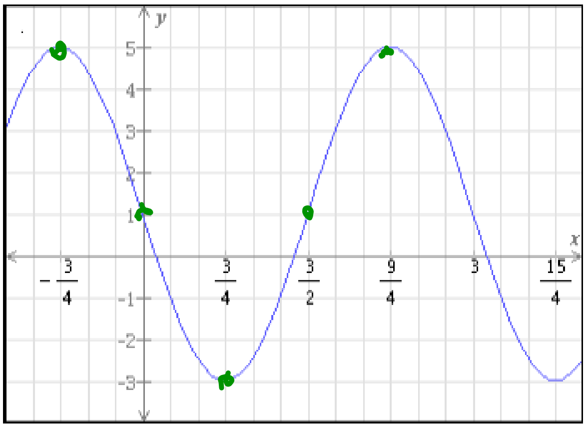
Write your answer in radians in terms of π
If there is more than one solution, separate them with commas.

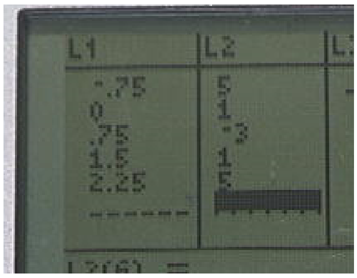


360-90=270

-pi/2+n2pi

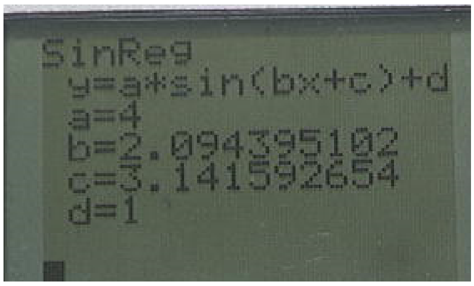
10. Write the equation of a sine or cosine function to describe the graph.





period=2pi/B=3

B=2pi/3=2.09...



11. Find the exact value of $\tan^{-1}\left(-\sqrt{3}\right) = -\frac{\pi}{3}$

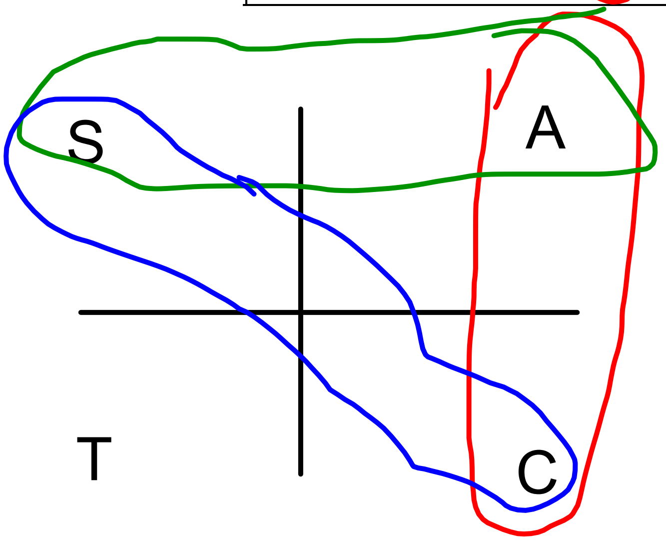
Write your answer in radians in terms of π

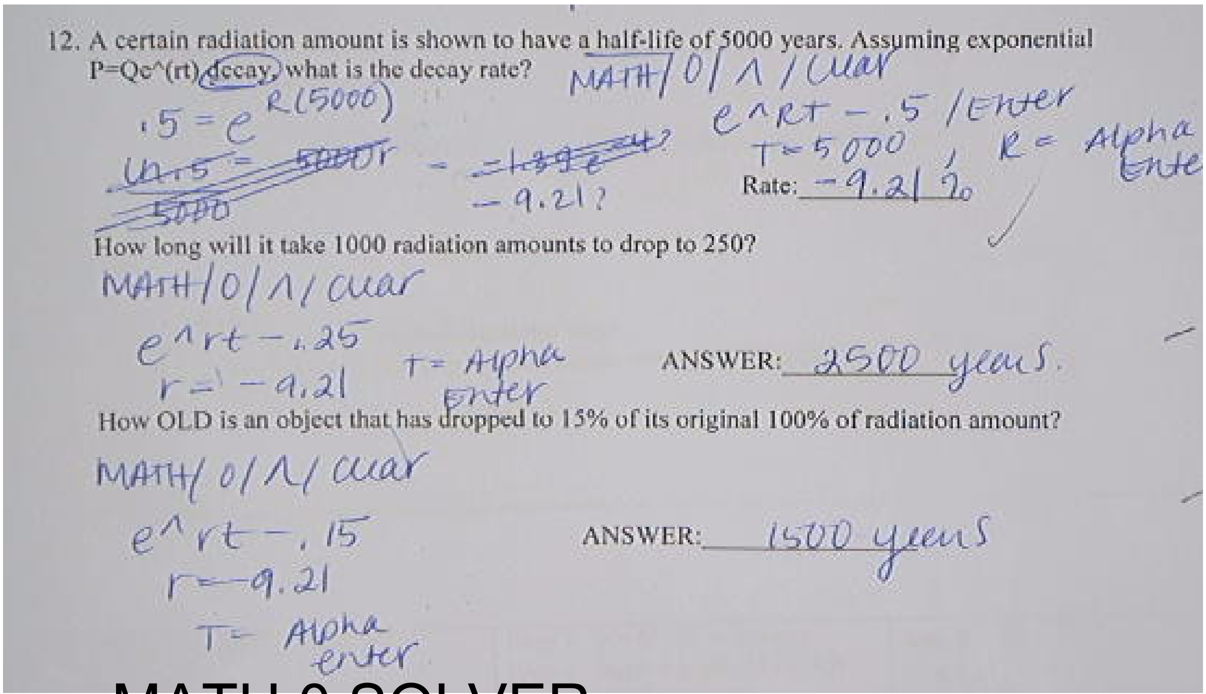
in calculator in degrees ..

answer is -60 which is -pi/3

12. Determine the quadrant in which the terminal side of θ lies.

(a)	$\cos\theta > 0$ and $\sin\theta > 0$ quadrant {I, II, III, IV}
(b)	$\tan\theta < 0$ and $\cos\theta > 0$ quadrant {I, II, III, IV}





12. A certain radiation amount is shown to have a half-life of 5000 years. Assuming exponential $P=Qe^{\wedge}(rt)$ decay, what is the decay rate?

MATH/0/^/Clear

$.5 = e^{R(5000)}$

~~ln .5 = 5000r~~

~~5000~~

−9.21?

e^RT − .5 /Enter

T=5000 , R= Alpha Enter

Rate: −9.21 %

How long will it take 1000 radiation amounts to drop to 250?

MATH/0/^/Clear

e^rt − .25

r= −9.21

T= Alpha Enter

ANSWER: 2500 years.

How OLD is an object that has dropped to 15% of its original 100% of radiation amount?

MATH/0/^/Clear

e^rt − .15

r=−9.21

T= Alpha enter

ANSWER: 1500 years

MATH 0:SOLVER

0=P-Qe^(RT)

P=1/2

Q=1

R=alpha enter

T=5000