

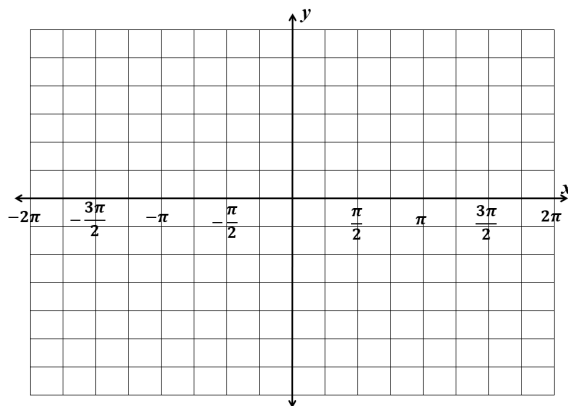
Write your questions
and thoughts here!Standard equations: $y = a \cos(b\theta) + d$ $y = a \sin(b\theta) + d$ **Amplitude:** _____ Half the difference between the maximum and minimum values.**Midline:** A horizontal line halfway between the maximum and minimum values. It is determined by finding the average of the maximum and minimum values. The concavity of the sinusoid will change when it crosses the midline. The equation for the midline is _____.**Period (cycle):** _____ The reciprocal of frequency. The change in θ values required for the function to complete one full cycle.**Frequency:** _____ The reciprocal of period. The number of cycles the graph completes per one radian.**Graph the following sinusoid functions.**

1. $f(x) = 3 \sin(2x)$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

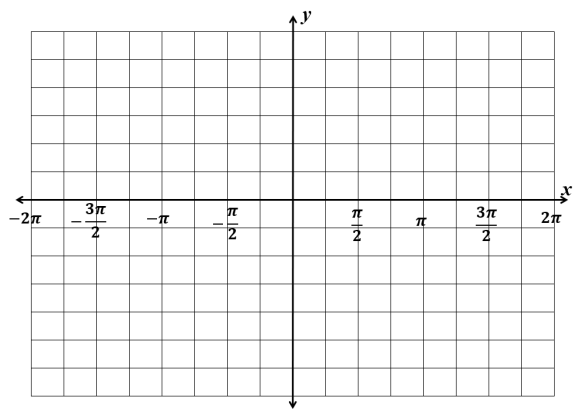


2. $y = -2 \cos\left(\frac{x}{2}\right)$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____



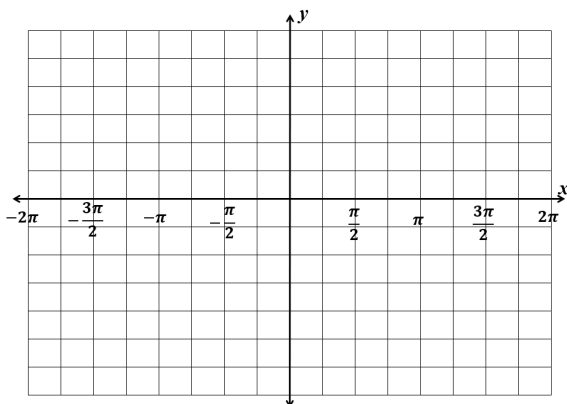
Write your questions and thoughts here!

3. $y = 2 \sin\left(\frac{x}{2}\right) + 1$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

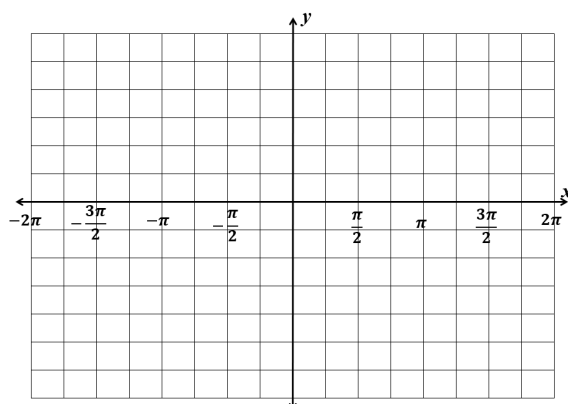


4. $y = 3 - 4 \cos(2x)$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____



3.6A Sinusoidal Function Transformations

AP Precalculus

3.6A Practice

Identify the amplitude, period, and frequency of each function.

