

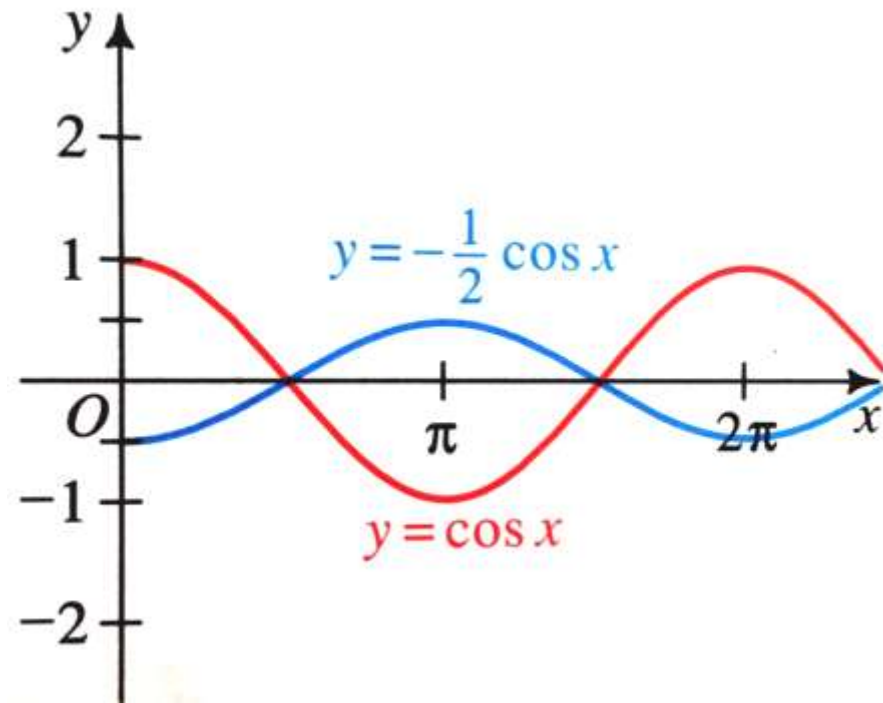
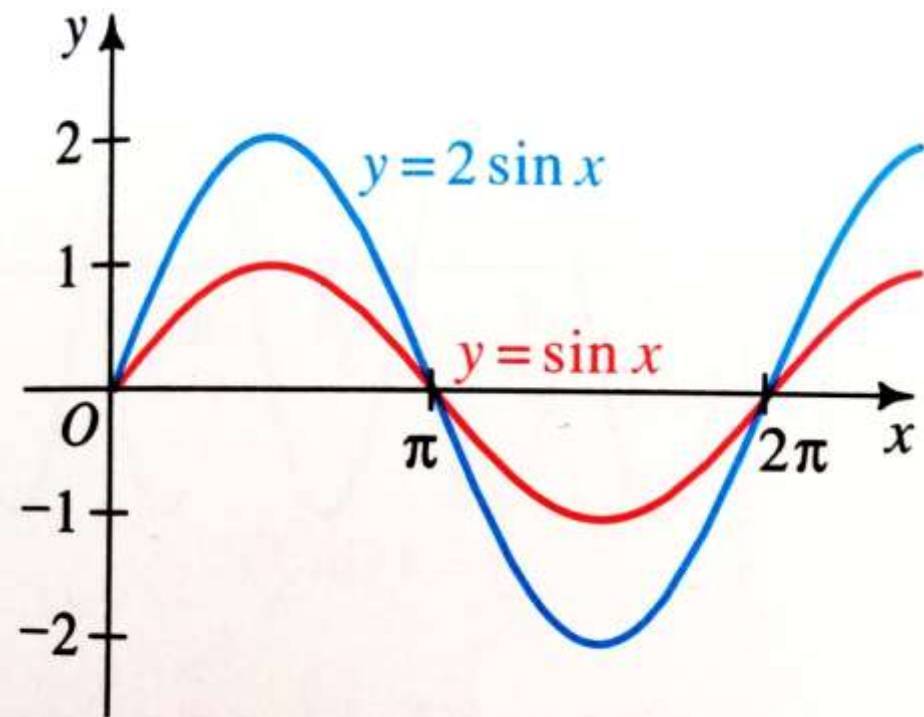
8.2 Sine and Cosine Curves

Objectives:

1. Find equations of sine and cosine curves
2. Apply the equations

Transformation Review

- Remember:
- $y = cf(x)$ is a **vertical stretch/shrink**
- $y = -f(x)$ is a **reflection over the x-axis**



