

Name \_\_\_\_\_ Date \_\_\_\_\_ Period Key

Answer the following about each equation.

1.  $f(\theta) = 6 \sin 4\left(\theta - \frac{\pi}{2}\right) - 3$

a = 6

b = 4

h/c =  $\frac{\pi}{2}$

k/d = -3 ↓

2.  $f(\theta) = 10 - 3 \cos \pi(\theta)$

a = -3

b =  $\pi$

h/c = 0

k/d = 10 ↑

$\frac{1}{2}$  pt each line

Write the phase shift (c value), b value, period and frequency of the following without using a calculator.

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

phase shift (h) = left  $\frac{\pi}{2}$

b = 1

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

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

4.  $f(\theta) = \cos 2\theta$

phase shift (h) = none

b = 2

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

frequency =  $\frac{1}{\pi}$

5.  $f(\theta) = \sin \frac{\theta}{3}$

phase shift (h) = none

b =  $\frac{1}{3}$

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

frequency =  $\frac{1}{6\pi}$

6.  $f(\theta) = \cos 2(\theta - \pi)$

phase shift (h) = right  $\pi$

b = 2

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

frequency =  $\frac{1}{\pi}$

7.  $f(\theta) = \frac{1}{4} \sin 6\theta$

phase shift (h) = none

b =  $\frac{1}{4}$

period =  $\frac{2\pi}{6} = \frac{\pi}{3}$

frequency =  $\frac{1}{\frac{\pi}{3}} = \frac{3}{\pi}$

8.  $f(\theta) = 8 \cos \frac{\theta}{4}$

phase shift (h) = none

b =  $\frac{1}{4}$

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

frequency =  $\frac{1}{8\pi}$

9.  $f(\theta) = -3 \cos 2(\theta - 4\pi)$

phase shift (h) = right  $4\pi$

b = 2

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

frequency =  $\frac{1}{\pi}$

10.  $f(\theta) = \sin \theta$

phase shift (h) = none

b = 1

period =  $2\pi$

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

11.  $f(\theta) = 8 \cos \theta - \pi$

phase shift (h) = none

b = 1

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

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

no parentheses

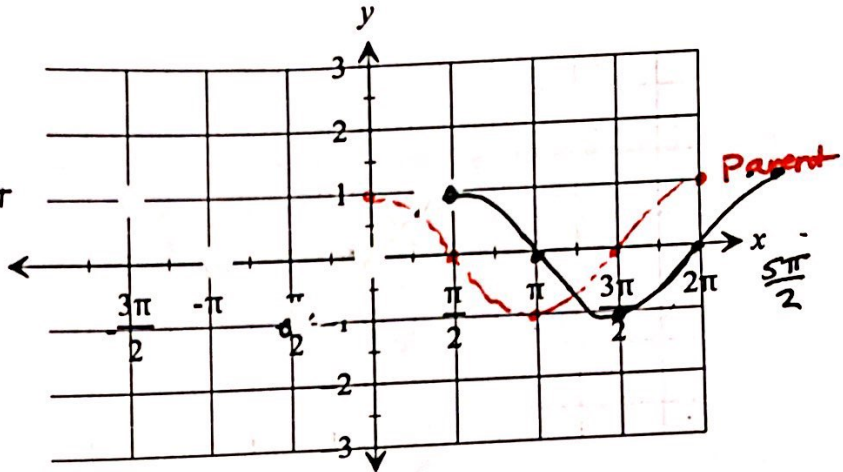
phase shift (c) and period ( $\frac{2\pi}{b}$ ). Then graph at least 1 period without a calculator, label 5 key

$f(\theta) = \cos(\theta - \frac{\pi}{2})$

phase shift  $\frac{\pi}{2}$  right

period  $\frac{2\pi}{1} = 2\pi \leftarrow$  1 cycle in  $2\pi$

Parent x right $\frac{\pi}{2}$	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
add $\frac{\pi}{2}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$	$\frac{5\pi}{2}$
$y = \cos \theta$	1	0	-1	0	1
Parent y	1	0	-1	0	1