1. $f(\theta) = 13 \sin(2\theta) - 7$

Amp: _____ Period: _____

Freq: _____

2. $g(t) = 5 - 6 \cos(\pi t)$

Amp: _____ Period: _____

Freq: _____

3. $h(\theta) = -24 \sin(8\pi\theta)$

Amp: _____ Period: _____

Freq: _____

Use the given information to create a *sine* function.

4.
 Amplitude: 5
 Period: 4π
 Vertical Shift: down 4

5.
 Amplitude: 2
 Period: $\frac{3\pi}{5}$
 Vertical Shift: up 9

6.
 Amplitude: 1
 Period: 4
 Vertical Shift: up 1

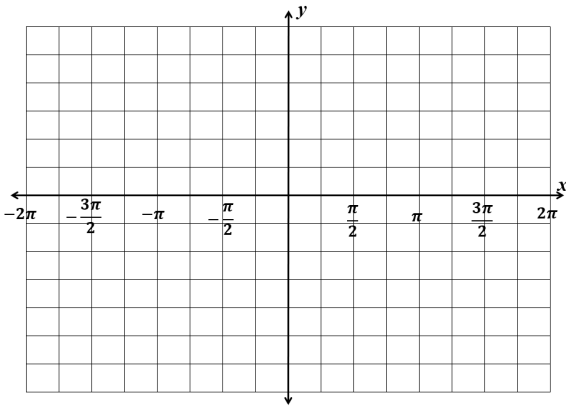
Identify the listed information and graph the trig function.

7. $y = 4 \sin\left(\frac{x}{2}\right)$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

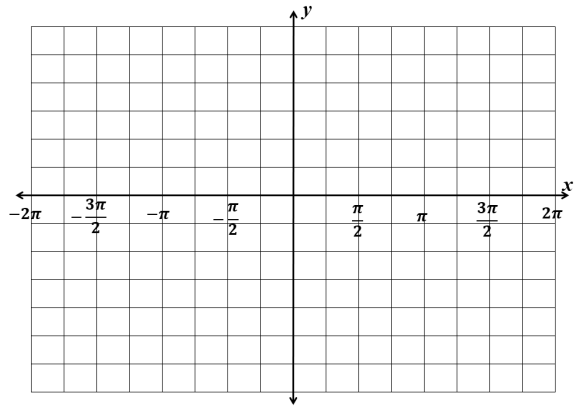


8. $y = -2 \cos\frac{1}{2}\theta$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