Amplitude

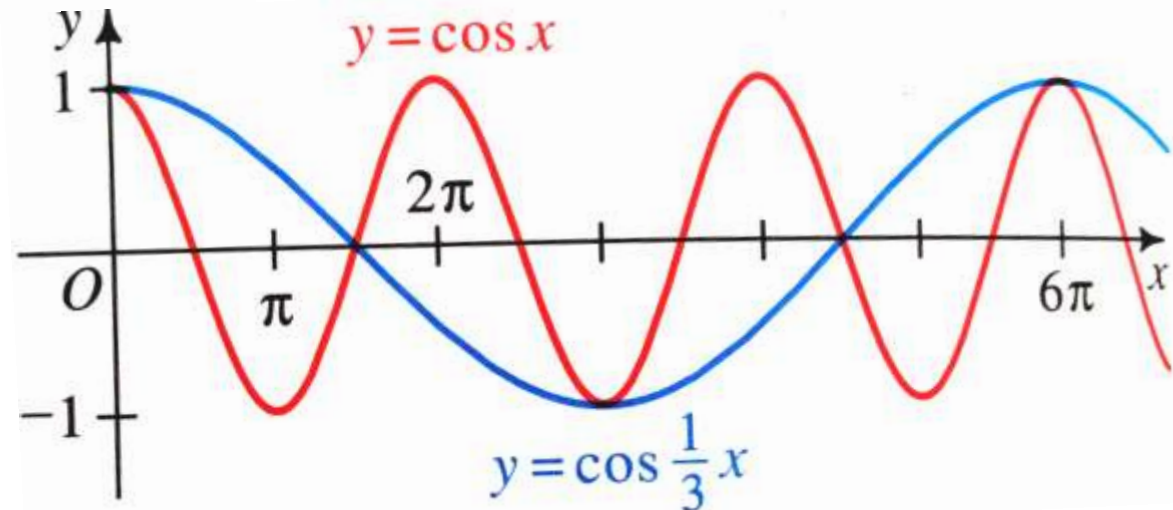
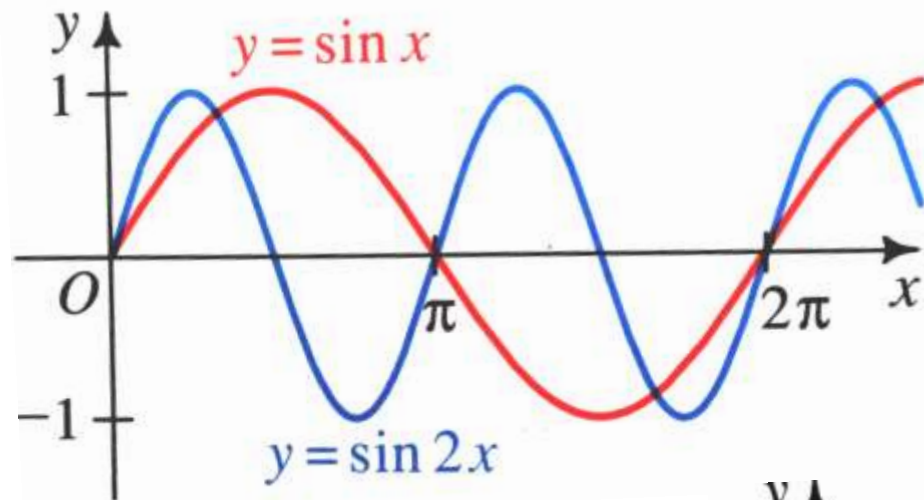
- The amplitude of $y = \sin x$ and $y = \cos x$ is 1.
- $y = 2 \sin x$ has amplitude: 2
- $y = -\frac{1}{2} \cos x$ has amplitude: $\frac{1}{2}$

- So, for $y = A \sin x$ and $y = A \cos x$ ($A \neq 0$):

$$\text{amplitude} = |A|$$

More Trans. Review

□ $y = f(\mathbf{c}x)$ is a **horizontal stretch/shrink**



Period

- The period of $y = \sin x$ and $y = \cos x$ is 2π .
- $y = \sin 2x$ has period: $\frac{2\pi}{2} = \pi$
- $y = \cos \frac{1}{3}x$ has period: $\frac{2\pi}{\frac{1}{3}} = 6\pi$
- So, for $y = \sin Bx$ and $y = \cos Bx$:

$$\text{period} = \frac{2\pi}{|B|}$$

Example:

