

Math 150 Lecture Notes Trigonometric Graphs

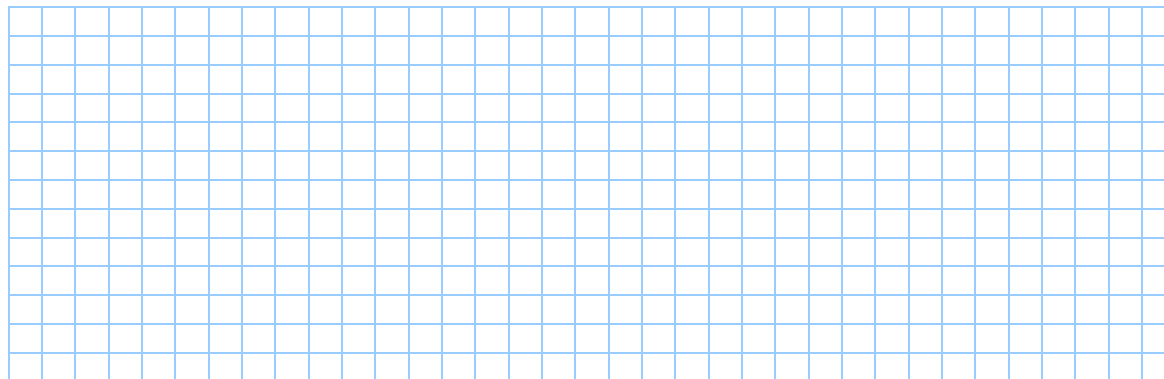
A function f is **periodic** if there is a positive number p such that $f(t + p) = f(t)$ for every t . The least such positive number (if it exists) is the **period** of f . If f has period p , then the graph of f on any interval of length p is called **on complete period** of f .

The sine and cosine function has period 2π . $\sin(t + 2\pi) = \sin t$ $\cos(t + 2\pi) = \cos t$

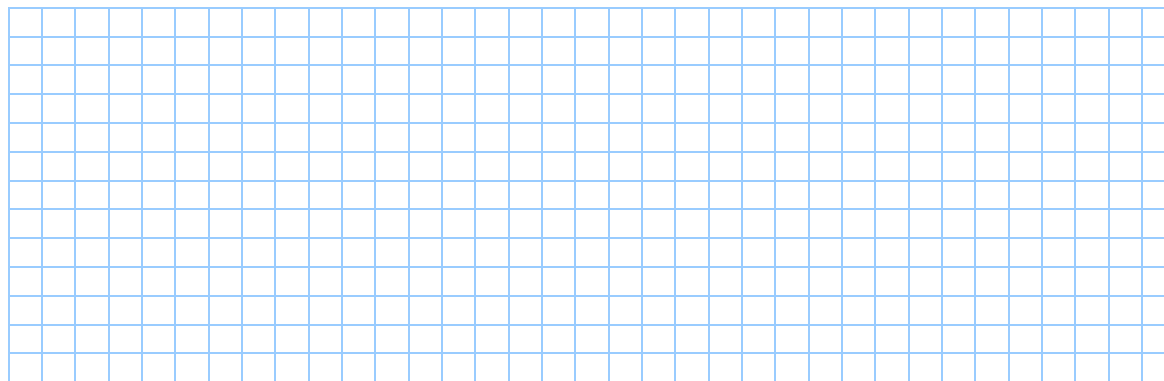
The sine and cosine curves $y = a \sin k(x - b)$ and $y = a \cos k(x - b)$ ($k > 0$)
have amplitude $|a|$, period $\frac{2\pi}{k}$, and phase shift b .

An appropriate interval on which to graph one complete period is $\left[b, b + \frac{2\pi}{k} \right]$.

Example 1: Graph $f(x) = 4 - 2 \sin x$

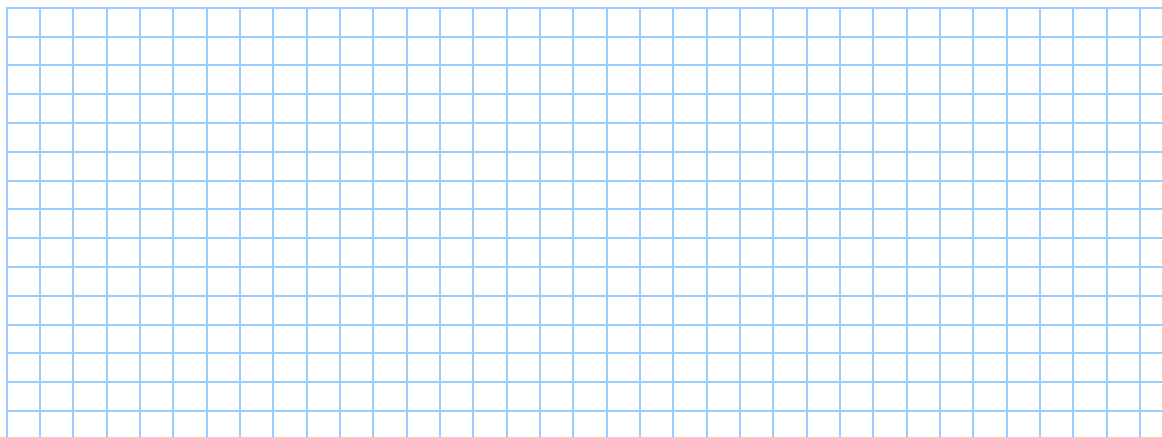


Example 2: Find the amplitude and period and sketch the graph of $g(x) = -3 \sin \pi x$.



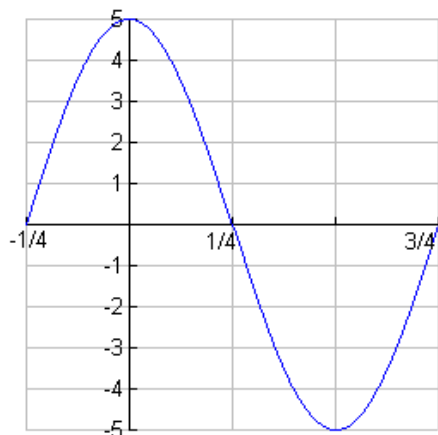
Example 3: Find the amplitude, period, and phase shift and graph one complete period of

$$g(x) = \sin \frac{1}{2} \left(x + \frac{\pi}{4} \right).$$



Example 4: The graph of one complete period of a sine or cosine curve is given.

- (a) Find the amplitude, period, and phase shift.
- (b) Write an equation that represents the curve in the form $y = a \sin k(x - b)$ or $y = a \cos k(x - b)$.



Example 5: Determine an appropriate viewing rectangle and graph the function $h(x) = 3 \sin 120 x$.