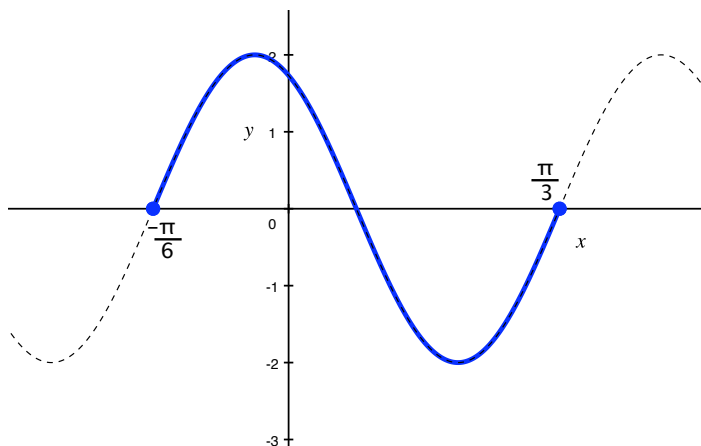


Math 120 Quiz #4 Solutions

1. The graph of one complete period of a sine or cosine curve is given.



- (a) (3 pts.) Find the amplitude, period, and phase shift.

Since the curve oscillates between -2 and 2 , the amplitude is 2 .

Answers for the phase shift will vary.

If you are using a sine curve, the phase shift may be $-\frac{\pi}{6}$, which means that the curve is shifted $\frac{\pi}{6}$ to the left.

To calculate the period, note that the curve goes through one complete cycle from $x = -\frac{\pi}{6}$ to $x = \frac{\pi}{3}$.

So, the period is $P = \frac{\pi}{3} - (-\frac{\pi}{6}) = \frac{\pi}{2}$.

- (b) (3 pts.) Write an equation that represents the curve in the form

$$y = a \sin k(x - b) + c \quad \text{or} \quad y = a \cos k(x - b) + c.$$

Answers will vary.

Using a sine curve with the information stated above, we have that $y = 2\sin 4(x + \frac{\pi}{6})$.

Note: Since the period is $\frac{\pi}{2} = \frac{2\pi}{k}$, $k = 4$.

2. $f(x) = 50 + 20\cos(1000\pi t)$

- (a) (2 pts.) What is the period of $f(x)$?

The period of $f(x) = \frac{2\pi}{1000\pi} = \frac{1}{500} = 0.002$.

- (b) (2 pts.) What are the maximum and minimum values of $f(x)$?

The amplitude of the function is 20 and the mean is 50 . The function will oscillate between the values $50 - 20 = 30$ and $50 + 20 = 70$.

So, the maximum value of $f(x)$ is 70 and the minimum value is 30 .