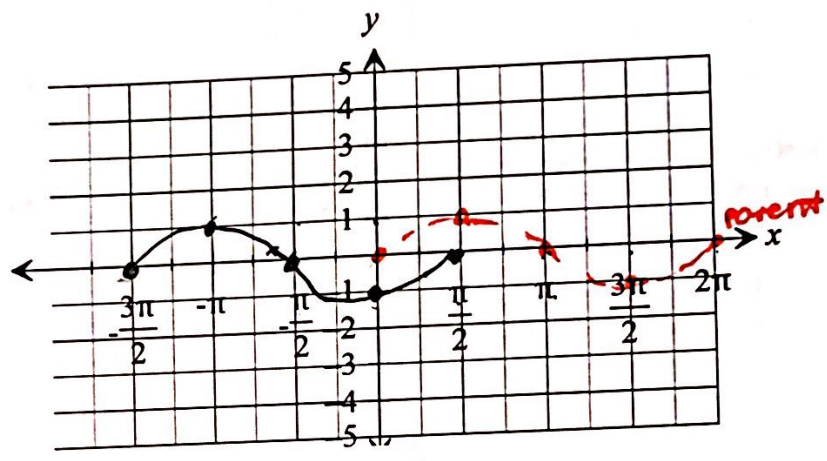


13.  $f(\theta) = \sin(\theta + \frac{3\pi}{2})$

phase shift left  $\frac{3\pi}{2}$  or  $1\frac{1}{2}$

period  $\frac{2\pi}{1} = 2\pi \leftarrow$  1 cycle in  $2\pi$

Parent x subtract $\frac{3\pi}{2}$	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$\theta$	$-\frac{3\pi}{2}$	$-\pi$	$-\frac{\pi}{2}$	0	$\frac{\pi}{2}$
$y = \sin \theta$	0	1	0	-1	0
Parent y	0	1	0	-1	0



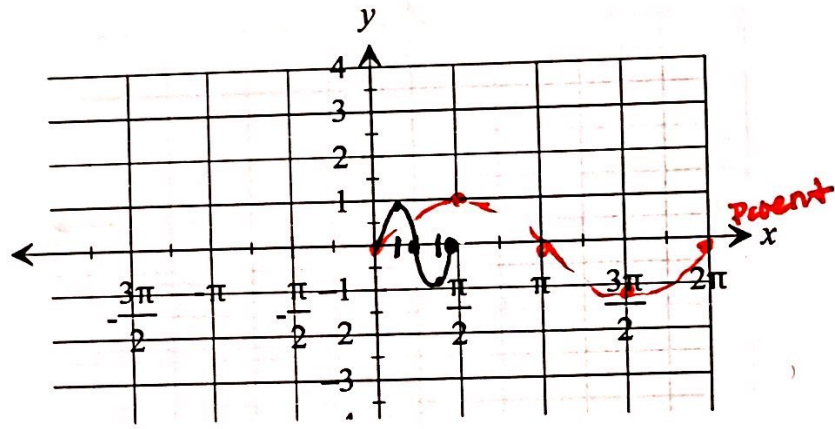
14.  $f(\theta) = \sin(4\theta)$

phase shift none

period  $\frac{2\pi}{4} = \frac{\pi}{2} \leftarrow$  1 cycle in  $\frac{\pi}{2}$

\* mult by 4 or 1/4

Parent x	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$\theta$	0	$\frac{\pi}{8}$	$\frac{\pi}{4}$	$\frac{3\pi}{8}$	$\frac{\pi}{2}$
$y = \sin \theta$	0	1	0	-1	0
Parent y	0	1	0	-1	0



