aisling.mccluskey@nuigalway.ie

x-intercept: point where the graph of f intersects the x-axis.

($f(x) = 0$)

y-intercept: point where graph of f intercepts y-axis,

Example

$f(x) = x^2 - 1$.

Domain of $f = \mathbb{R}$

Codomain of $f = \mathbb{R}$

Range of $f = \{f(x) \in \mathbb{R} : x \in \text{Domain}\}$

$= [-1, \infty)$.

x-intercepts: $0 = f(x) = x^2 - 1$.

$(-1, 0)$, $(1, 0)$ are the two x-intercepts.

y-intercepts: $f(0) = -1$

So $(0, -1)$ is the y-intercept.

Example $g(x) = \frac{x^2-1}{x}$

Domain of $g = \mathbb{R} \setminus \{0\}$

Codomain of $g = \mathbb{R}$

Range of $g = \mathbb{R}$ (?)

x-intercepts: $0 = g(x) = \frac{x^2-1}{x}$

$(-1,0)$, $(1,0)$ are the x-intercepts.

y-intercepts:

$g(0) = ?$ 0 not in domain.

There is no y-intercept.

Example $h(x) = x^2+1$

Domain of $h = \mathbb{R}$

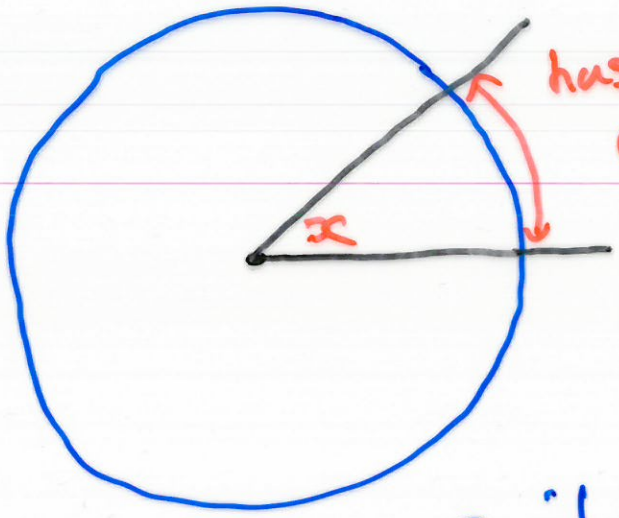
Codomain of $h = \mathbb{R}$

Range of $h = [1, \infty)$

there is no x-intercept.

$(0,1)$ is the y-intercept.

What is a radian ?

