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THU

4.5 part 1 | Graphs of Sine & Cosine Functions

Period of a function - the cycle of the graph on which it does not repeat

"Periodic" - when it repeats

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

$-1 \leq y \leq 1$

all real numbers

domain: $(-\infty, \infty)$

range: $[-1, 1]$

period: 2π

x-intercepts: $0 + \pi n$

y-intercepts: $y=0$ integer

Sine

"parent graph"

→ odd function rotation about the origin.

$\sin(-t) = -\sin t$

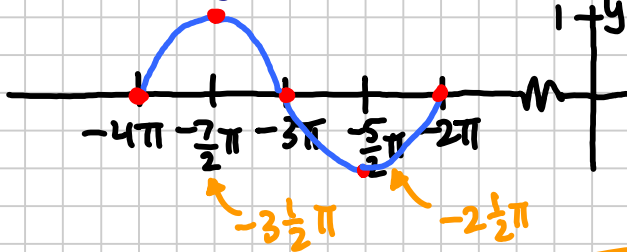
max values: $\frac{\pi}{2} + 2\pi n$

"y" → min values: $\frac{3\pi}{2} + 2\pi n$

$2\pi \div 4 \rightarrow \frac{\pi}{2}$

ex) Graph $y = \sin x$

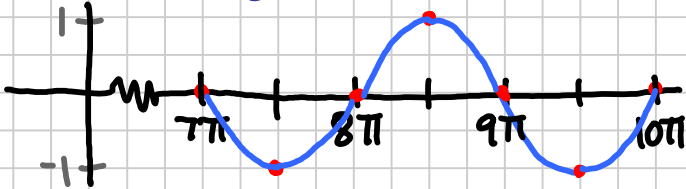
$-4\pi \leq x \leq -2\pi$ restriction on the domain



$\sin(-4\pi)$	$\rightarrow \sin 0 = 0$
" (-2π)	$\rightarrow \sin 0 = 0$
" (-3π)	$\rightarrow \sin \pi = 0$
$\sin(\frac{1}{2}\pi)$	$\rightarrow 1$

ex) Graph $y = \sin x$

$7\pi \leq x \leq 10\pi$ $10\pi - 7\pi = \frac{3\pi}{4}$ quadrant width



x	7π	$\frac{15\pi}{2}$	8π	9π	10π
y	0	-1	0	1	0

Cosine

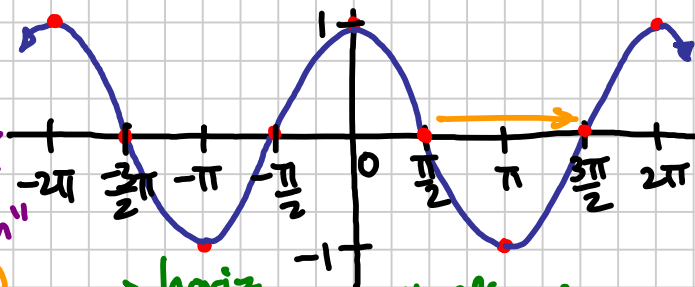
"parent graph"

→ even function

$\cos(t) = \cos t$

→ horiz reflection

"reflection about the y-axis"



Domain: $(-\infty, \infty)$

range: $[-1, 1]$

period: 2π or 360°

x-ints: $\frac{\pi}{2} + \pi n$

y-ints: $y=1$ integer

max values: $0 + 2\pi n$

min values: $\pi + 2\pi n$