Name Key- James
Date

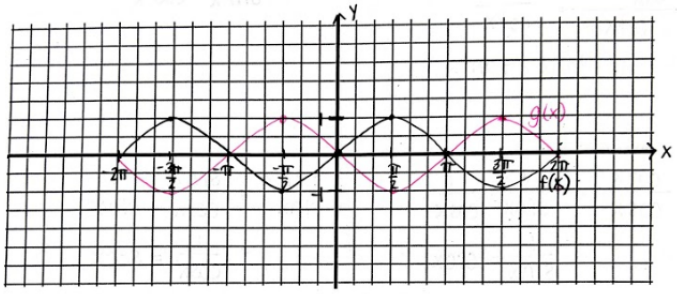
PreCalc
Wkst 6.2

On the graph below, sketch: f(x) = sin(x) and g(x) = sin(-x). from $[-2\pi, 2\pi]$

State the transformation that maps f(x) onto g(x). ry-axis

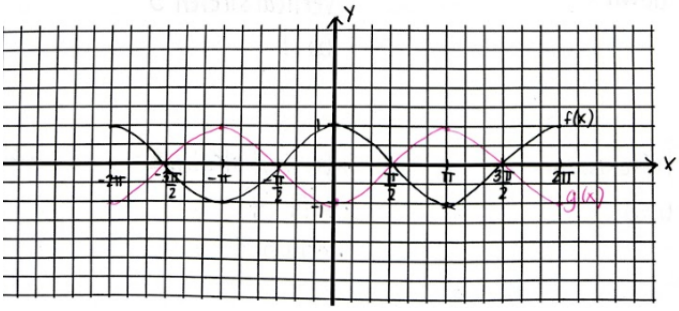
Retakes on Quiz 1 must be done by EOD Wednesday.

Test is Friday




2. On the graph below, sketch: f(x) = cos(x) and g(x) = -cos(x). $[-2\pi, 2\pi]$

State the transformation that maps f(x) onto g(x). rx-axis




3 - 6: Simplify.

3. $\frac{\sec x \sin x}{\cot x}$

$\frac{\frac{1}{\cos x} \cdot \sin x}{\cot x} = \frac{\tan x}{\cot x} = \frac{\tan x}{\frac{1}{\tan x}}$

$= \tan x \cdot \tan x = \tan^2 x$

$\frac{\frac{\sin x}{\cos x}}{\frac{\cos x}{\sin x}} = \frac{\sin x}{\cos x} \cdot \frac{\sin x}{\cos x} = \tan^2 x$

4. $\sin^2 x \cot^2 x \sec^2 x$

$\sin^2 x \cdot \frac{\cos^2 x}{\sin^2 x} \cdot \frac{1}{\cos^2 x} = 1$

5. $\frac{\cot^2 x}{\cos x \cdot \cot x}$

$\frac{\cot x}{\cos x} = \frac{\cos x}{\sin x} \cdot \frac{1}{\cos x}$

$= \frac{1}{\sin x} = \csc x$

6. $\frac{\tan^2 x}{\sin x \cdot \tan x}$

$\frac{\tan x}{\sin x} = \frac{\sin x}{\cos x} \cdot \frac{1}{\sin x}$

$= \frac{1}{\cos x} = \sec x$

In 7 - 10: Given f(x) = sin(x), state the transformations to produce g(x).

7. g(x) = 2sin(x) - 4
- Vertical stretch 2
- down 4

8. g(x) = -5sin(x) + 1
- rx-axis
- vertical stretch 5
- up 1

9. g(x) = sin(-x) + 3
- ry-axis
- up 3

10. $g(x) = 2\sin\left(x + \frac{\pi}{2}\right) - 3$
- vertical stretch 2
- left $\frac{\pi}{2}$
- down 3

# Translation s


...and to think, we both evolved from a single cell!

Dec 3-9:57 AM

$y = A\cos(bx + c) + d$ $\quad$ $y = A\sin(bx+c) + d$

$y = A\cos(bx + c) + d$ → describes a curve that starts at $A + d$ (maximum)

$y = A\sin(bx + c) + d$ → describes a curve that starts at $0 + d$ (midline)

Amplitude = $|A|$ $\quad$ Vertical Shift = $d$ (middle)

Period = $\frac{2\pi}{b}$ (length of 1 full cycle)

Frequency = $\frac{1}{\text{period}} = \frac{b}{2\pi}$ (# cycles per period)

Phase Shift = $-\frac{c}{b}$ (horizontal shift)

Dec 3-10:03 AM

Find the amplitude, vertical shift, range, period, frequency and phase shift:

$y = A\cos(bx + c) + d$

1. $y = 7\cos\left(\frac{\pi}{2}x + \frac{\pi}{4}\right)$

amp = 7

vert. shift = 0

0 ↑+7 ↓-7

range = $[-7, 7]$

period = $\frac{2\pi}{b} = \frac{2\pi}{\pi/2} = 2\pi \cdot \frac{2}{\pi} = 4$

frequency = $\frac{1}{4}$

phase shift = $\frac{-c}{b} = \frac{-\pi/4}{\pi/2} = -\frac{\pi}{4} \cdot \frac{2}{\pi} = -\frac{1}{2}$ (left $\frac{1}{2}$)

2. $y = -8\sin(4x - \pi)$ → r x-axis

amp = 8

V.S. = 0

0 ↑+8 ↓-8

range = $[-8, 8]$

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

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

ps = $\frac{-c}{b} = \frac{-(-\pi)}{4} = \frac{\pi}{4}$ (right)

Jan 17-4:20 PM

$y = A\sin(bx + c) + d$

3. $y = -4\sin\left(3x + \frac{3\pi}{4}\right) - 1$

r x-axis

amp = 4

vs = -1 (middle)

