

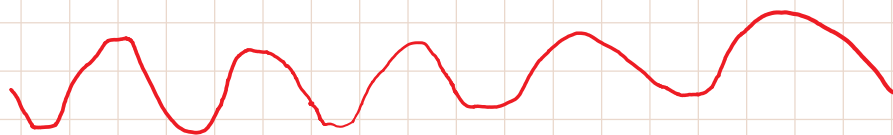
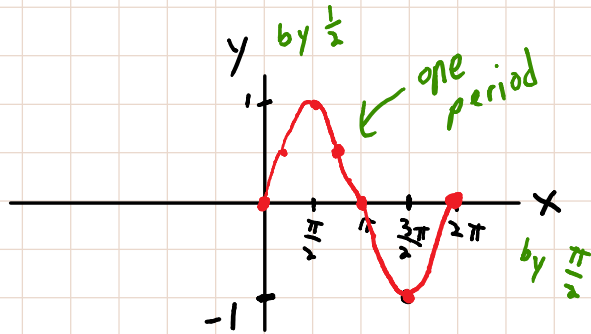
Section 5.5: Cartesian Graphs of Sine and Cosine

Friday, January 24, 2014 12:25 PM

Goal: To graph functions of the forms $y = a \cos(bx)$ and $y = a \sin(bx)$ on the xy -plane.

ex) Graph one period of $y = \sin x$

x	y
0	0
$\frac{\pi}{6}$	$\frac{1}{2}$
$\frac{\pi}{2}$	1
$\frac{5\pi}{6}$	$\frac{1}{2}$
π	0
$\frac{3\pi}{2}$	-1
2π	0

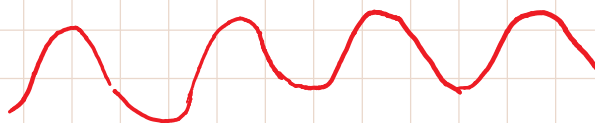
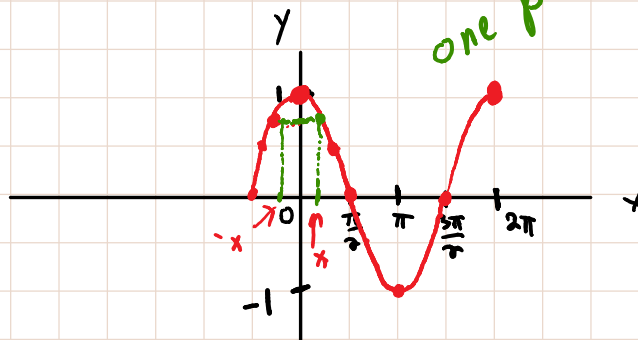


Notes on $y = \sin x$

- ① Domain: $(-\infty, \infty)$
- ② Range: $[-1, 1]$
- ③ Period: 2π
- ④ Amplitude is 1 $\left(\frac{|\max ht - \min ht|}{2}\right)$
- ⑤ odd function ($\sin(-x) = -\sin x$)

ex) Graph one period of $y = \cos x$

x	y
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1



Notes on $y = \cos x$

- ① Domain, range, period, amp all same as $y = \sin x$
- ② Its even fctn.
($\cos(-x) = \cos x$)

