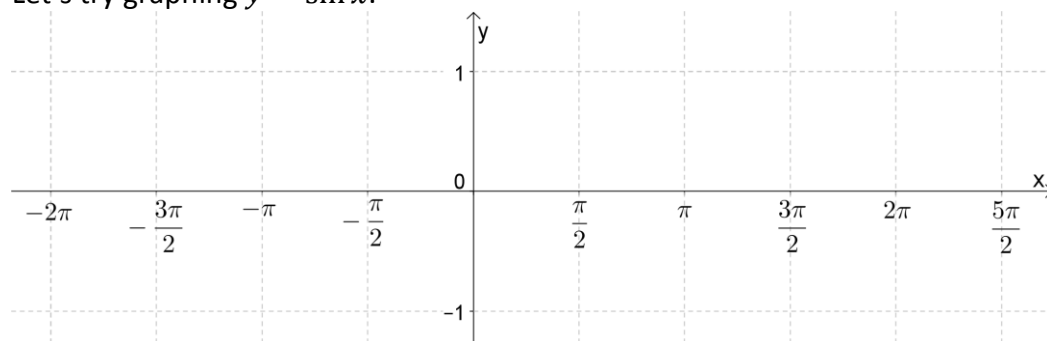


Graphs of the Sine and Cosine Functions

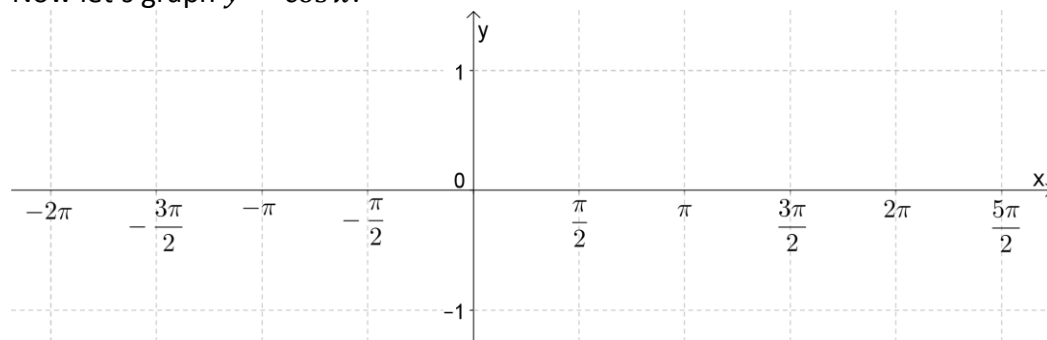
A **periodic function** is a function f such that $f(x) = f(x + np)$ for every real # x in the domain of f , every integer n , and some positive real number p . The least possible positive value of p is the **period** of the function.

Note: $\sin x$ and $\cos x$ are periodic with period _____.

Let's try graphing $y = \sin x$.

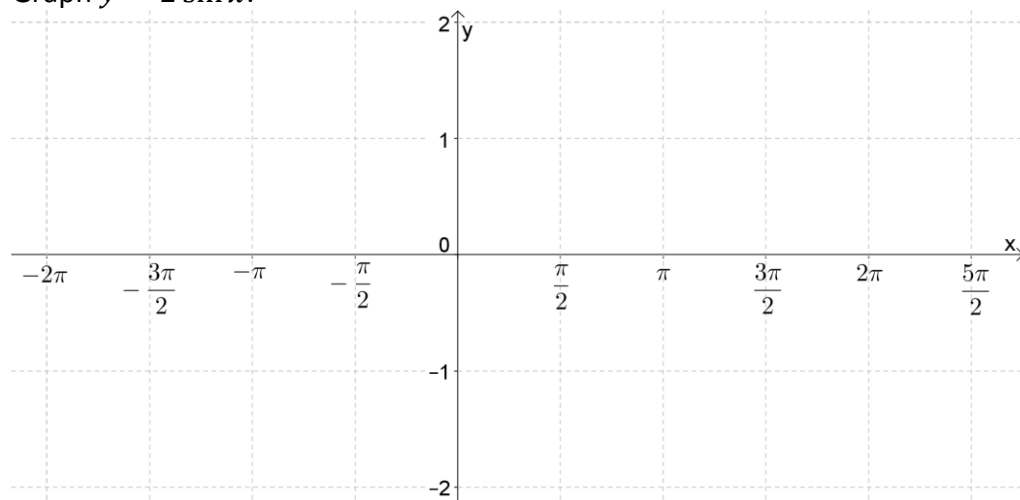


Now let's graph $y = \cos x$.



Ex 1.

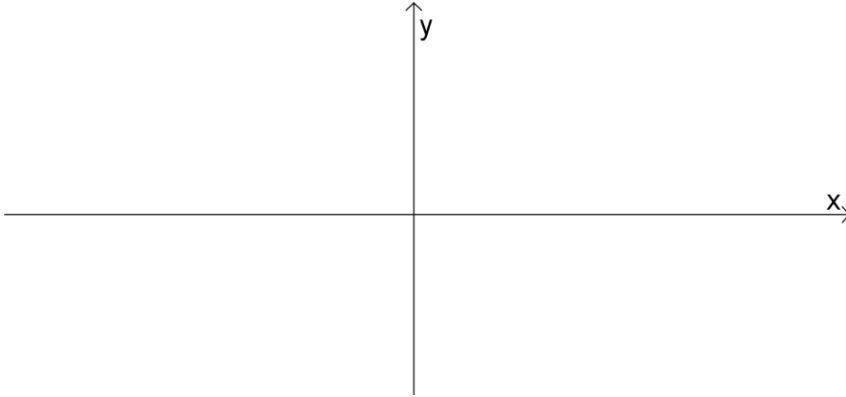
Graph $y = 2 \sin x$.