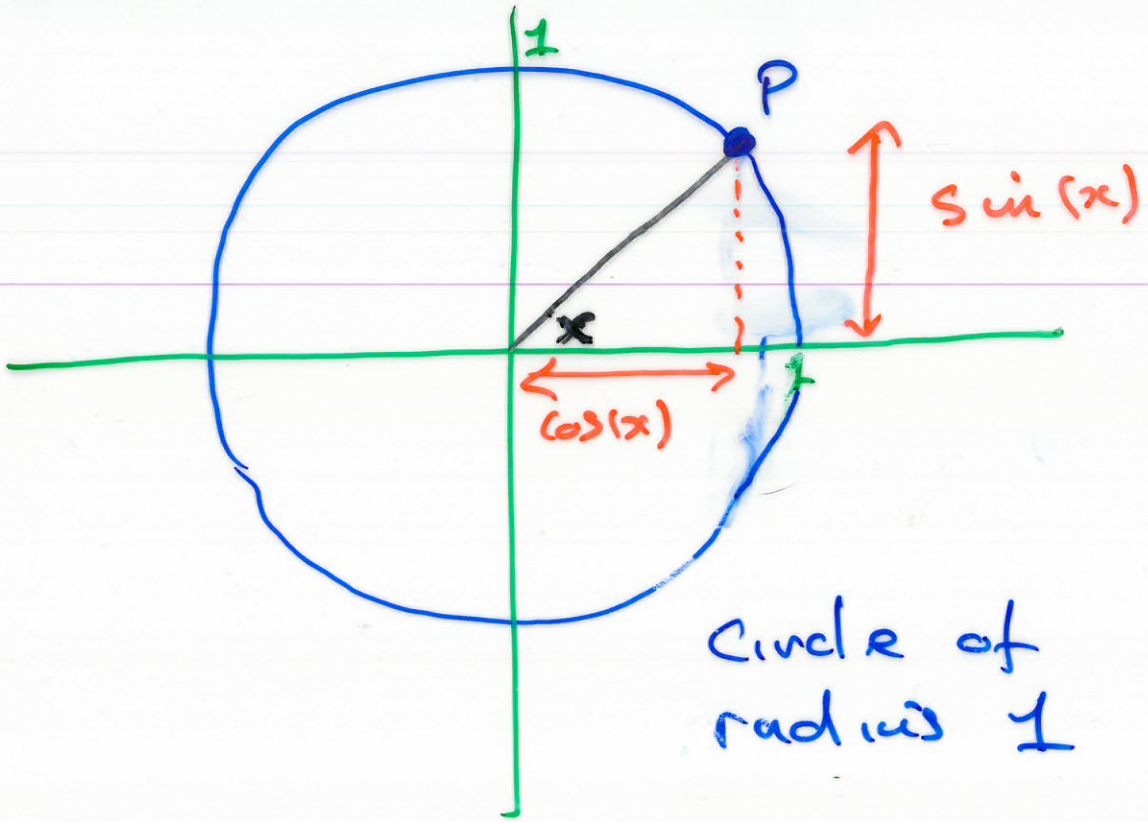


Circle of radius 1

$90° = \frac{2\pi}{4} = \frac{\pi}{2}$ radians

$180° = \frac{2\pi}{2} = \pi$ radians

Sine & Cosine



Circle of radius 1

P is the point $P = (\cos(x), \sin(x))$

Domain of $\sin(x) = \mathbb{R}$

Codomain of $\sin(x) = \mathbb{R}$

Range of $\sin(x) = [-1, 1]$

Domain $\cos(x) = \mathbb{R}$

Range $\cos(x) = [-1, 1]$

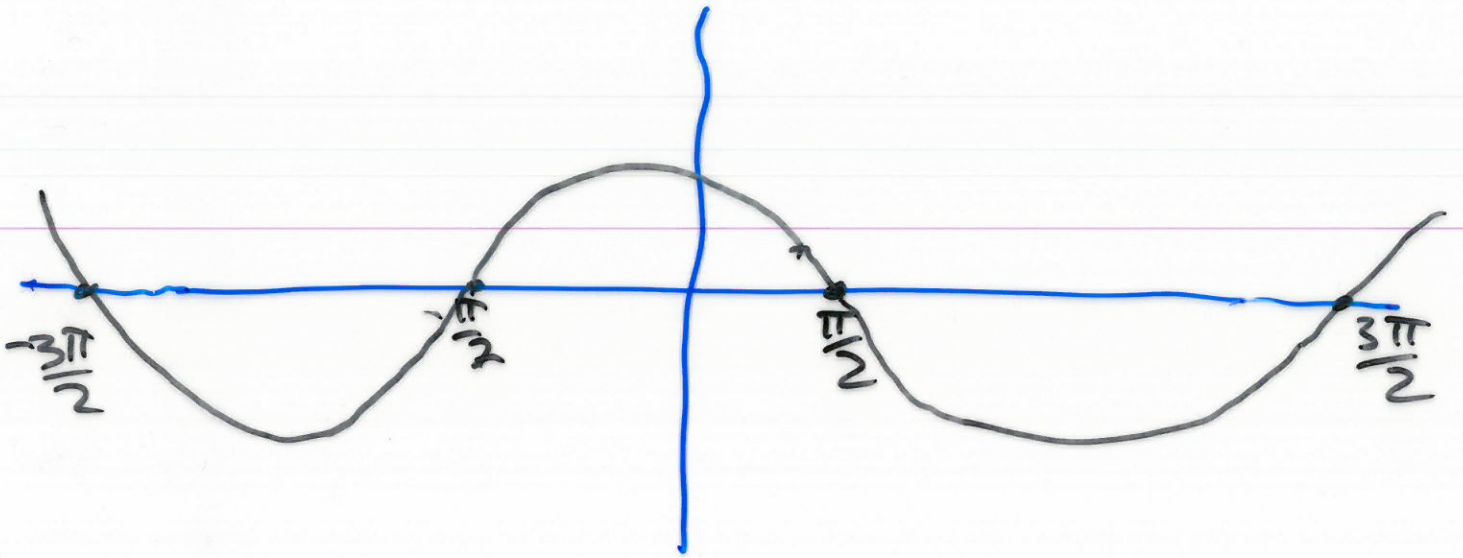
$\sin(-x) = -\sin(x)$

$\cos(-x) = \cos(x)$

$\sin(x + 2\pi) = \sin(x)$

$\cos(x + 2\pi) = \cos(x)$

