Name: Francesca L. **Date:** ____ **Hour:** ____ **13-7 worksheet**

Sine and Cosine Vertical Translations and Phase Shifts

1. $y = \frac{1}{2}\sin 3(\theta + \frac{\pi}{2}) - 1$

amp = $\frac{1}{2}$ period = $2\pi/3$ flip= no

phase shift= $-\pi/2$ left vertical shift= -1 down

each = $\frac{\pi}{6}$

$\frac{2\pi}{3} \cdot \frac{1}{4} = \frac{2\pi}{12} = \frac{\pi}{6}$

2. a b

$y = -2\cos\frac{1}{3}(\theta - \frac{\pi}{3}) + 1$

$P = \frac{2\pi}{b}$

$P = \frac{2\pi}{\frac{1}{3}} = 2\pi \cdot \frac{3}{1} = 6\pi$

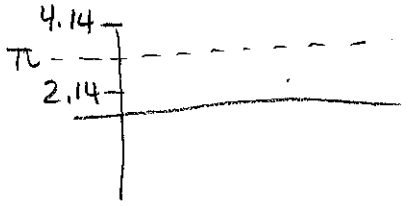
amp = 2 period = 6π flip= yes

phase shift= $\pi/3$ R vertical shift= 1 up

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

$6\pi \cdot \frac{1}{4} = \frac{6\pi}{4} = \frac{3\pi}{2}$

3. $y = 4\sin 3(\theta + \frac{\pi}{2}) - 1$



amp = 4 period = $2\pi/3$ flip= no

phase shift= $\pi/2$ L vertical shift= 1 D

each = $\frac{\pi}{6}$

4. $y = \frac{2}{3}\cos\left(\theta - \frac{\pi}{2}\right)$

amp = $\frac{2}{3}$ period = 2π flip= no

phase shift= $\pi/2$ R vertical shift= n/a

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

5. $y = -\frac{1}{2}\sin 4(\theta - \pi) + 1$

amp = $\frac{1}{2}$ period = $\pi/2$ flip= yes

phase shift= π R vertical shift= 1 up

each = $\pi/8$

Find the *amplitude, period, vertical shift, phase shift and flip. Graph one period.*

6. $y = \sin\left(\theta + \frac{\pi}{2}\right)$

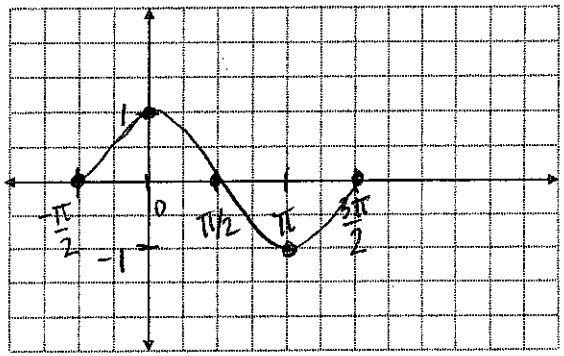
amplitude (a) = 1

b = 1 Period 2π

Phase shift $-\pi/2$ (L)

