2. List the three Pythagorean Identities:

(a) : $\sin^2(x) + \cos^2(x) = 1$

(b) : $\div$ by $\sin^2(x)$

(c) : $\div$ by $\cos^2(x)$

3. Give a function equivalent to what is given:

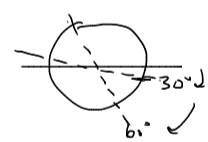
(a) $\sin(-x) =$ $-\sin(x)$

(b) $\dfrac{1}{\sin(x)} =$

(c) $\sec(-x) =$ $\dfrac{1}{\cos(-x)} = \dfrac{1}{\cos(x)}$

(d) $\dfrac{1}{\cot(x)} =$

4. Evaluate exactly without decimals: (If undefined write UND)



(a) $\sin(\frac{\pi}{4}) =$ $\frac{\sqrt{2}}{2}$

period $= \pi$

(b) $\tan(150°) =$ $\tan(180° - 30°) = \tan(-30°)$
$= -\frac{\sqrt{3}}{3}$

(c) $\sec(-\frac{\pi}{3}) =$

$= \dfrac{1}{\cos(-\frac{\pi}{3})} = \dfrac{1}{\cos(\frac{\pi}{3})} = \dfrac{1}{(\frac{1}{2})} = 2$

$360°, 720$

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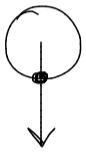
mult. of period

(d) $\sin(900°) =$ $\sin(720° + 180°) = \sin(180°) = 0$

(e) $\cot(\frac{15\pi}{4}) =$ $\cot\left(\frac{16\pi}{4} - \frac{\pi}{4}\right) = \cot\left(-\frac{\pi}{4}\right) = -1$

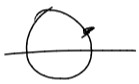
$= \frac{1}{\tan(-\frac{\pi}{4})} = -\frac{1}{\tan(\frac{\pi}{4})}$



(f) $\tan(270°) =$ und.

↳ line has ∞ slope

(g) $\arccos(-1) =$ π



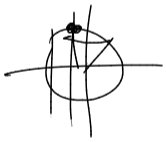
(h) $\sin^{-1}(\frac{1}{2}) =$ where in $[-\frac{\pi}{2}, \frac{\pi}{2}]$

$y = \frac{1}{2}$ $\pi/6$

(i) $\arctan(0) =$ 0

↳ where in $[-\frac{\pi}{2}, \frac{\pi}{2}]$ is slope $= 0$

(j) $\tan^{-1}(1) =$ $\frac{\pi}{4}$



(k) $\cos^{-1}(-\frac{1}{2}) =$ $\frac{2\pi}{3}$

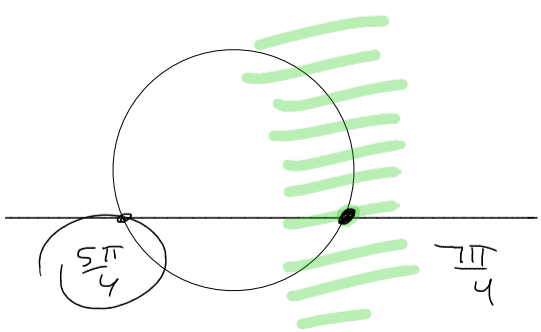
lives in $[0, \pi]$

(l) $\arcsin(-\frac{\sqrt{2}}{2}) =$ $-\frac{\pi}{4}$

$[-\frac{\pi}{2}, \frac{\pi}{2}]$

$\cos^{-1}(w)$ is a number in $[0, \pi]$ where x-coord $= w$

$\sin^{-1}(w)$ ↳ number in $[-\frac{\pi}{2}, \frac{\pi}{2}]$ whose y-coord $= w$



5. What is $\tan(\cos^{-1}(x))$

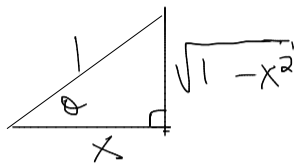
know

$\cos^{-1}(x) = \theta$

so

$x = \cos\theta = \frac{adj}{hyp} = \frac{x}{1}$

(make Δ)



$\tan\theta = \frac{opp}{adj} = \frac{\sqrt{1-x^2}}{x}$

6. State the amplitude, period, and all shifts for the following functions:

(a) $5\sin(\frac{3x}{4}) + 2$ $= 5 \cdot \sin\left(\frac{3}{4}(x-0)\right) + 5A\sin(k(x-p)) + C$

$k = 3/4$

Amplitude: 5 $\quad |A| = $ amp

Period: $\frac{2\pi}{\left(\frac{3}{4}\right)} = 2\pi \cdot \frac{4}{3} = \frac{8\pi}{3}$ $\quad \left[\frac{2\pi}{k} = \text{period}\right]$

Horizontal Shift: none $\quad p$ hor. shift to right

Vertical Shift: up 2 $\quad C$ vert shift up

(b) $\frac{7}{2}\cos[4(x + \frac{\pi}{3})] - 4$

k

Amplitude: $7/2$

Period: $\frac{2\pi}{4} = \frac{\pi}{2}$

Horizontal Shift: left $\frac{\pi}{3}$

Vertical Shift: down 4

7. For the following write the letter of the graph corresponding to its equation.

period $=2\pi$

(i) $y = 2\sin(x + \frac{\pi}{4})$:

B

(ii) $y = \frac{1}{2}\sin(\frac{3}{4}x) - 2$:

down 2

C

(iii) $y = \cos(x)$:

