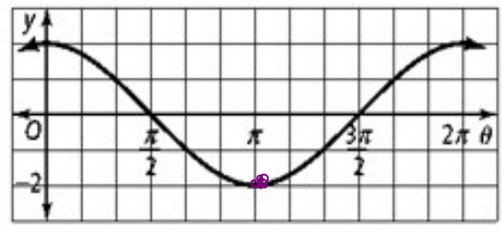
Cosine Functions

- operate the same way sine functions do

-cosine functions start at the maximum or the minimum

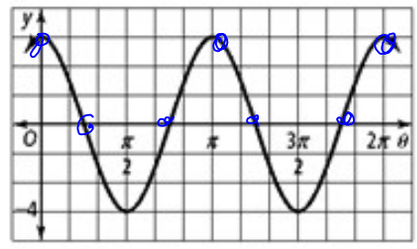
Find the period and the amplitude of each cosine function. Then determine where the maximum values, minimum values, and zeros occur in the interval from 0 to 2π.

1.



amp: 2
cycles: 1
Period = 2π
Max: 0, 2π
Min: π
Zeros: $\pi/2$, $3\pi/2$

2.



amp: 4
cycles = 2
Period = $\frac{2\pi}{2} = \pi$
Max: 0, π, 2π
Min $\pi/2$, $3\pi/2$
zeros: $\pi/4$, $3\pi/4$, $5\pi/4$, $\frac{7\pi}{4}$

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

$y = a \cos b\theta$

$\text{Period} = 2\pi/b$

3. amplitude 2π, period 1

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

$b = 2\pi$

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

4. amplitude 2, period π/2

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

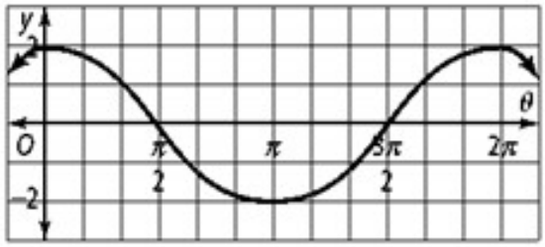
$b\pi = 4\pi$

$b = 4$

$y = 2 \cos 4\theta$

Write an equation of a cosine function for each graph.

5)

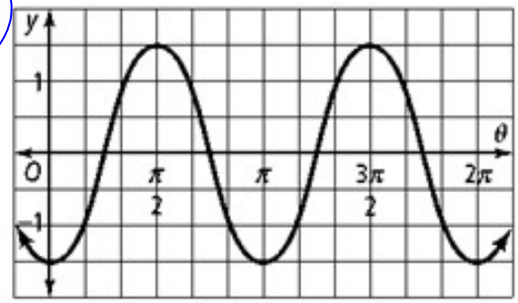


amp = 2

cycles = 1

$y = 2\cos\theta$

6)



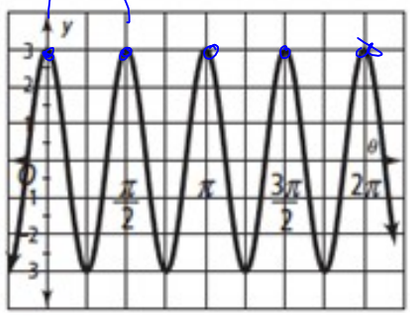
amp = $\frac{3}{2}$

cycles 2

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

Identify the period, cycles and amplitude of each function.

7)

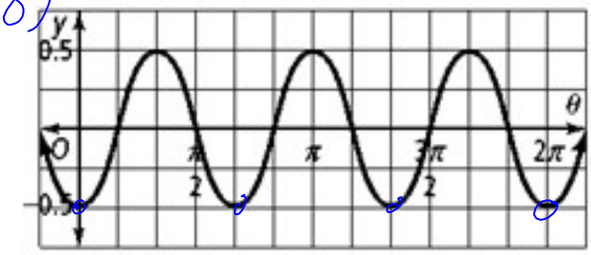


amp = 3

cycles 4

Period = π/2

8)



amp = 1/2

cycles = 3

Period = 2π/3

Identify the period, cycles and amplitude of each function.

9) $y = 3\cos 2\theta$

amp = 3

cycles = 2

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

10) $y = 0.5\cos\theta$

amp = 0.5

cycles: 1

Period = 2π

11) $y = -2\cos 4\theta$

amp 2

cycles: 4

Period: $\frac{2\pi}{4} = \frac{\pi}{2}$

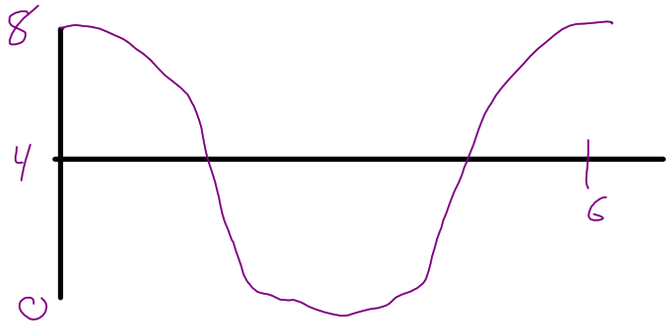
12 $y = \cos 2\theta$

amp: 1

cycles: 2

Period = π

13) A helicopter lowers a rope ladder to a scuba diver floating on the ocean surface. The wave crests at 8ft above the lowest level of the water every 6 s. Write a cosine equation to describe the height of the diver as a function of time.



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

amp = 4

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

$6b = 2\pi$

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