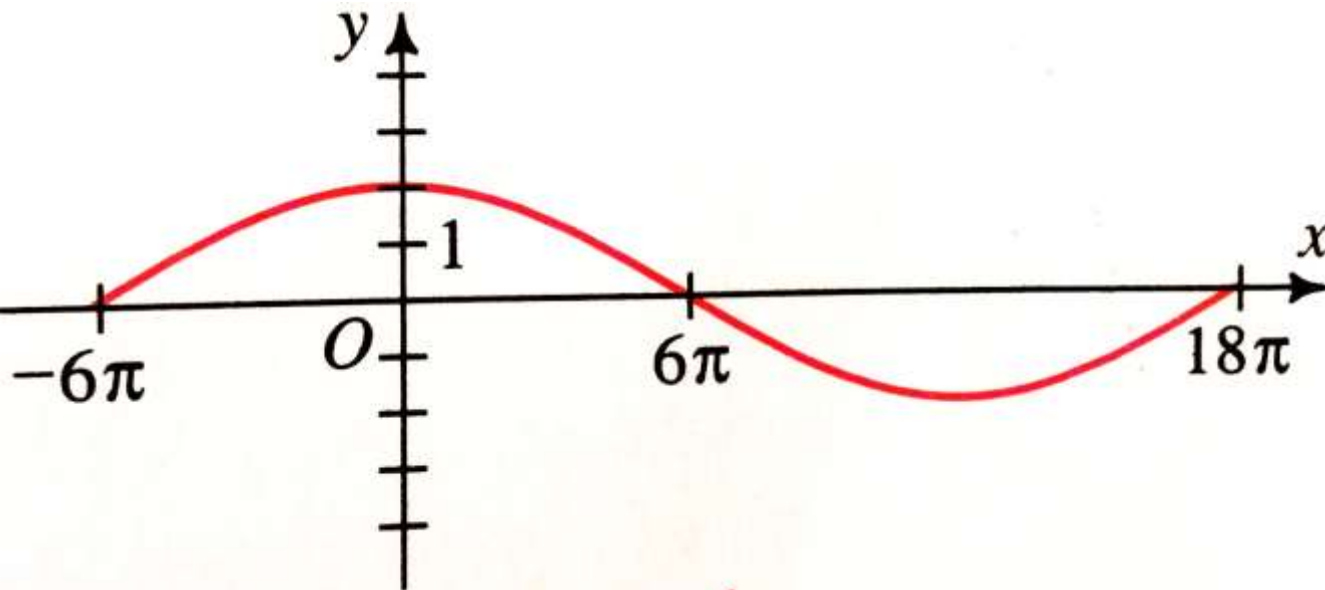
- Give the amplitude and period of $y = -4 \sin 3x$. Sketch its graph.

You Try!

- Give the amplitude and period of $y = -3 \cos \frac{\pi}{3} x$ and sketch its graph.

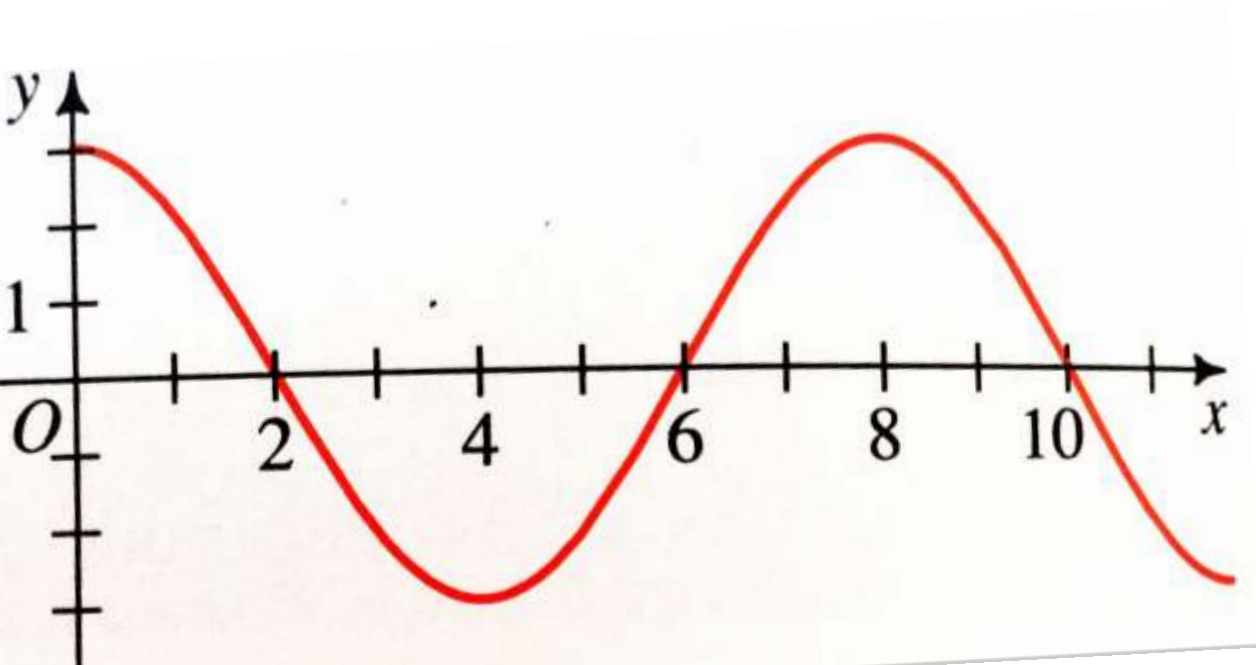
Example:

