Sine and Cosine Functions

Name_____

Determine the amplitude and period of each function.

1. $y = \sin 4x$

Amplitude 1

Period 2π

2. $y = \cos 5x$

Amplitude 1

Period $\frac{2}{5}\pi$

3. $y = -2 \sin x$

Amplitude 2

Period 2π

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

Amplitude 4

Period 4π

5. $y = 2 \sin (-3x)$

Amplitude 2

Period $\frac{+2\pi}{3}$

6. $y = 3 \sin \frac{2}{3}x$

Amplitude 3

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

7. $y = -3 \cos \frac{1}{3}x$

Amplitude 3

Period 6π $\quad \frac{2\pi}{1} \cdot \frac{3}{1}$

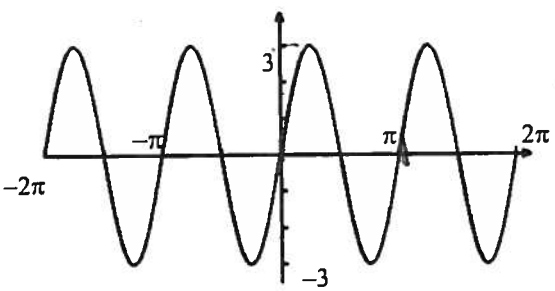
8. $y = 2 \cos (-2x)$

Amplitude 2

Period $+\pi$ $\quad \frac{2\pi}{1} \cdot \frac{1}{2}$

Give the amplitude and period of each function graphed below. Then write an equation of each graph.

9.



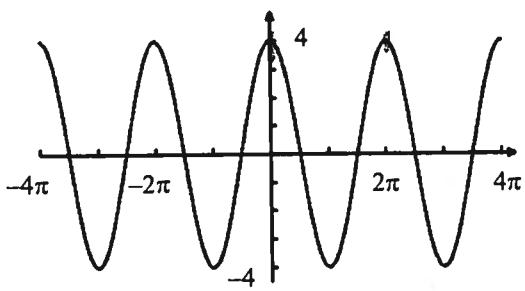
Amplitude 3

Period π

Equation $y = 3 \sin 2\theta$

$\frac{2\pi}{b} = \frac{\pi}{1}$ $\quad b\pi = 2\pi$

10.

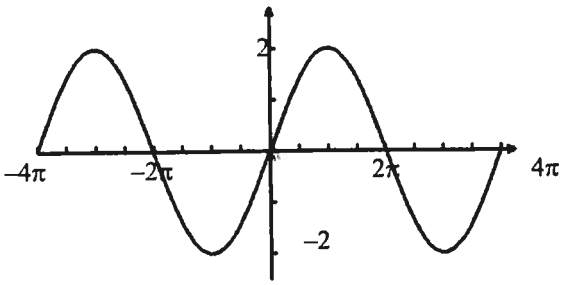


Amplitude 4

Period 2π

Equation $y = 4 \cos \theta$

11.



Amplitude 2

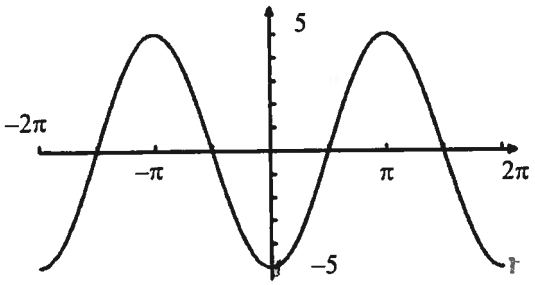
$\frac{2\pi}{b} = \frac{4\pi}{1}$

$4\pi b = 2\pi$

Period 4π

Equation $y = 2\sin\frac{1}{2}\theta$

12.



Amplitude 5

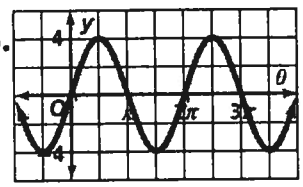
$\frac{2\pi}{b} = \frac{2\pi}{1}$

Period 2π

Equation $y = -5\sin\theta$

Find the amplitude and period of each sine curve. Then write an equation for each curve.

13.



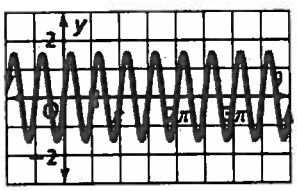
Amplitude 4

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

Period 2π

Equation $y = 4\sin\theta$

14.



Amplitude $1\frac{1}{2}$

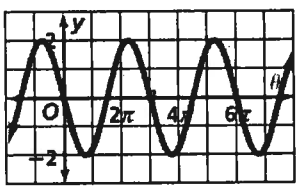
$\frac{2\pi}{b} = \frac{\pi}{2}$

$4\pi = \pi b$

Period $\frac{\pi}{2}$

Equation $y = 1.5\sin 4\theta$

15.



