

Worksheet - Answers

Graphing Sin and Cos Functions

Graph the following functions.

1) $y = 4 \cos(\theta + \frac{\pi}{4})$

Period	Amplitude	Shift	Axis	Phase Shift	Equation	Point on x-axis	Y-intercept	Y-axis
2π	4	Left	Y	$-\frac{\pi}{4}$	$y = 4 \cos(\theta + \frac{\pi}{4})$	$-\frac{\pi}{4}$	4	4

2) $y = \frac{3}{2} \sin(\frac{\theta}{4} + 2\pi)$

Period	Amplitude	Shift	Axis	Phase Shift	Equation	Point on x-axis	Y-intercept	Y-axis
8π	$\frac{3}{2}$	Left	Y	0	$y = \frac{3}{2} \sin(\frac{\theta}{4} + 2\pi)$	0	$\frac{3}{2}$	$\frac{3}{2}$

3) $y = -2 \sin(2\theta) + 4$

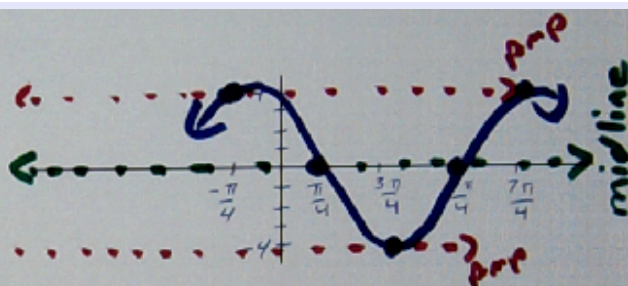
Period	Amplitude	Shift	Axis	Phase Shift	Equation	Point on x-axis	Y-intercept	Y-axis
π	2	Left	Y	0	$y = -2 \sin(2\theta) + 4$	0	4	2

4) $y = -\cos(\frac{\theta}{2} + \pi)$

Period	Amplitude	Shift	Axis	Phase Shift	Equation	Point on x-axis	Y-intercept	Y-axis
4π	1	Left	Y	$-\pi$	$y = -\cos(\frac{\theta}{2} + \pi)$	$-\pi$	-1	-1

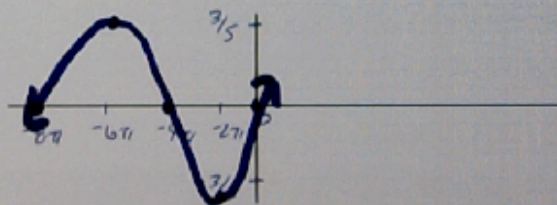
1) $y = 4 \cos(\theta + \frac{\pi}{4})$

Period	Multiply	Notch	Add	Phase Shift	Equals	Point on x-axis	
2π	•	(0)	•	$-\pi/4$	"	$-\pi/4$	This is your starting point
2π	•	$\frac{1}{2}$	•	$-\pi/4$	"	$\pi/4$	1 st notch
2π	•	$\frac{3}{2}$	•	$-\pi/4$	"	$3\pi/4$	2 nd notch
2π	•	$\frac{5}{2}$	•	$-\pi/4$	"	$5\pi/4$	3 rd notch
2π	•	$\frac{7}{2}$	•	$-\pi/4$	"	$7\pi/4$	4 th notch and ending point for one period



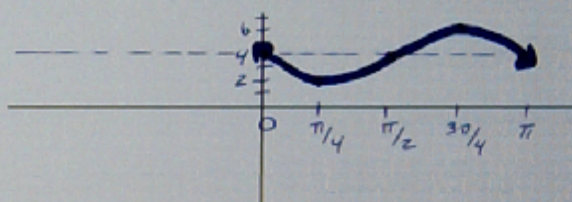
2) $y = \frac{3}{5} \sin(\frac{\theta}{4} + 2\pi)$

Period	Multiply	Notch	Add	Phase Shift	Equals	Point on x-axis	
8π	•	(0)	•	-8π	"	-8π	This is your starting point
8π	•	$\frac{1}{2}$	•	-8π	"	-6π	1 st notch
8π	•	$\frac{3}{2}$	•	-8π	"	-4π	2 nd notch
8π	•	$\frac{5}{2}$	•	-8π	"	-2π	3 rd notch
8π	•	$\frac{7}{2}$	•	-8π	"	0	4 th notch and ending point for one period