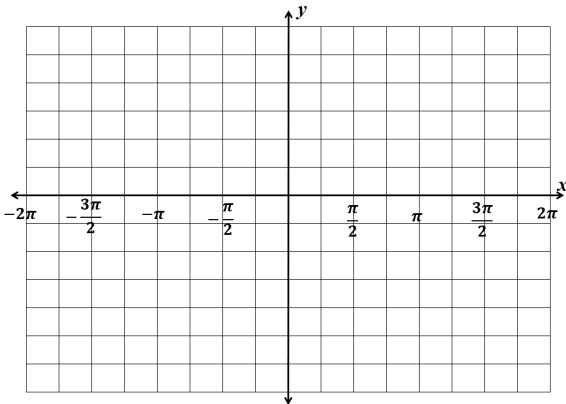


9. $y = -\cos 4x$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

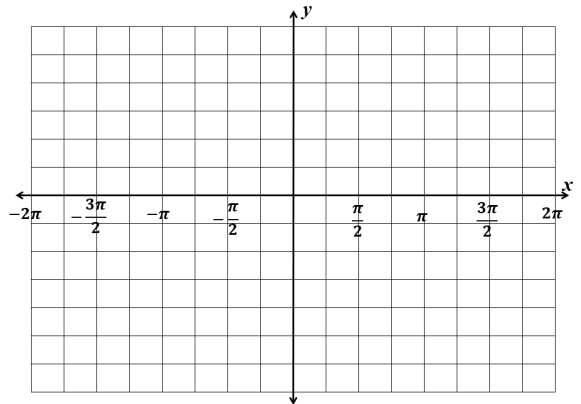


10. $y = -3 \cos 2x$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

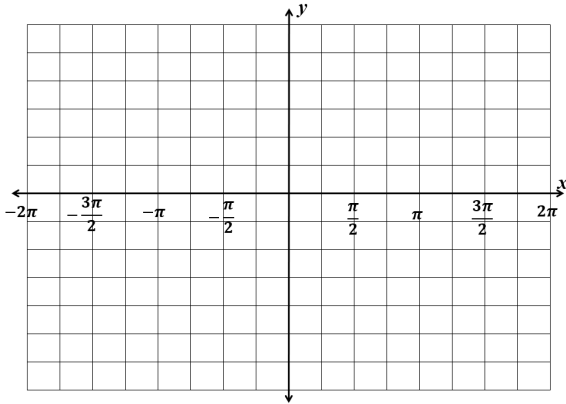


11. $y = 3 \sin x - 1$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

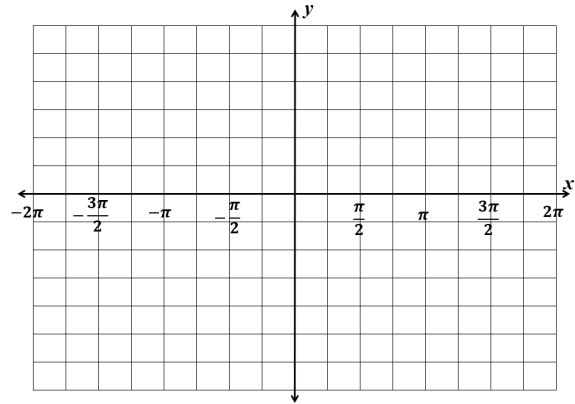


12. $y = -3 + 4 \sin \frac{2}{3}x$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