15.  $f(\theta) = -\cos(\frac{\theta}{3})$

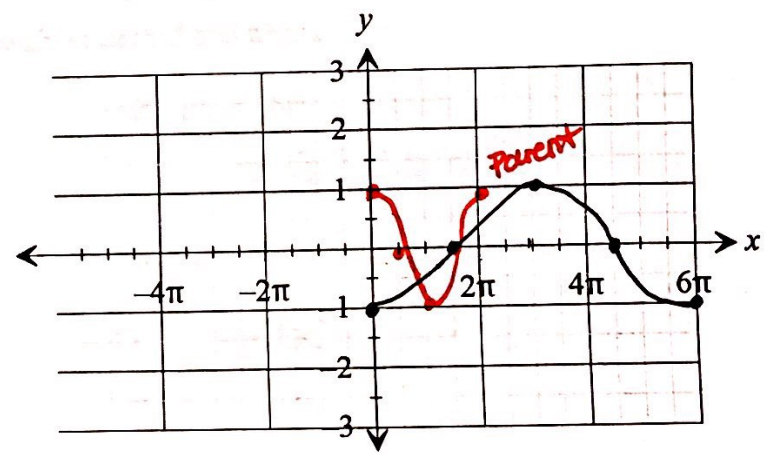
phase shift none

period  $\frac{2\pi}{\frac{1}{3}} = 2\pi \cdot 3 = 6\pi \leftarrow$  one cycle in  $6\pi$

\* mult by 3

Parent x	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$\theta$	0	$\frac{3\pi}{2}$	$3\pi$	$\frac{9\pi}{2}$	$6\pi$
$y = \cos \theta$	-1	0	1	0	-1
Parent y	1	0	-1	0	1

-1





$f(\theta) = -\cos 2(\theta - \pi)$

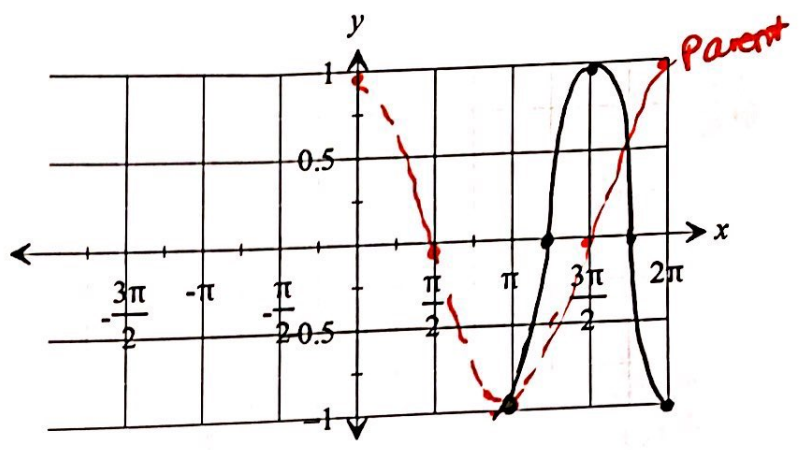
shift right  $\pi$

period  $\frac{2\pi}{2} = \pi \leftarrow 1 \text{ cycle in } \pi$

$\frac{1}{2} \cdot \frac{3\pi}{4} + \frac{\pi}{4} \quad \frac{2\pi}{2} + \pi$

mult. by  $\frac{1}{2}$   
add  $\pi$

$\theta$	$0$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$y = \cos \theta$	$-1$	$0$	$1$	$0$	$-1$
mult. by $\frac{1}{2}$	$-1$	$0$	$1$	$0$	$-1$