- Give the amplitude, period, and an equation of the graph shown.



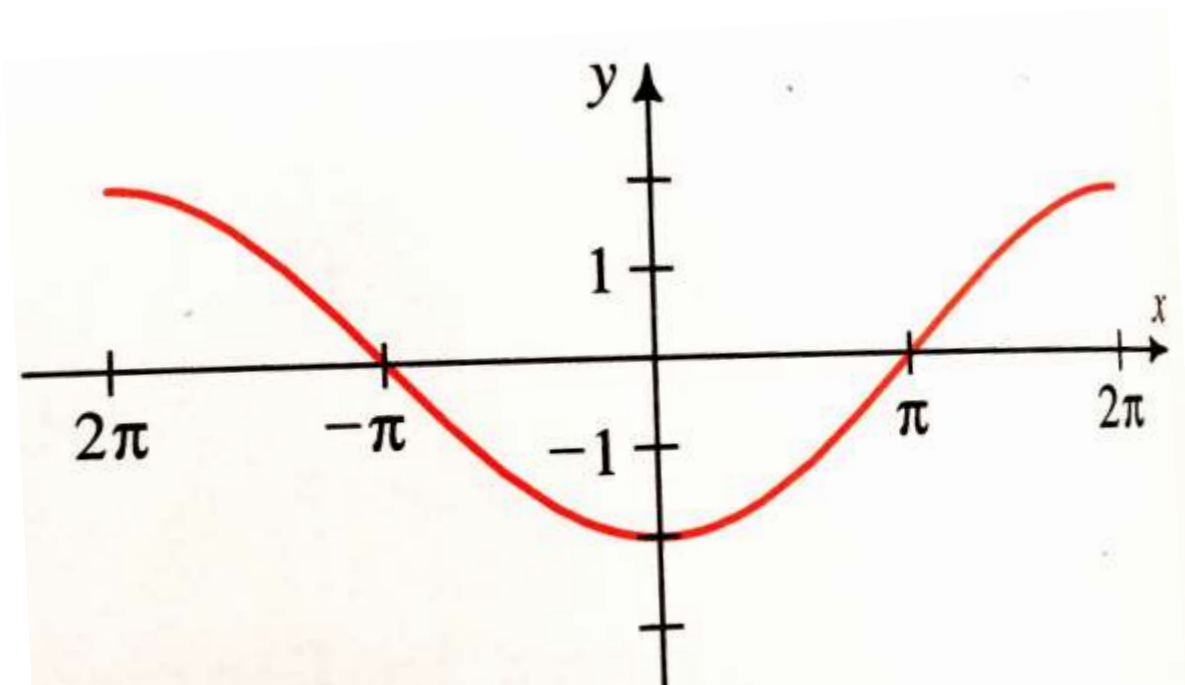
Example:

- Give the amplitude, period, and an equation of the graph shown.



You Try!

- Give the amplitude, period, and an equation of the graph shown.



Solving Equations

- To solve algebraically:
 - Isolate the “trig part”
 - Use inverse trig to find an angle
 - Find others within the restrictions
 - Solve for x

Example:

- Solve $6 \sin 2x = 5$ for $0 \leq x < 2\pi$ to the nearest hundredth of a radian.

Solving Graphically

- Graph $y =$ each side of the equation.
- Find x -coordinates of all intersection points within the restrictions.

Example:

- Solve $6 \sin 2x = 5$ for $0 \leq x < 2\pi$
(by graphing).

You Try!

- Solve $4 \sin \frac{1}{2} x = 3$ for $0 \leq x < 2\pi$ to the nearest hundredth of a radian.
(Using either method.)