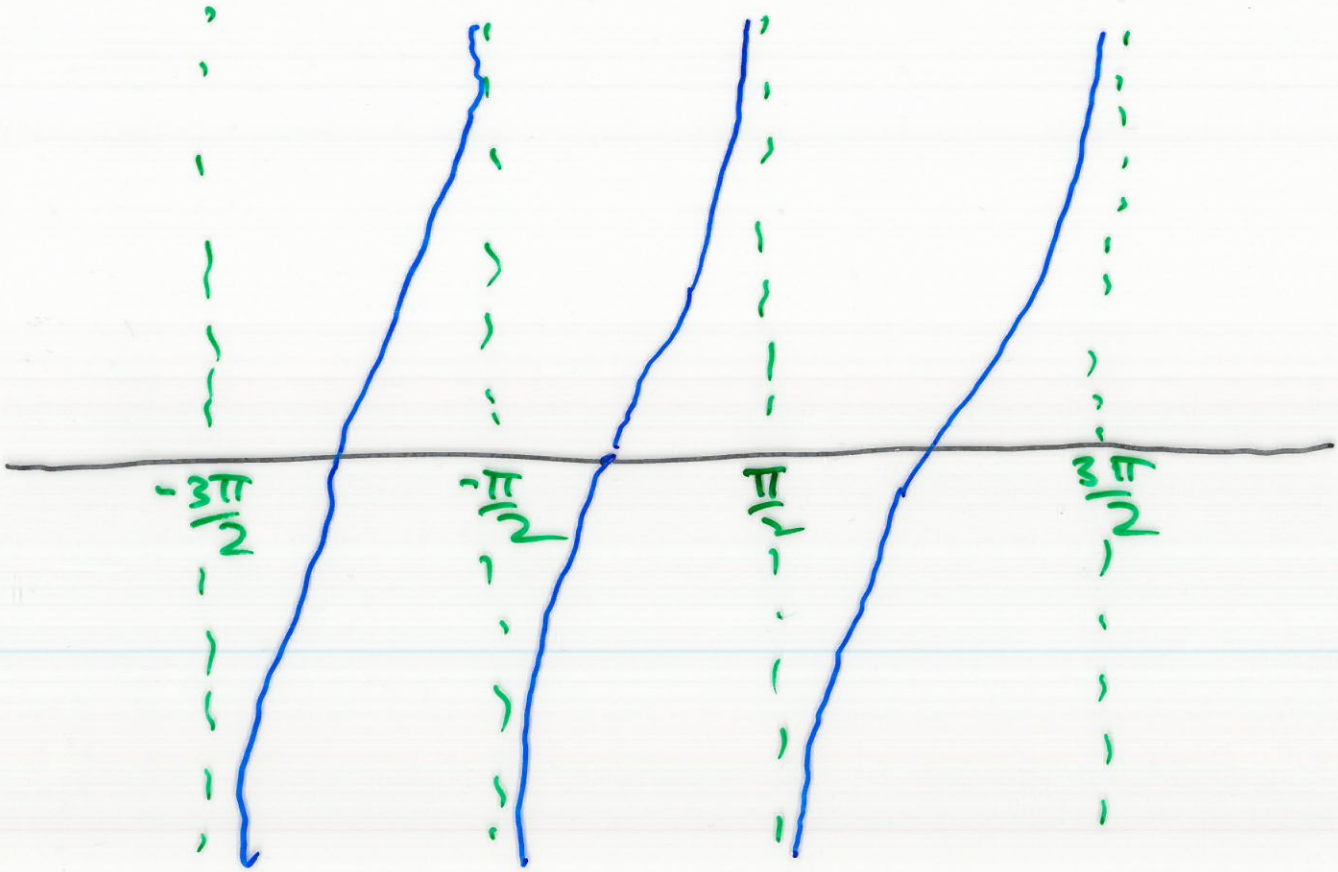
Graph of $\cos(x)$:



Tangent :

$$\tan(x) = \frac{\sin(x)}{\cos(x)}$$

Domain of $\tan = \mathbb{R} \setminus \left\{ \pm\frac{\pi}{2}, \pm\frac{3\pi}{2}, \pm\frac{5\pi}{2}, \dots \right\}$



Functions Defined in Pieces

Example Let $c(t)$ be the cost of parking my car for t hours at Dublin airport.

Domain $= [0, \infty)$

$$c(t) = \begin{cases} 0, & 0 \le t < \frac{1}{12} \\ 5, & \frac{1}{12} \le t < 1 \\ 10, & 1 \le t < 3 \\ 25, & 3 \le t < 24 \\ & \text{etc.} \end{cases}$$