Week 9,

Monday

- 1. trig equations
  - a. period of functions
  - b. quadratic
  - c. exponential
    - i. e^(sin(x)) = 1
  - d. logorithmic
    - i. ln(tan(x) = 0

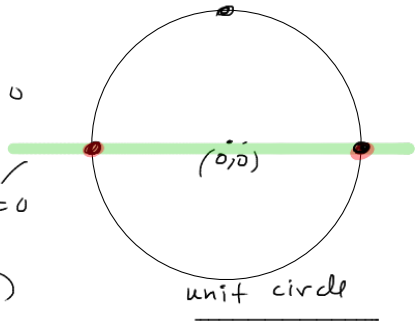
Graphs / Periods of Trig Functions

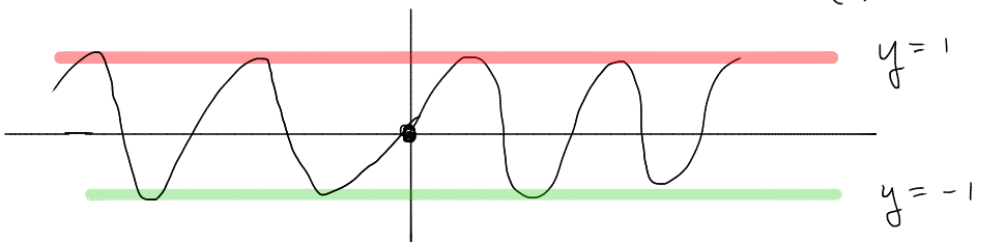
$f(x) = \sin(2\pi)$ ← (height) y-value for angle = x.

max: 1
min: −1
period: 2π

zeros: (the input that makes $\sin(x) = 0$)
: $0, \pi, 2\pi, 3\pi, \ldots, n\cdot\pi$ w/ $n \in \mathbb{Z}$

n is an integer $(0, \pm1, \pm2, \pm3)$





Ex Solve $\sin(\theta) = 0$.

① Find all sols w/in unit circle:

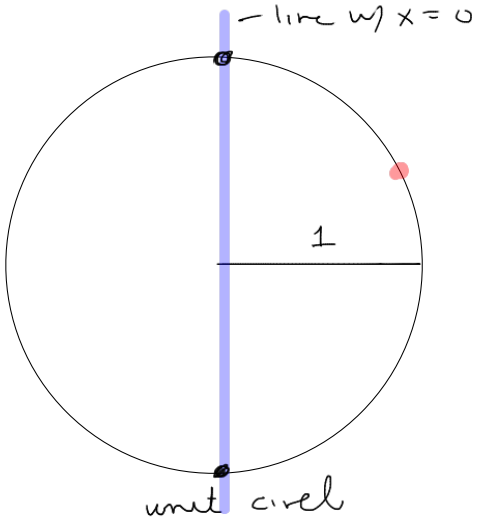
$\theta = 0$ and $\theta = \pi$

② Add all multiples of the period to each soln

$\theta = 0 + 2\pi\cdot n$ (even multiples of π)
$\theta = \pi + 2\pi n$ (odd mult. of π) $(n \in \mathbb{Z})$

graph of $y = \cos(x)$

$f(t) = \cos(t)$ (x-value for angle t)



max: 1

min: -1

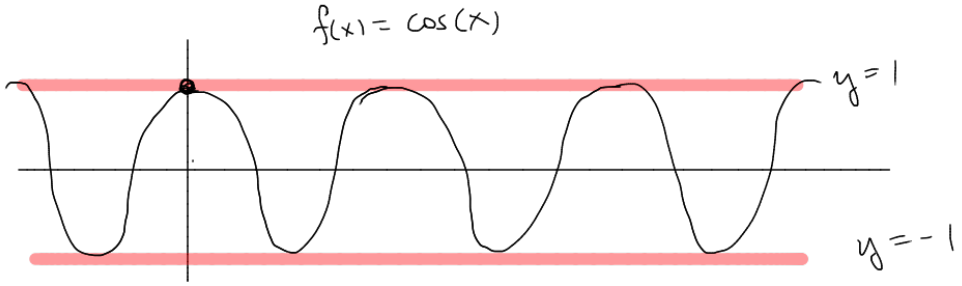
period: 2π

zeros: $\pi/2 + 2\pi k$

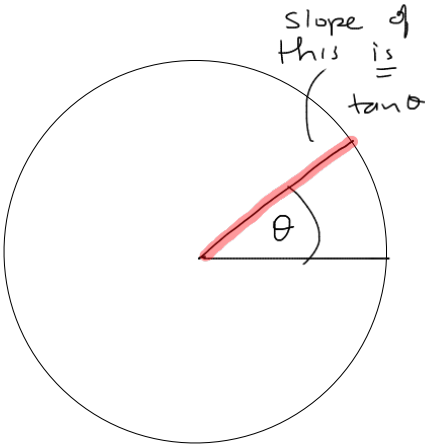
$3\pi/2 + 2\pi k$

$k \in \mathbb{Z}$. (eg $\frac{\pi}{2} + 2\pi \cdot 7 = \frac{\pi}{2} + \frac{14\pi \cdot 2}{2} = \frac{29\pi}{2}$)

$f(0) = \cos(0) = 1$



$f(\theta) = \tan\theta$ (slope of the line through origin the terminal point for θ)



max - none

min - none

period - π

zeros - $0, \pi$, zeros in unit circle

all zeros $\begin{cases} 0 + \pi k \\ \pi + \pi k \end{cases}$

asymptotes: $\frac{\pi}{2}, \frac{3\pi}{2}$ initial ones $\rightsquigarrow$ $\frac{\pi}{2} + \pi k$

$\frac{3\pi}{2} + \pi k$

$f(0) = 0$

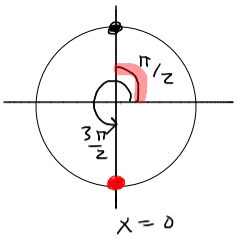
Equations

Find all possible solutions

① $\cos(x) = 0$

$\cos(\frac{\pi}{2}) =$ x-coord $= 0$ for $90°$

$\cos(\frac{3\pi}{2}) =$ x-coord $= 0$ for $\frac{3\pi}{2}$



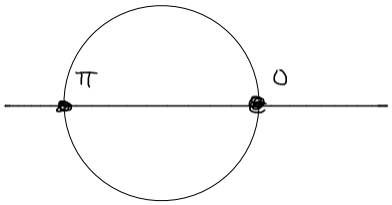
$\frac{\pi}{2} + 2\pi k$

$\frac{3\pi}{2} + 2\pi k$

② $e^{\sin(x)} = 1$

$\ln(e^{\sin(x)}) = \ln(1)$

$\sin(x) = 0$



$0 + 2\pi k$ ← $2\pi k$ even

$\pi + 2\pi k$

$(2k+1)\pi$ odd

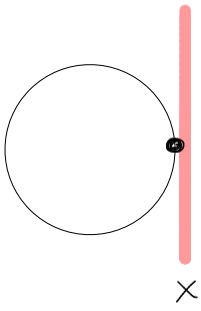
$\Rightarrow \pi n, \; n \in \mathbb{Z}$

③ $\ln(\cos(x)) = 0$

$e \qquad e$

$\cos(x) = e^0 = 1$

where do x-coords $= 1$ (what angle)



← angle 0

$0 + 2\pi k$

$2\pi k$