17.  $f(\theta) = \cos \frac{1}{2}(\theta - \frac{\pi}{4})$

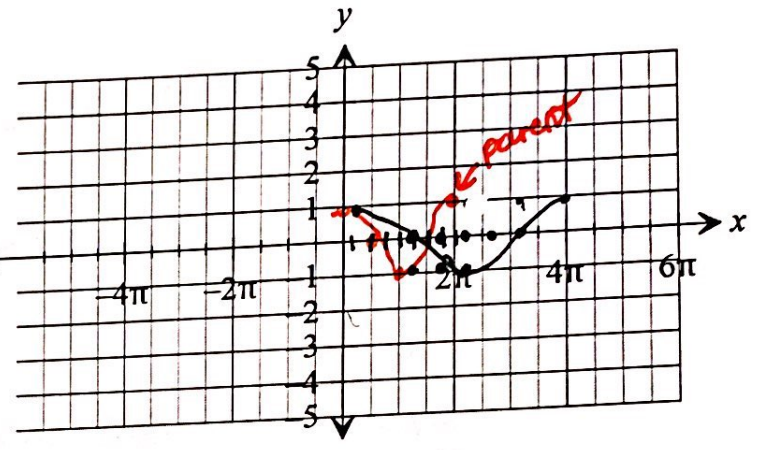
phase shift  $\frac{\pi}{4}$  right

period  $\frac{2\pi}{\frac{1}{2}} = 2\pi \cdot 2 = 4\pi \leftarrow 1 \text{ cycle in } 4\pi$

$\frac{2}{4}\pi \quad \frac{3}{4}\pi \quad \frac{2\pi}{4}$   
 $\frac{\pi}{4} + \frac{\pi}{4} \quad \frac{2\pi}{4} + \frac{\pi}{4} \quad \frac{3\pi}{4} + \frac{\pi}{4} \quad \frac{4\pi}{4} + \frac{\pi}{4}$

\* mult by 2  
add  $\pi/4$

$\theta$	$0$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$y = \cos \theta$	$1$	$0$	$-1$	$0$	$1$

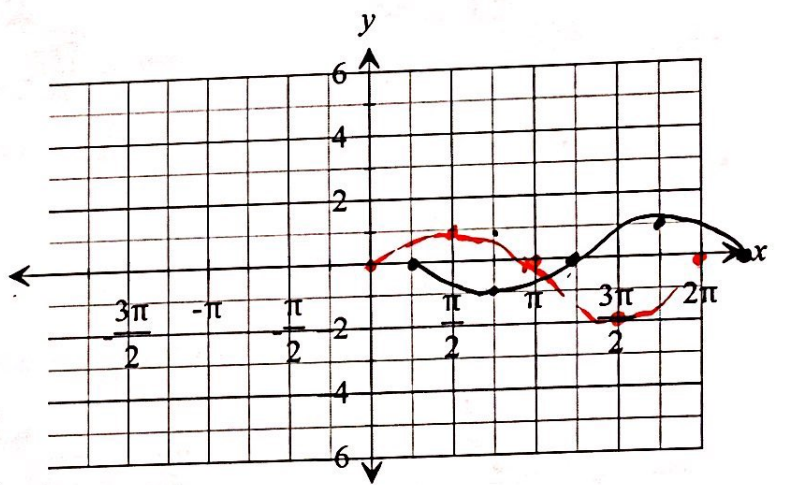


18.  $f(\theta) = -\sin(\theta - \frac{\pi}{4})$

phase shift right  $\frac{\pi}{4}$

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

$\theta$	$0$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$y = \sin \theta$	$0$	$1$	$0$	$-1$	$0$
mult. by $-1$	$0$	$-1$	$0$	$1$	$0$



Write an equation for the sine curve that has the given period and phase shift.

19. phase shift 3, period  $\pi$

$f(x) = \sin(2(x-3))$

20. phase shift  $\frac{\pi}{2}$ , period  $\frac{\pi}{2}$

$f(x) = \sin(4(x - \frac{\pi}{2}))$

21. phase shift 0, period  $2\pi$

$f(x) = \sin x$

22. phase shift  $\pi$ , period  $\frac{\pi}{3}$

$f(x) = \sin(6(x - \pi))$