Trig 6.4

height

360° = 2π

Find the amplitude and period for sine and cosine functions
Write equations of sine and cosine functions given the amplitude and period

parent graph $y = \sin x$

amplitude

period

frequency

hertz

activity: Desmos

graphing calc
whiteboards
tuning fork & petri dish

Sinusoid exploration

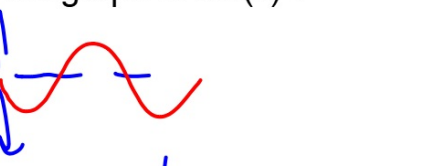
Login as usual, open up Desmos graphing website

Follow directions, explore changes to the basic sine and cosine graphs
Record comments in your notes

Summarize:
What are the effects of changing parameters on the graph of sin(x) ? cos(x) ?

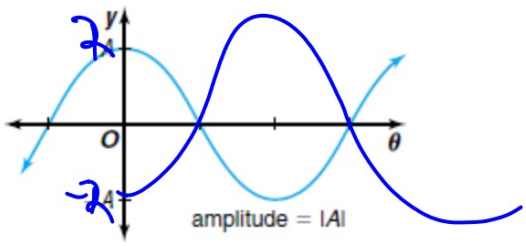
cos
sin

- a = amplitude
- b = period
- C = vertical trans.



Amplitude of Sine and Cosine Functions

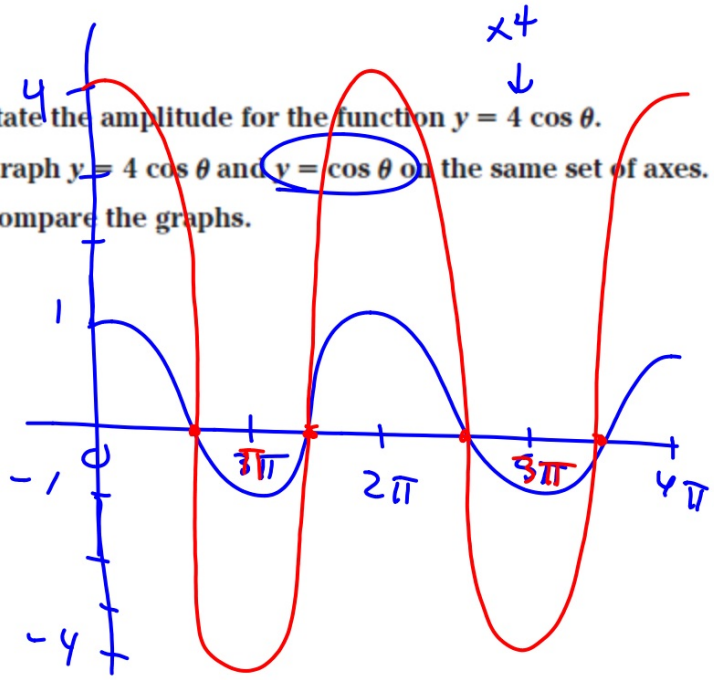
The amplitude of the functions $y = A \sin \theta$ and $y = A \cos \theta$ is the absolute value of A, or $|A|$.



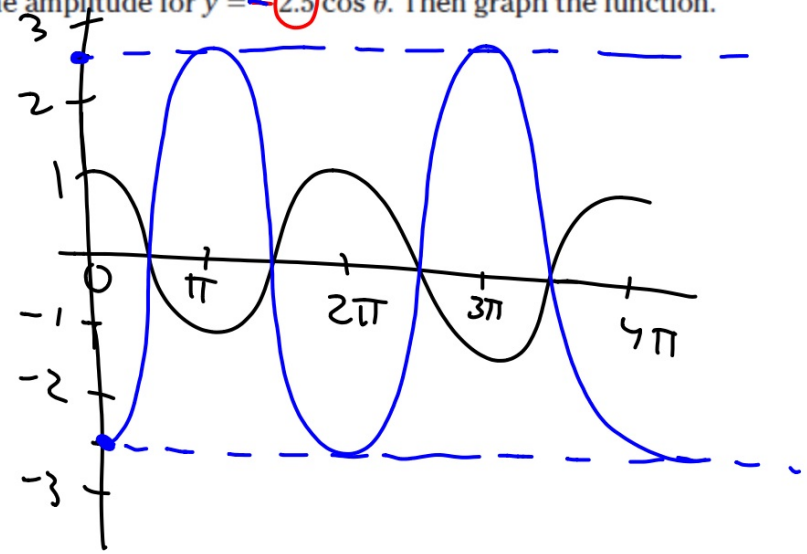
1 a. State the amplitude for the function $y = 4 \cos \theta$.

b. Graph $y = 4 \cos \theta$ and $y = \cos \theta$ on the same set of axes.

c. Compare the graphs.



