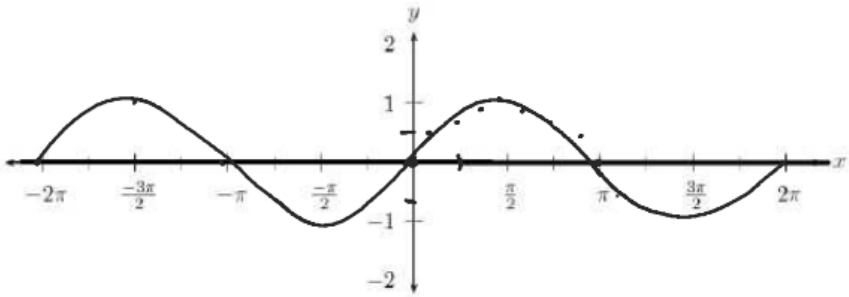
What you'll Learn About

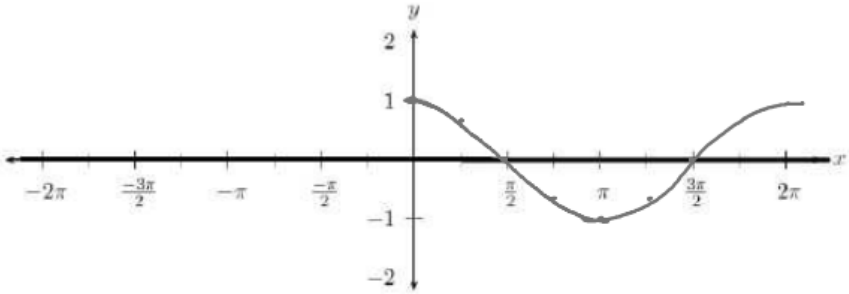
- The basic waves revisited/Sinusoids and Transformations
- Modeling

The graph of y = sin x



x	y
0	0
π/6	1/2
π/4	√2/2 ≈ .707
π/3	√3/2 ≈ .866
π/2	1
2π/3	√3/2 ≈ .8660
3π/4	√2/2 ≈ .707
5π/6	1/2
π	0
7π/6	−1/2
5π/4	−√2/2 ≈ −.707
4π/3	−√3/2 ≈ −.8660
3π/2	−1

The graph of y = cos x



x	y
0	1
π/6	√3/2 ≈ .8660
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π/3	1/2
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x	y
7π/6	−√3/2 ≈ −.866
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4π/3	−1/2
3π/2	0

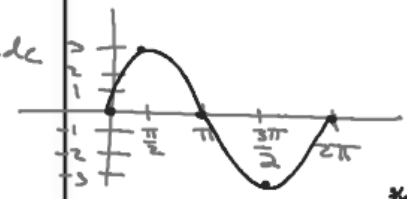
$y = A \sin x$

$y = A \cos x$

$|A|$ = Amplitude

Find the amplitude of the function and use the language of transformations to describe how the graph of the function is related to the graph of y = sinx

A) y = 3sinx

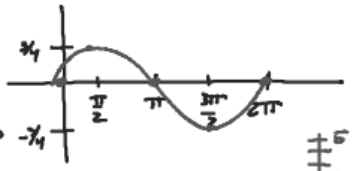


Vertical Stretch by a factor of 3

B) $y = \frac{3}{4}\sin x$

$A = \frac{3}{4}$

Vertical Compression by a factor of 3/4

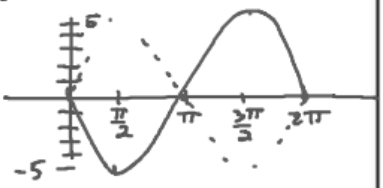


C) y = -5sinx

A = 5

Vert stretch by a factor of 5

Reflect over x-axis



$y = A \sin Bx$

$y = A \cos Bx$

$\text{Period} = \frac{2\pi}{B}$

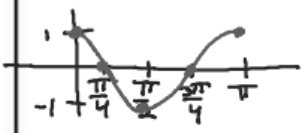
$\frac{\frac{2\pi}{1} \cdot \frac{4}{3}}{\frac{3}{4}} = \frac{8\pi}{3}$

Find the period of the function and use the language of transformations to describe how the graph of the function is related to the graph of y = cosx

A) y = cos(2x)

$Per = \frac{2\pi}{B}$

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



B) $y = \cos\frac{x}{2}$

$B = \frac{1}{2}$

$Per = \frac{2\pi}{B}$

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

$= 4\pi$

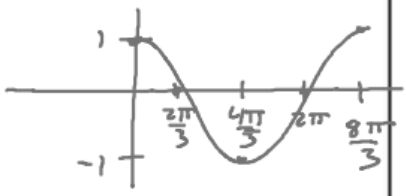
C) $y = \cos\left(\frac{-3x}{4}\right)$

$y = \cos \frac{3}{4} x$

$B = \frac{3}{4}$

$Per = \frac{2\pi}{B}$

$= \frac{2\pi}{\frac{3}{4}}$

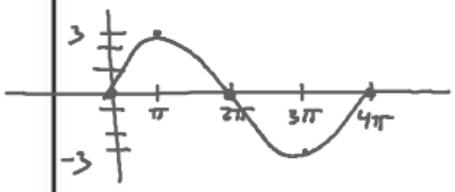


Graph 1 period of the function without using your calculator.

A) $y = 3\sin\frac{x}{2}$

Amp = 3

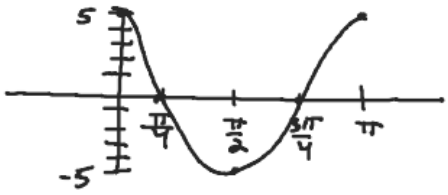
Per $\frac{2\pi}{\frac{1}{2}} = 4\pi$



$y = 5\cos 2x$

Amp = 5

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



Identify the maximum and minimum values and the zeros of the function in the interval $[-2\pi, 2\pi]$. Use your understanding of transformations, not your calculator.

A) y = 4 sin x

B) $y = -2\cos\frac{x}{3}$