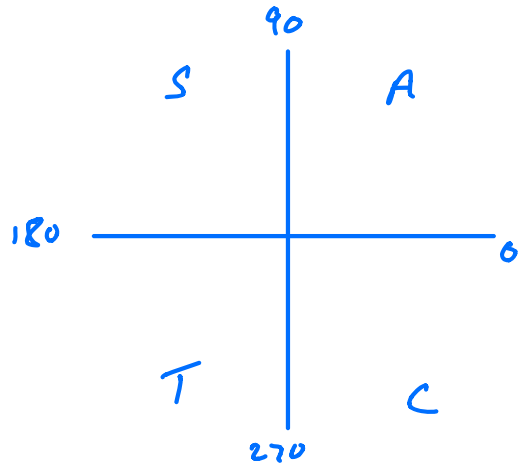
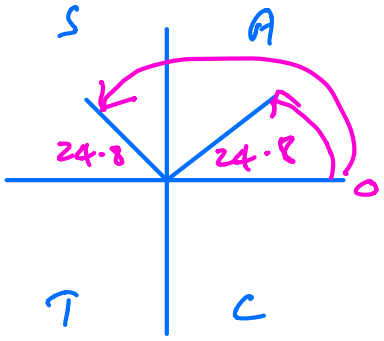
CAST Diagram



Examples $\sin x = 0.42$

$\sin^{-1} 0.42 = 24.8^\circ$

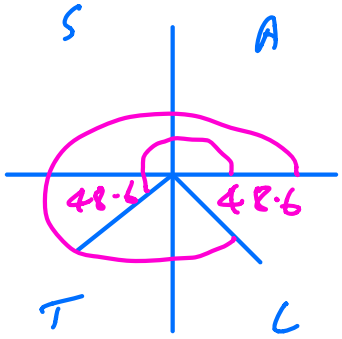


$x = 24.8^\circ$

$x = 155.2^\circ$

$\sin x = -0.75$

$\sin^{-1} 0.75$
$= 48.6^\circ$

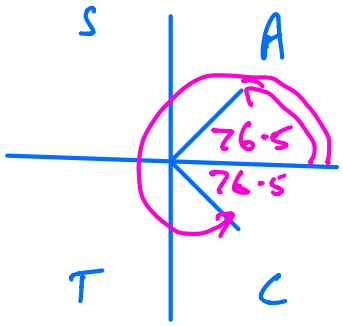


$x = 228.6^\circ$

$x = 311.4^\circ$

$\cos x = 0.234$

$\cos^{-1} 0.234$
$= 76.5^\circ$



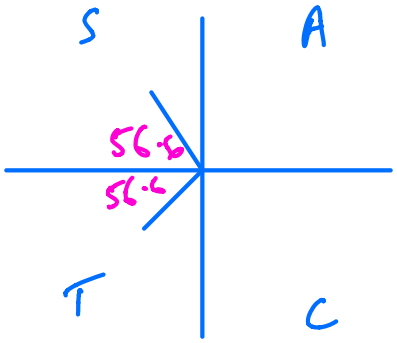
$x = 76.5°$

$x = 283.5°$

$\cos x = -0.55$

$\cos^{-1} 0.55$

$= 56.6°$



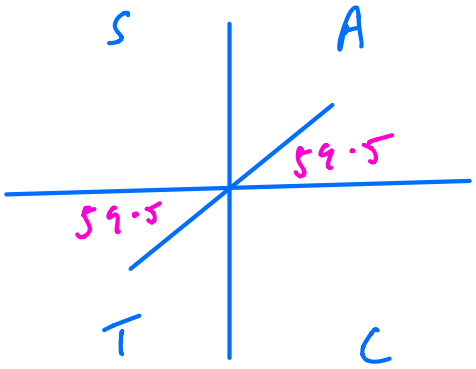
$x = 123.4$

$x = 236.6$

$\tan x = 1.7$

$\tan^{-1} 1.7$

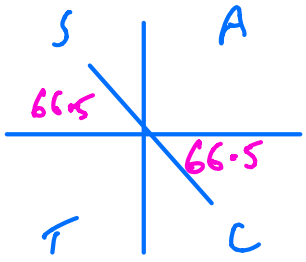
$= 59.5°$



$x = 59.5°$

$x = 239.5°$

$\tan x = -2.3$



$\tan^{-1} 2.3 = 66.5°$

$x = 113.5°$

$x = 293.5°$

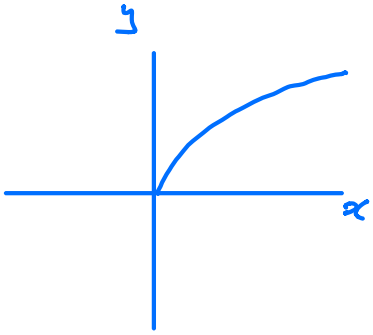
Functions - Domain and Range

If $y = f(x)$

The domain is the set of x values for which the function is defined

The range is the set of values taken by y for all possible values of x

Examples $y = \sqrt{x}$



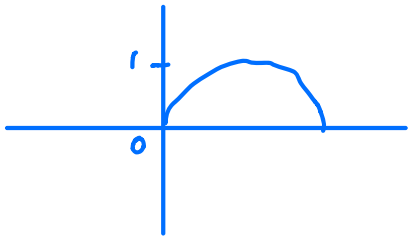
Domain $x \geq 0$

Range $y \geq 0$

Ex 2 $y = \sin x$

May choose domain $0 \leq x \leq \pi$

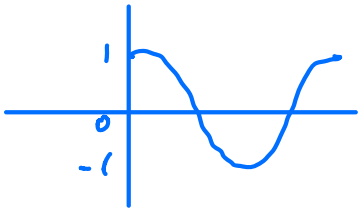
Range $0 \leq y \leq 1$



Ex 3 $f(x) = \cos x$

Choose domain $0 \leq x \leq 2\pi$

Range $-1 \leq f(x) \leq 1$



Inverse Functions

If $f(x)$ and $g(x)$ are inverse functions their graphs are mirror images of each other in the line $y = x$

The domain of $f(x)$ is the range of $g(x)$
The domain of $g(x)$ is the range of $f(x)$

Ex Let $f(x) = x^2$ for $\frac{1}{2} \le x \le 4$

Domain of f is $\frac{1}{2} \le x \le 4$
Range of f is $\frac{1}{4} \le f(x) \le 16$

Inverse function is
$f^{-1}(x)$ or $g(x) = \sqrt{x}$
Domain $\frac{1}{4} \le x \le 16$
Range $\frac{1}{2} \le g(x) \le 4$

At corresponding points on inverse functions
eg $(2, 5)$ and $(5, 2)$
the gradients are the POSITIVE RECIPROCALS of each other eg $\frac{3}{4}$ and $\frac{4}{3}$