6. State the amplitude for $y = \pm 2.5 \cos \theta$. Then graph the function.

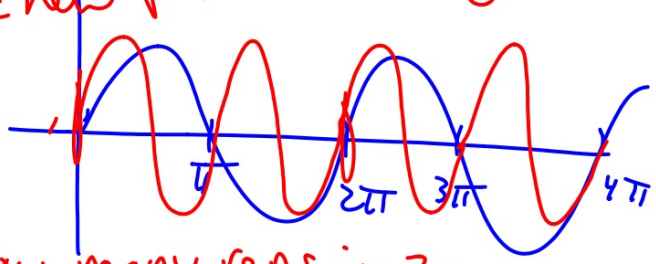


$\frac{360}{k}$ $\frac{2\pi}{2} = \pi$ $b = 2$

Period of Sine and Cosine Functions	The period of the functions $y = \sin k\theta$ and $y = \cos k\theta$ is $\frac{2\pi}{k}$, where $k > 0$.

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

$y = \sin 2\theta$

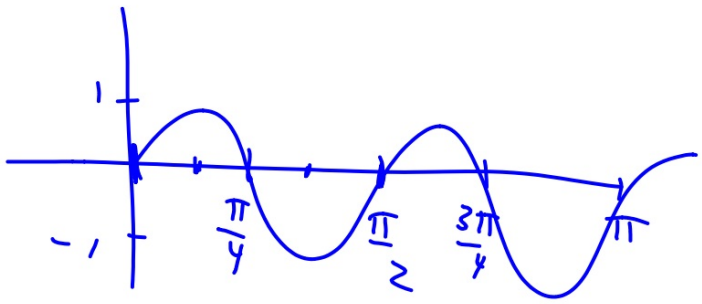


K : how many reps in 2π

or 360/k (degrees)

7. State the period for $y = \sin 4\theta$. Then graph the function.

$\frac{2\pi}{4} = \frac{\pi}{2}$



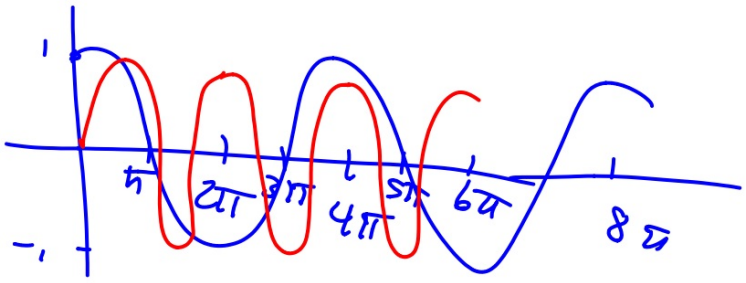
(1/2)X

2 a. State the period for the function $y = \cos\frac{\theta}{2}$.

b. Graph $y = \cos\frac{\theta}{2}$ and $y = \cos\theta$.

$y = \cos\left(\frac{1}{2}\theta\right)$

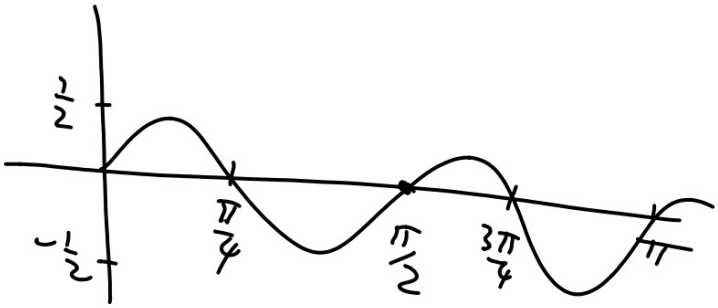
$\frac{2\pi}{\frac{1}{2}} = 4\pi$



Suggestion: Draw the curve first, then label amp, period, etc. on axes.