(iv) $y = -\cos(\frac{4\pi}{3}x) + 2$:

A

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

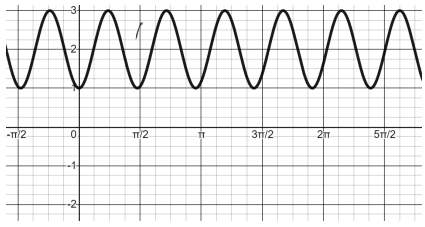
(v) $y = 2\cos[2(x - \frac{\pi}{3})]$:

F

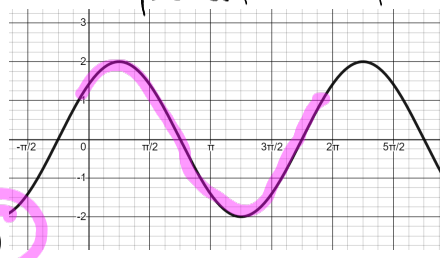
(vi) $y = \frac{3}{2}\sin(3x) + \frac{1}{2}$:

D

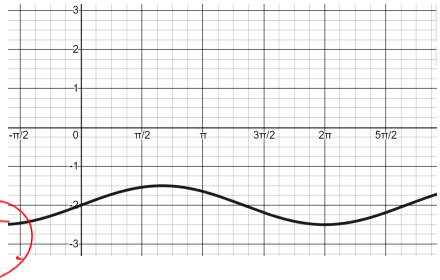
period $= 2\pi$



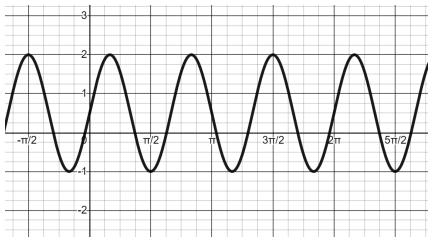
A)



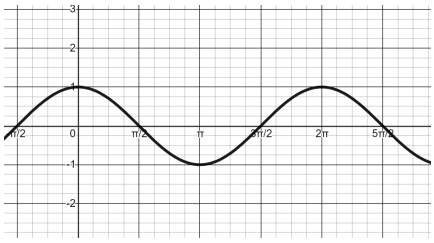
B)



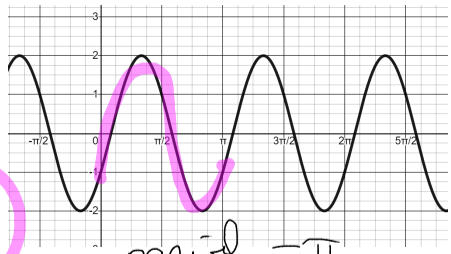
C)



D)



E)



F)

period $=\pi$

Next Topics

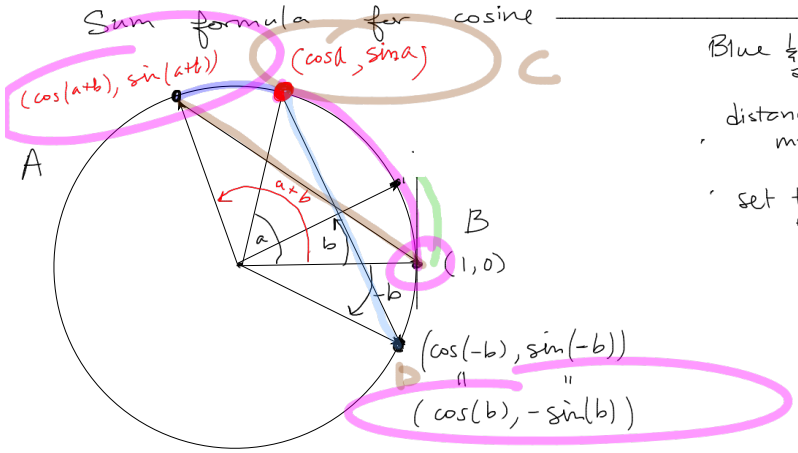
1. Trig Identities (laws)
2. Law of Sines / Law of Cosines (next week)

Trig Identities

1. pythagorean ones
2. trig sum formulas:

$\cos(a+b) =$ _____

Sum formula for cosine



Blue & Brown segments are equal in length

- distance b/w points must be the same
- set two distances equal & clean-up
  - a formula will result

$$d(A,B) = \sqrt{\underbrace{(\cos(a+b) - 1)}^2 + \underbrace{(\sin(a+b) - 0)}^2} = \sqrt{\cos^2(a+b) - 2\cos(a+b) + 1 + \sin^2(a+b)}$$

$$= \sqrt{2 - 2\cos(a+b)}$$

$=$

$$d(C,D) = \sqrt{\underbrace{(\cos(a) - \cos(b))}^2 + \underbrace{(\sin(a) + \sin(b))}^2} =$$

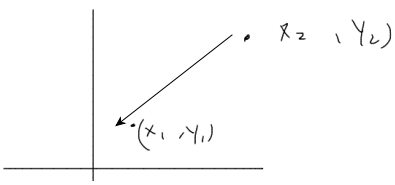
$$= \sqrt{\cos^2 a - 2\cos a\cos b + \cos^2 b + \sin^2 a + 2\sin a\sin b + \sin^2 b}$$

$$= \sqrt{2 + 2(\sin a\sin b - \cos a\cos b)}$$

$=$

$$\cos(a+b) = \cos a\cos b - \sin a\sin b$$

Distance Formula:



$$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$