ex) Graph one period

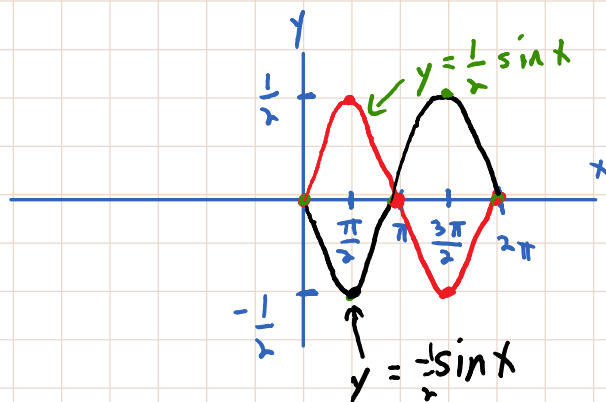
a) $f(x) = -\frac{1}{2} \sin x$

$$p = 2\pi$$

$$\text{Amp} = \left| -\frac{1}{2} \right| = \frac{1}{2}$$

$-\frac{1}{2} < 0$ reflects original graph across x-axis

$$f(x) = -\frac{1}{2} \sin x$$



b) $y = 3 \sin\left(\frac{1}{2}x\right)$

$$\text{Amp} = 3$$

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

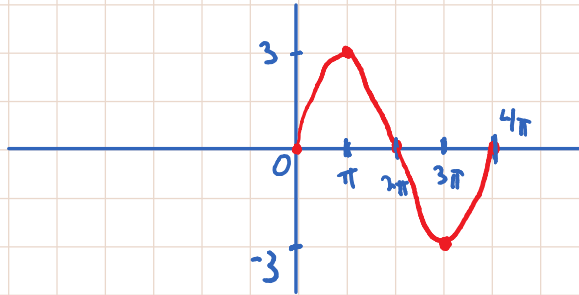
$$y = a \sin(bx) \text{ and } y = a \cos(bx)$$
$$p = \left| \frac{2\pi}{b} \right| = \frac{2\pi}{b} \text{ when } b > 0$$

Formula

$$\text{Amp} = 3$$

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

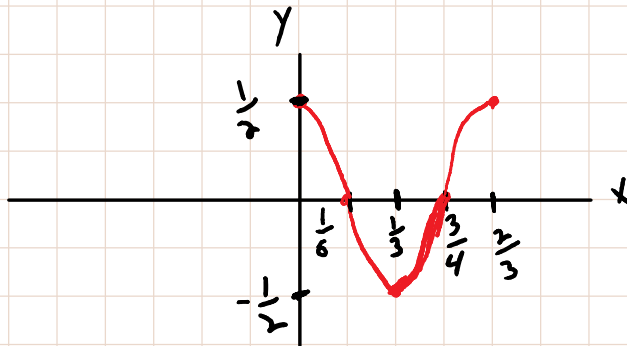
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period formula



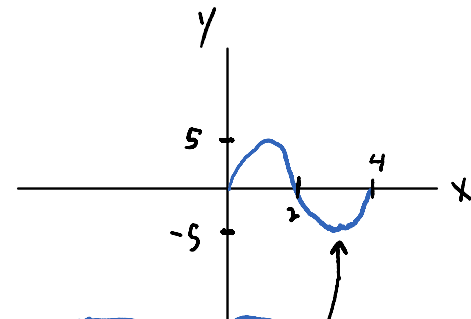
(ex) Graph 1 period $y = \frac{1}{2} \cos(3\pi x)$

$$\text{Amp} = \left| \frac{1}{2} \right| = \frac{1}{2}$$

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



Warm-up: Find the equation of graph



$y = 5 \sin\left(\frac{\pi}{4}x\right)$
 answer

clue: $y = a \sin(bx)$ find

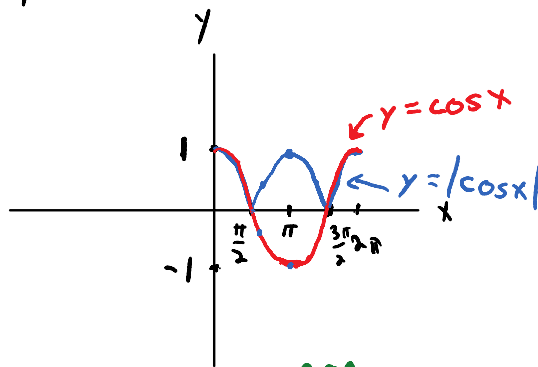
$a = 5$

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

\downarrow
 $\frac{4}{1} = \frac{2\pi}{b}$

$4b = 2\pi \rightarrow b = \frac{\pi}{2}$

(ex) Graph $y = |\cos x|$



~~Note: Vertical asymptotes occur at x-values where a function is undefined~~

ignore

~~(ex) Graph one period of $y = \tan x$~~
 write one period ...