Amplitude 2

$\frac{2\pi}{b} = \frac{3\pi}{1}$

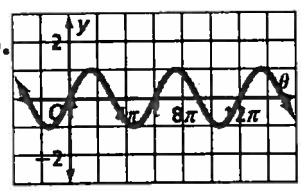
$3\pi b = 2\pi$

$b = \frac{2}{3}$

Period 3π

Equation $y = -2\sin\frac{2}{3}\theta$

16.



Amplitude 1

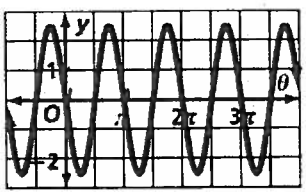
$\frac{2\pi}{b} = \frac{6\pi}{1}$

$6\pi b = 2\pi$

Period 6π

Equation $y = \sin\frac{1}{3}\theta$

17.



Amplitude $2\frac{1}{2}$

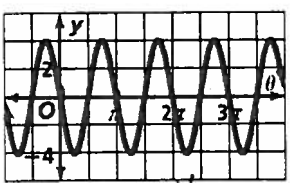
$\frac{2\pi}{b} = \pi$

$\pi b = 2\pi$

Period π

Equation $y = -2.5\sin 2\theta$

18.



Amplitude 4

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

$2\pi = b\pi$

Period π

Equation $y = -4\sin 2\theta$

Write a sine function for each description. Assume that $a > 0$.

19. amplitude = 2; period = π

$y = 2\sin 2\theta$

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

$\pi b = 2\pi$

20. amplitude = 3; period = 2π

$y = 3\sin\theta$

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

21. amplitude = 2; period = $\frac{\pi}{2}$

$\frac{2\pi}{b} = \frac{\pi}{2}$ $y = 2\sin 4\theta$

$4\pi = b\pi$

22. amplitude = 2; period = $\frac{\pi}{4}$

$y = 2\sin 8\theta$

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

$\pi b = 8\pi$

23. amplitude = 1.5; period = $\frac{\pi}{3}$

$y = 1.5\sin 6\theta$

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

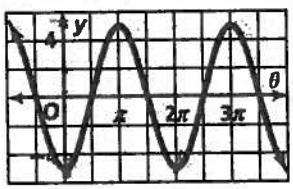
24. amplitude = 2.5; period = 2π

$y = 2.5\sin\theta$

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

Write an equation of a cosine function for each graph.

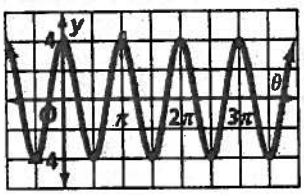
25.



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

$y = -5\cos\theta$

26.

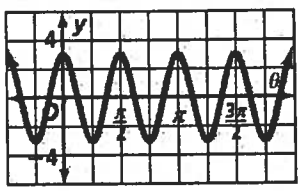


$\frac{2\pi}{b} = \frac{\pi}{1}$

$2\pi = b\pi$

$y = 4\cos 2\theta$

27.



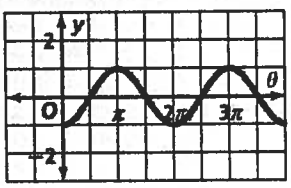
$\frac{\pi}{2} = \frac{2\pi}{b}$

$2\pi = b$

$y = 3\cos 4\theta$

Find the period and amplitude of each cosine function. Identify where the maximum value(s), minimum value(s), and zeros occur in the interval from 0 to 2π.

28.



Amplitude 1

Period 2π

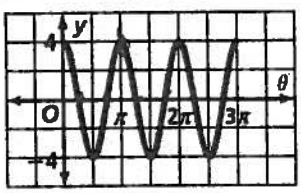
Equation $y = -\cos\theta$

Zeros $\frac{\pi}{2}, \frac{3\pi}{2}$

Max $(\pi, 1)$

Min $(0,-1)\ (2\pi,-1)$

29.



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

Period π

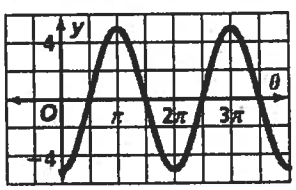
Equation $y = 4\cos 2\theta$

Zeros $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

Max $(0,4)\ (\pi,4)\ (2\pi,4)$

Min $(\frac{\pi}{2},-4)\ (\frac{3\pi}{2},-4)$

30.



Amplitude 5

Period 2π

Equation $y = 5\cos\theta$

Zeros $\frac{\pi}{2}, \frac{3\pi}{2}$

Max $(\pi, 5)$

Min $(0,-4)\ (2\pi,-4)$

Write a cosine function for each description. Assume that $a > 0$.

31. amplitude = 2π, period = 1

$y = 2\pi \cos 2\pi\theta$

32. amplitude = $\frac{1}{2}$, period = π

$y = \frac{1}{2} \cos 2$

33. amplitude = $\frac{3}{5}$, period = $\frac{3\pi}{2}$

$y = \frac{3}{5} \cos \frac{4}{3}\pi$

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

$\frac{3\pi b}{3\pi} = \frac{4\pi}{3\pi}$

34. amplitude = 3, period = 4

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

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

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