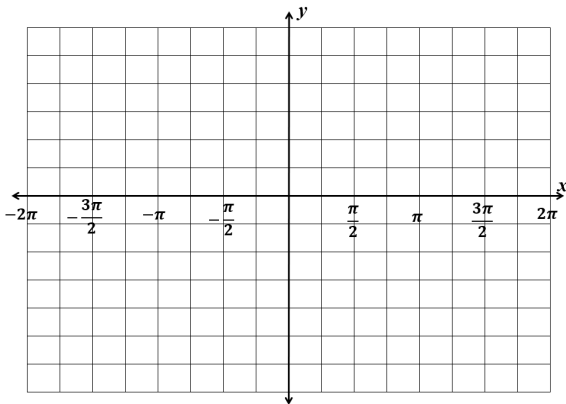


13. $y = 2 - 3 \sin \left(\frac{x}{2}\right)$

Amp: _____ Period: _____

Midline: _____ Freq: _____

Max value: _____ Min value: _____

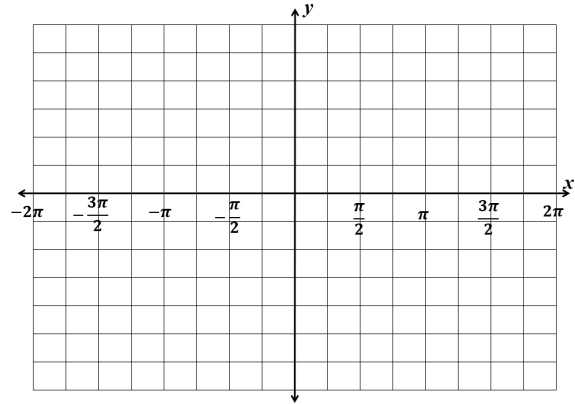


14. $y = -2 \cos(2x) + 4$

Amp: _____ Period: _____

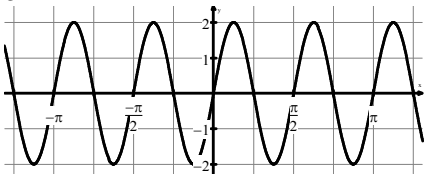
Midline: _____ Freq: _____

Max value: _____ Min value: _____



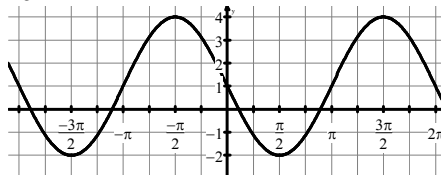
Write the equation of the following *sine* curves.

15.



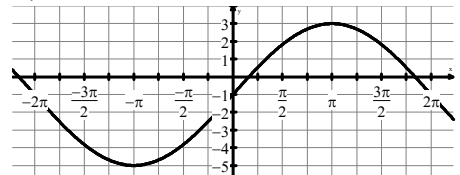
$y =$ _____

16.



$y =$ _____

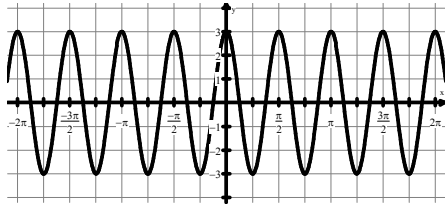
17.



$y =$ _____

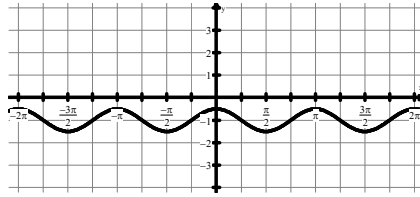
Write the equation of the following *cosine* curves.

18.



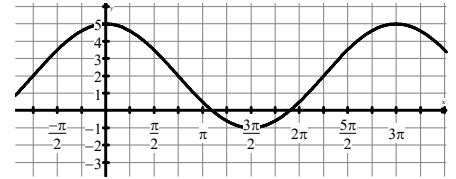
$y =$ _____

19.



$y =$ _____

20.



$y =$ _____

3.6A Sinusoidal Function Transformations

3.6A Test Prep

21. **Calculator active.** The cycle between low tides and high tides at a beachfront town can be measured by

$$f(x) = a \sin(bx) + d$$

where a , b , and d are constants. The maximum value of the tide is 12.04 feet, and the minimum value of the tide is 1.36 feet. Assuming we know the values of b and d , which of the following would best define $f(x)$?

- (A) $10.68 \sin(bx) + d$
- (B) $6.7 \sin(bx) + d$
- (C) $6.02 \sin(bx) + d$
- (D) $5.34 \sin(bx) + d$

22. **Calculator active.** The table gives minimum temperature, in degrees Fahrenheit, on the first day of each of 8 months in a certain city. The function f given by $f(\theta) = a \sin(b\theta) + d$, where a , b , and d are constants, is used to model these data with θ representing the number of the month. Assume the period of f is 12 months.

Month	1	2	3	4	5	6	7	8
Temperature (degrees Fahrenheit)	28.6	23.2	34.9	40.3	48.6	56.7	61.0	68.2

Based on the data in the table, which of the following is the best value for d ?

- (A) $\frac{\pi}{6}$
- (B) 22.5
- (C) 45
- (D) 45.7

23. The table gives ordered pairs for seven points from a larger data set. The larger data set can be modeled by a sinusoidal function f with a period of 6. The minimum values of the data set occur at x -values that are multiples of 6.

x	0	1	2	3	4	5	6
$f(x)$	-4	-1	3	6	3	-1	-4

Which of the following best defines $f(x)$ for the larger data set?

- (A) $-4 \cos(12\pi x) + 1$
- (B) $-4 \cos\left(\frac{\pi}{3}x\right) + 1$
- (C) $-5 \cos(12\pi x) + 1$
- (D) $-5 \cos\left(\frac{\pi}{3}x\right) + 1$