Note: The **amplitude** of a periodic function is half the difference between the maximum and minimum values. For $y = a \sin x$ and $y = a \cos x$ the amplitude is $|a|$.

Ex 2.

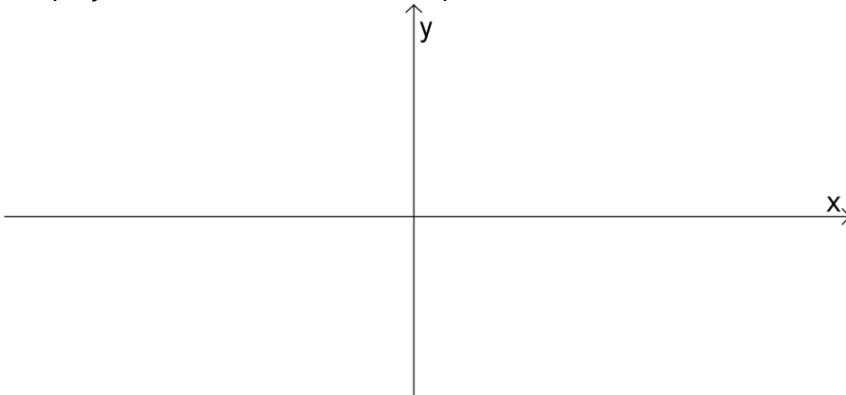
Graph $y = \sin 2x$ over a two-period interval.



Note: The period of both $y = \sin bx$ and $y = \cos bx$ is $\frac{2\pi}{b}$.

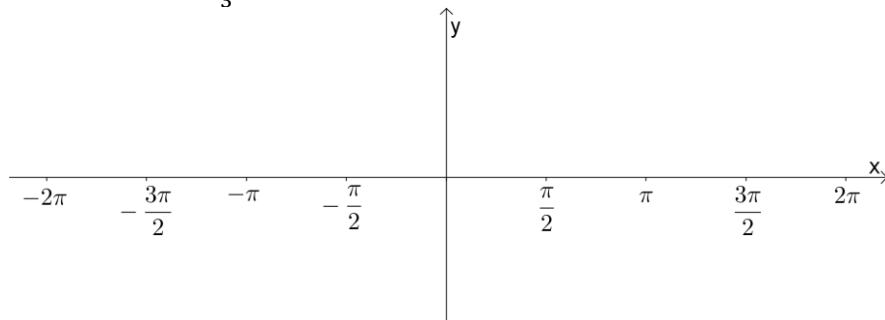
Ex 3.

Graph $y = -2 \cos 3x$ over a two-period interval.

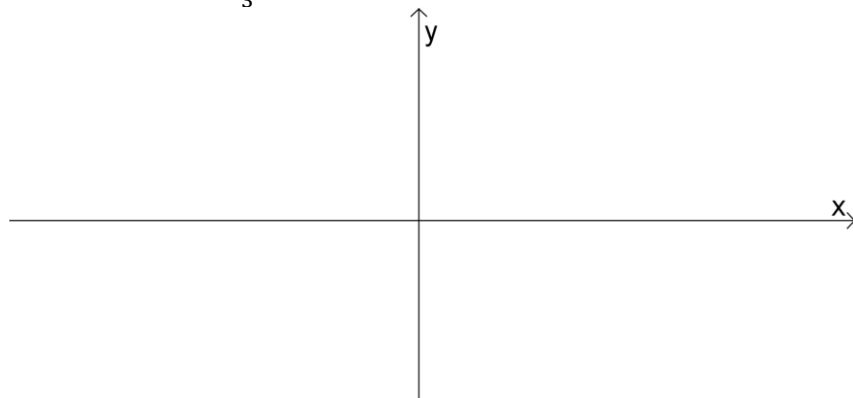


Practice

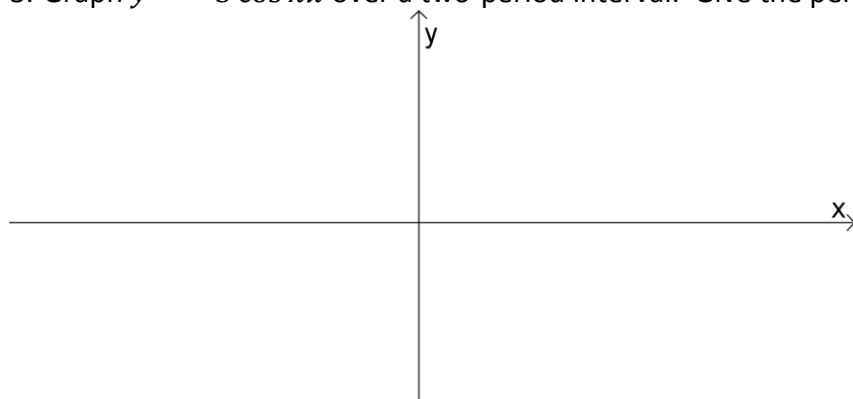
1. Graph $y = -\frac{2}{3}\sin x$ over the interval $[-2\pi, 2\pi]$. Give the amplitude.



2. Graph $y = \cos\frac{1}{3}x$ over a two-period interval. Give the period and the amplitude.



3. Graph $y = -3\cos \pi x$ over a two-period interval. Give the period and the amplitude.



Q: The following number is the only one of its kind. 8,549,176,320 Can you figure out what is so special about it?