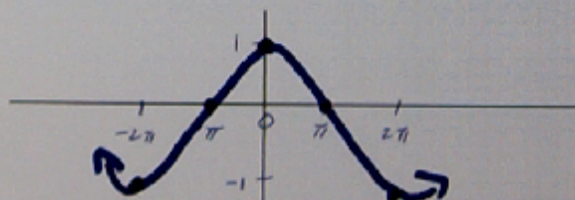
3) $y = -2 \sin(2\theta) + 4$

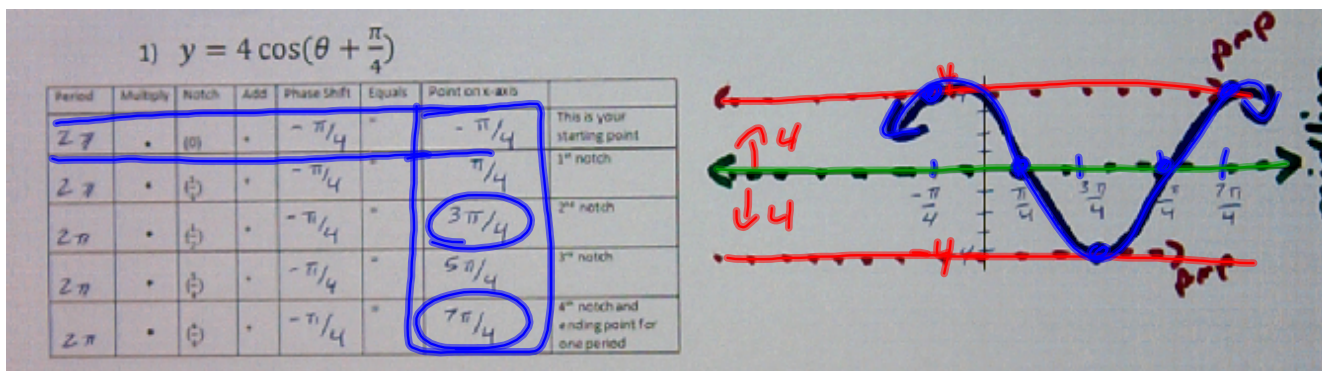
Period	Multiply	Notch	Add	Phase Shift	Equals	Point on x-axis	
π	*	(0)	*	NONE	*	0	This is your starting point
π	*	$\frac{\pi}{4}$	*		*	$\frac{\pi}{4}$	1 st notch
π	*	$\frac{\pi}{2}$	*		*	$\frac{\pi}{2}$	2 nd notch
π	*	$\frac{3\pi}{4}$	*		*	$\frac{3\pi}{4}$	3 rd notch
π	*	π	*		*	π	4 th notch and ending point for one period



4) $y = -\cos\left(\frac{\theta}{2} + \pi\right)$

Period	Multiply	Notch	Add	Phase Shift	Equals	Point on x-axis	
4π	*	(0)	*	-2π	*	-2π	This is your starting point
4π	*	$\frac{\pi}{2}$	*	-2π	*	$-\pi$	1 st notch
4π	*	π	*	-2π	*	0	2 nd notch
4π	*	$\frac{3\pi}{2}$	*	-2π	*	π	3 rd notch
4π	*	2π	*	-2π	*	2π	4 th notch and ending point for one period





$$y = \boxed{4} \cos(\theta + \frac{\pi}{4})$$

amp 4 period $\frac{2\pi}{1} = 2\pi$ PS. $\frac{-\pi/4}{1} = \frac{-\pi}{4}$

$$2\pi(0) = 0 - \frac{\pi}{4} = -\pi/4$$

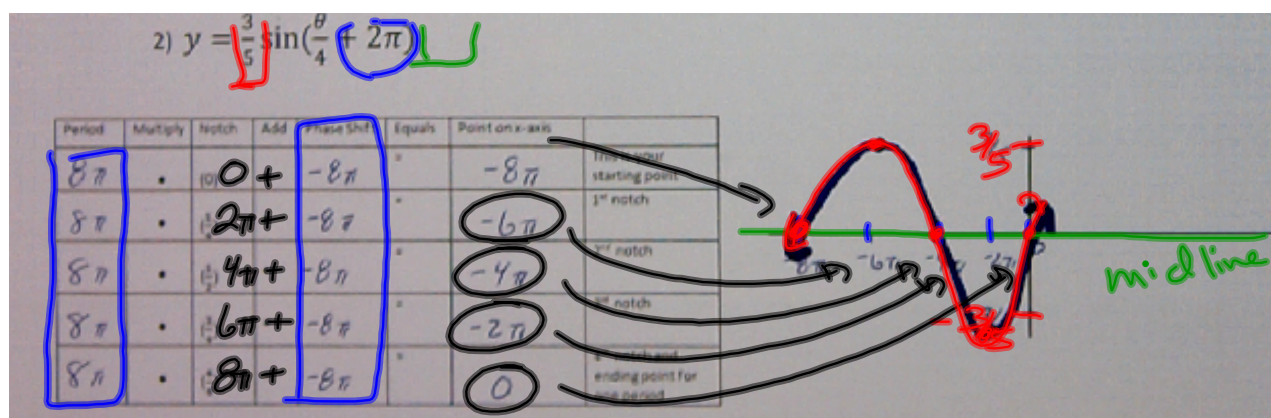
$$2\pi(1/4) = \frac{2\pi}{4} - \frac{\pi}{4} = \pi/4$$