$\frac{1}{2}$ $\frac{2\pi}{4}$ $\frac{\pi}{2}$

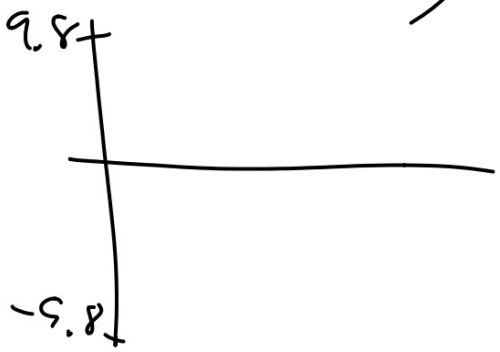
3 **State the amplitude and period for the function $y = \frac{1}{2}\sin 4\theta$. Then graph the function.**



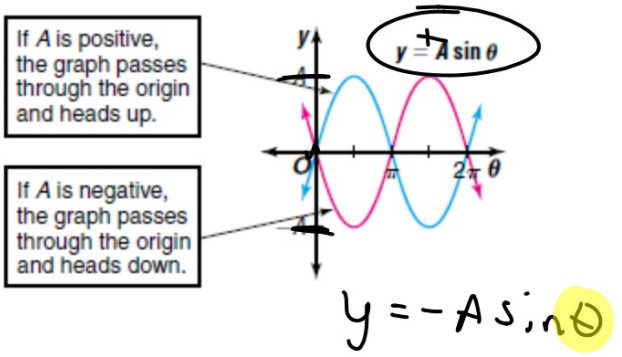
$\frac{2\pi}{n} = \frac{6\pi}{1}$ $\frac{6\pi n}{6\pi} = \frac{2\pi}{6\pi}$

4 **Write an equation of the cosine function with amplitude 9.8 and period 6π.**

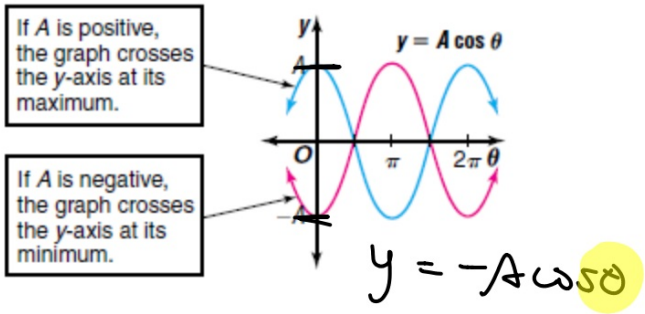
$y = 9.8\cos\left(\frac{1}{3}\theta\right)$



Which one is the parent graph?



y = −A sin θ



y = −A cos θ

±

Write an equation of the sine function with each amplitude and period.

12. amplitude $= 0.8$, period $= \pi$

13. amplitude $= 7$, period $= \frac{\pi}{3}$

17-47 odd

±

Write an equation of the cosine function with each amplitude and period.

14. amplitude $= 1.5$, period $= 5\pi$

15. amplitude $= \frac{3}{4}$, period $= 6$

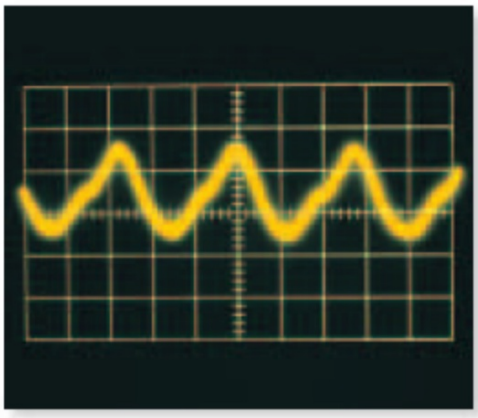
I can wash two cars per hour...

$$\text{period} = \frac{1}{\text{frequency}} \qquad \text{frequency} = \frac{1}{\text{period}}$$

Frequency: 1 Hertz = 1 cycle per sec.
20 Hz = 20 cycles per sec.
etc.

petri dish &
tuning fork

6 **MUSIC** **Write an equation of the sine function that represents the initial behavior of the vibrations of the note G above middle C having amplitude 0.015 and a frequency of 392 hertz.**



reminder:
f = 1/p and p = 1/f
period = 2π/k

16. **Music** Write a sine equation that represents the initial behavior of the vibrations of the note D above middle C having an amplitude of 0.25 and a frequency of 294 hertz.