Vertical shift 0 Flip no

each = $\pi/2$



7. $y = 2\sin 3\left(\theta + \frac{\pi}{3}\right) + 2$

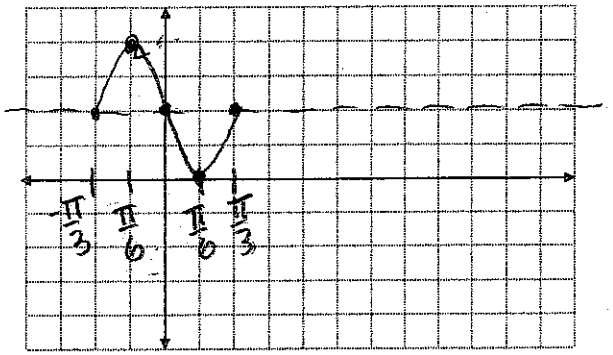
amplitude (a) = 2

b = 3 Period $2\pi/3$

Phase shift $-\pi/3$

Vertical shift +2 Flip no

each = $\frac{\pi}{6}$



8. $y = -\sin 2\left(\theta + \frac{\pi}{2}\right) - 3$

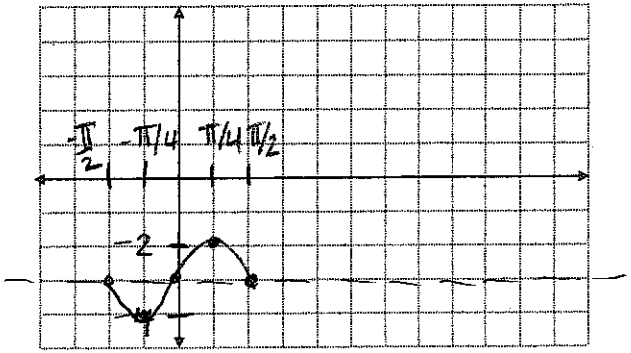
amplitude (a) = 1

b = 2 Period π

Phase shift $\pi/2$ L

Vertical shift -3 Flip yes

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



9. $y = \cos\left(\theta - \frac{\pi}{3}\right) - 2$

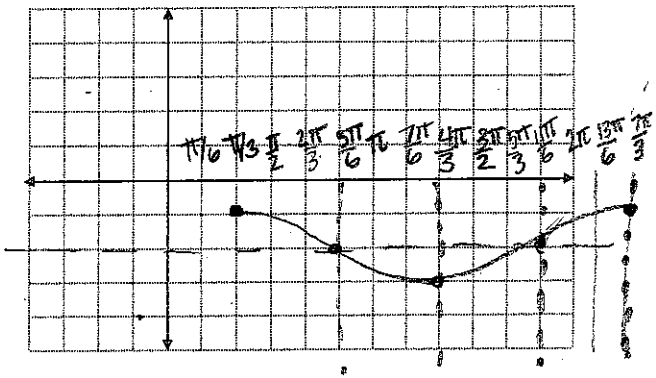
amplitude (a) = 1

b = 1 Period 2π

Phase shift $\pi/3$ R

Vertical shift 2D Flip no

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



10. $y = -3\cos(\theta + \pi) + 1$

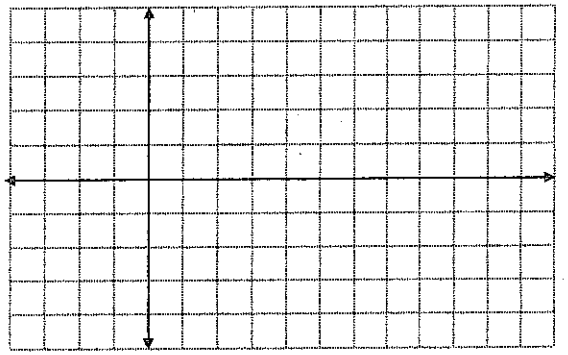
amplitude (a) = ____

b = ____ Period ____

Phase shift ____

Vertical shift ____ Flip ____

each =



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

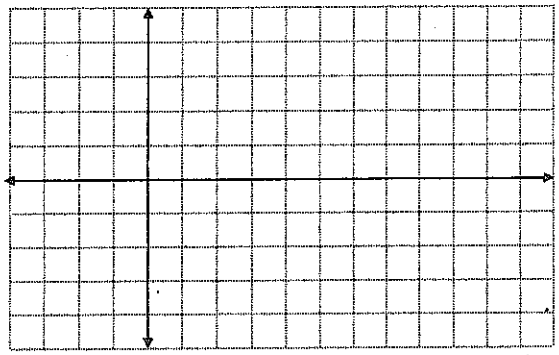
amplitude (a) = ____

b = ____ Period ____

Phase shift ____

Vertical shift ____ Flip ____

each =



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