3 ↑+4 ↓-4 -5

range = $[-5, 3]$

period = $\frac{2\pi}{b} = \frac{2\pi}{3}$

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

ps = $\frac{-c}{b} = \frac{-3\pi/4}{3} = -\frac{3\pi}{4} \cdot \frac{1}{3} = -\frac{\pi}{4}$ (left)

4. $y = 5 - 2\sin\left(2x - \frac{\pi}{6}\right) + 5$ r x-axis

amp = 2

vs = 5

7 ↑+2 ↓-2 3

range = $[3, 7)$

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

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

ps = $\frac{-c}{b} = -\frac{-\pi/6}{2} = \frac{\pi}{6} \cdot \frac{1}{2} = \frac{\pi}{12}$ (right)

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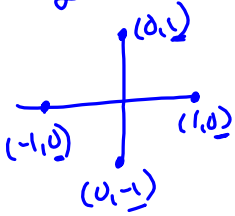
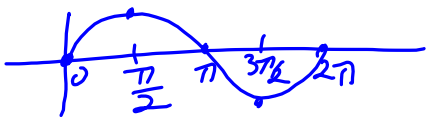
# Sine + cosine basic values

$y = \sin x$

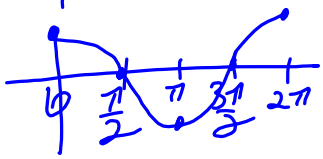



| $x$ | $0$ | $\pi/2$ | $\pi$ | $3\pi/2$ | $2\pi$ |
|---|---|---|---|---|---|
| $y$ | $0$ | $1$ | $0$ | $-1$ | $0$ |




$y = \cos x$

| $x$ | $0$ | $\pi/2$ | $\pi$ | $3\pi/2$ | $2\pi$ |
|---|---|---|---|---|---|
| $y$ | $1$ | $0$ | $-1$ | $0$ | $1$ |




Jan 11-9:06 AM

$y = A\cos(bx+c)+d$

5. Graph $y = 2\cos(x)$ in the interval $[-2\pi, 2\pi]$

Amp = $2$
v.s. = $0$

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

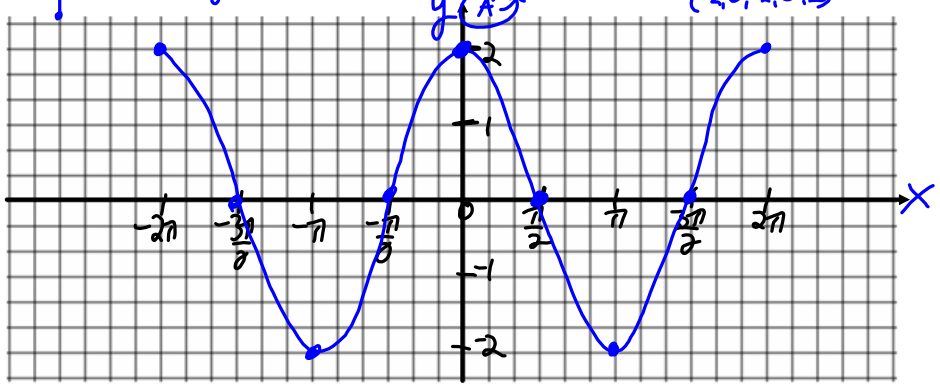
xscl = $\frac{\text{Per}}{4} = \frac{2\pi}{4} = \frac{\pi}{2}$

Range = $[-2, 2]$

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

No phase shift b/c no 'c' value.

cos y's = 1, 0, -1, 0, 1 $\times 2$ (1, 0, -1, 0, 1) = (2, 0, -2, 0, 2)

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6. Graph $y = -2\cos(x) - 1$ in the interval $[-2\pi, 2\pi]$

Amp = 2
V.S. = −1
Range = [−3, 1]

$-1 \begin{matrix}\uparrow +2 \\ \downarrow -2\end{matrix}$
$-3$

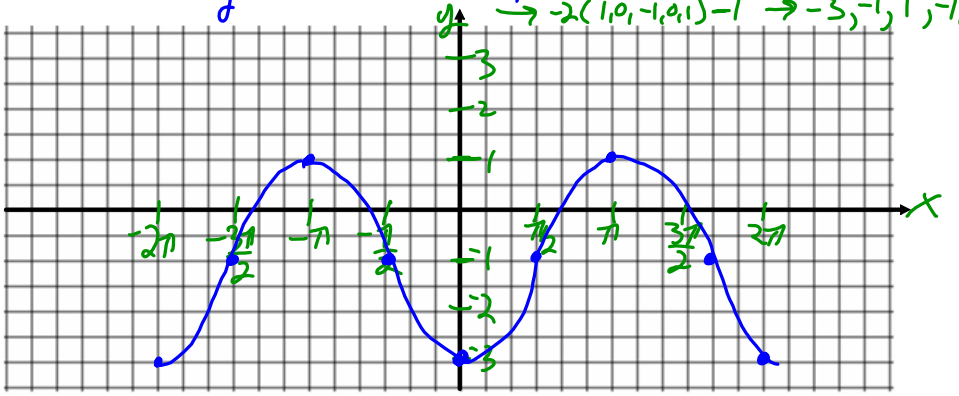
Period = $\frac{2\pi}{1} = 2\pi$

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

xscl = $\frac{\text{per}}{4} = \frac{2\pi}{4} = \frac{\pi}{2}$

No C → No phase shift

y's = (1, 0, −1, 0, 1) → $\times A, +d \rightarrow \times -2, -1$
→ $-2(1,0,-1,0,1) - 1 \rightarrow -3, -1, 1, -1, -3$

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Jan 17-4:22 PM