$$2\pi(1/2) = \frac{2\pi}{2} - \frac{\pi}{4} = \frac{4\pi}{4} - \frac{\pi}{4} = \frac{3\pi}{4}$$

$$2\pi(3/4) = \frac{6\pi}{4} - \frac{\pi}{4} = \frac{5\pi}{4}$$

$$2\pi(1) = 2\pi - \frac{\pi}{4}$$

$$\begin{aligned} & 2\pi - \frac{\pi}{4} \\ & \frac{8\pi}{4} - \frac{\pi}{4} = \frac{7\pi}{4} \end{aligned}$$



$$\text{period } \frac{2\pi}{\frac{1}{4}} = 2\pi \cdot \frac{4}{1} = 8\pi$$

$$\text{phase shift: } \frac{-2\pi}{\frac{1}{4}} = -2\pi \cdot 4 = -8\pi$$

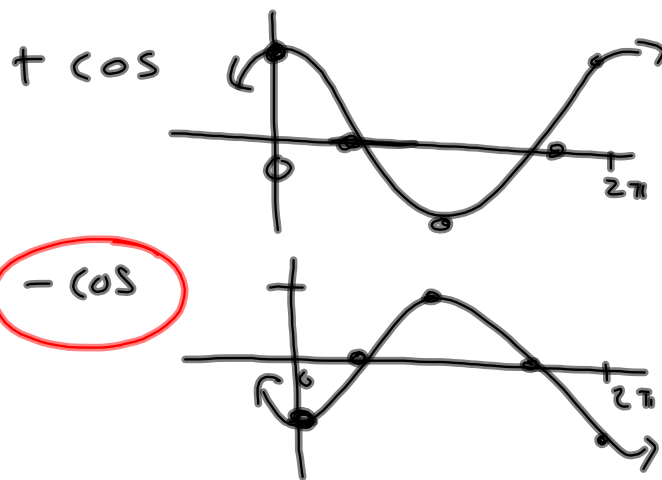
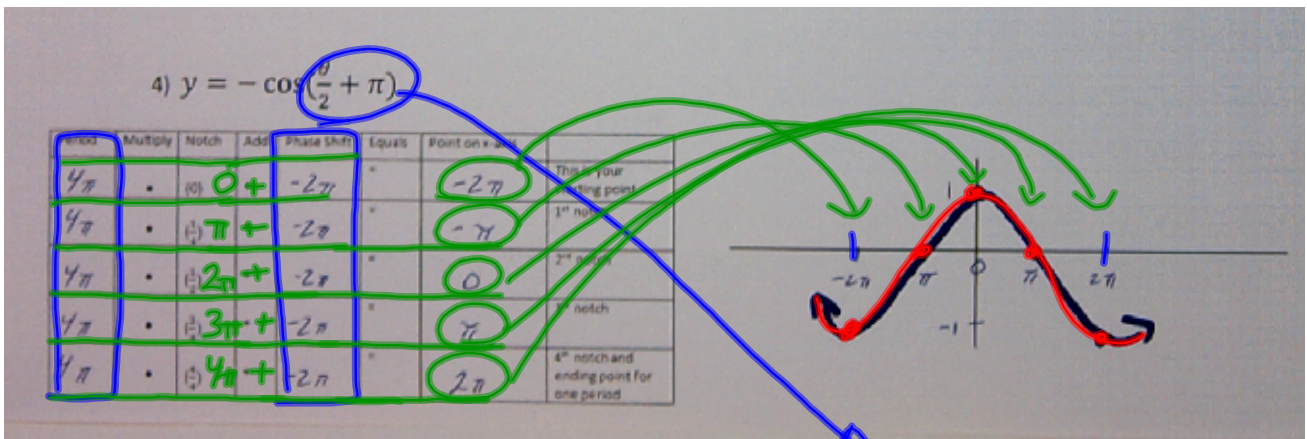
3) $y = -2 \sin(2\theta) + 4$ \checkmark
 $|-2| = 2$

Period	Multiply	Notch	Add	Point on x-axis	Notes
π	•	(0)	*	0	This is your starting point
π	•	$\frac{\pi}{2}$	*	$\frac{\pi}{4}$	1 st notch
π	•	π	*	$\frac{\pi}{2}$	2 nd notch
π	•	$\frac{3\pi}{2}$	*	$\frac{3\pi}{4}$	3 rd notch
π	•	2π	*	π	4 th notch and ending point for one period

$-\sin$

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

$-2 \sin(2\theta)$ No phase shift



$\left(\frac{\theta}{2} + \pi\right)$

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

Phase shift = $-\frac{\pi}{\frac{1}{2}} = -2\pi$