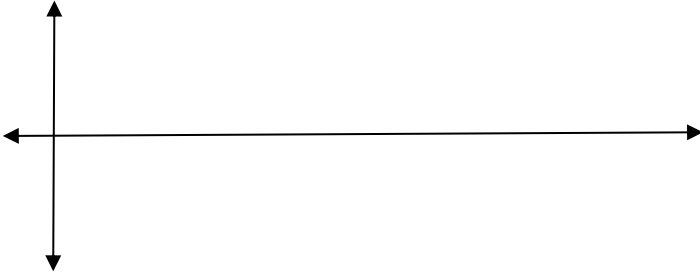




Graph one cycle of each equation. Label all critical points.

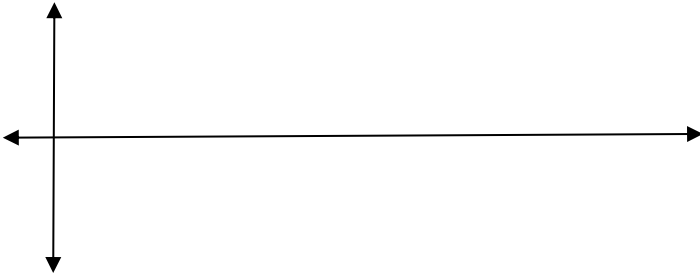
10.  $y = -2 \sin \theta$



Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

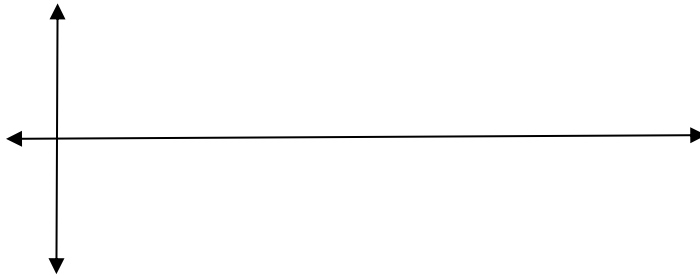
11.  $y = \frac{1}{2} \sin 4\theta$



Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

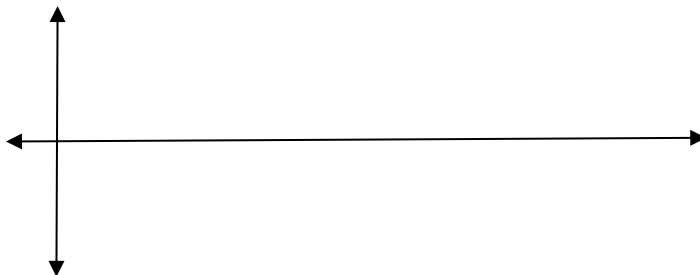
12.  $y = 3 \cos \frac{1}{2} \theta$



Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

13.  $y = -\frac{1}{3} \cos \pi \theta$



Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

How many cycles does each function have in the interval from 0 to  $2\pi$ ?

14.  $y = 4 \sin 3\theta$

15.  $y = -5 \cos \pi \theta$

Identify the period for each function.

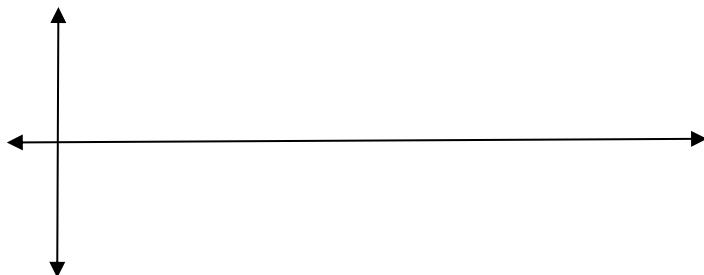
16.  $y = 2 \sin \pi \theta$

17.  $y = -\frac{1}{2} \cos 2.5\theta$

Identify the phase shift or translation in each. Graph one cycle of each equation.

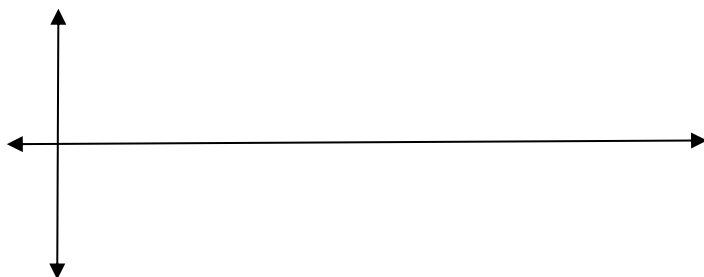
18.  $y = 3 \sin(x - \pi)$

phase shift: \_\_\_\_\_



19.  $y = 2 \cos x - 3$

vertical translation: \_\_\_\_\_



Find the amplitude and period of each function. Describe any phase shift or vertical translation.

20.  $y = \frac{1}{2} \sin 4x + 2$

amplitude =

period =

phase shift =

vertical translation =

21.  $y = -\cos\left(x + \frac{\pi}{2}\right)$

amplitude =

period =

phase shift =

vertical translation =

22. Write an equation for the sine function with amplitude 3 and period  $= \pi$ .

23. Write an equation for the translation 3 units up of  $y = \cos x$ .

**Answers:**

1. a. not periodic  
b. period = 2.1  
c. period = 3.3  
d. period = 3
2. a. amplitude = 1.5  
period = 5  
b. amplitude = 2.5  
period = 4  
c. amplitude = 2  
period = 6  
d. amplitude = 2  
period = 2
4. a.  $442^\circ, -278^\circ, \dots$   
b.  $130^\circ, -590^\circ, \dots$
5. a.  $100^\circ$   
b.  $335^\circ$
6. a.  $\frac{\pi}{3}$   
b.  $\frac{3\pi}{4}$
7. a.  $420^\circ$   
b.  $286^\circ$
8. a.  $\sin 45^\circ = \frac{\sqrt{2}}{2}$   
 $\cos 45^\circ = \frac{\sqrt{2}}{2}$   
b.  $\sin \frac{5\pi}{6} = \frac{1}{2}$   
 $\cos \frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$
9. 18.8
10. amplitude = 2  
period =  $2\pi$
11. amplitude =  $\frac{1}{2}$   
period =  $\frac{\pi}{2}$
12. amplitude = 3  
period =  $4\pi$
13. amplitude =  $\frac{1}{3}$   
period = 2
14. 3
15.  $\pi$  (about 3.14)
16. 2
17.  $\frac{4\pi}{5}$
18.  $\pi$  units to the right  
*graph*
19. 3 units down  
*graph*
20. amplitude =  $\frac{1}{2}$   
period =  $\frac{\pi}{2}$   
phase shift = none  
vert. translation = 2 up
21. amplitude = 1  
period =  $2\pi$   
phase shift =  $\frac{\pi}{2}$  left  
vert. translation = none
22.  $y = 3 \sin 2x$
23.  $y = \cos x + 3$