Graph and form of sin and cosine

$y = a\sin[bx + c] + d$ (a: amplitude, b: frequency, d: shift up)

Find period: $P = \frac{2\pi}{b}$

Phase shift: $bx + C = 0$, $x = \frac{-c}{b}$

Domain: $D[-\infty, \infty]$

Range: $R[0 \leq x \leq 2]$

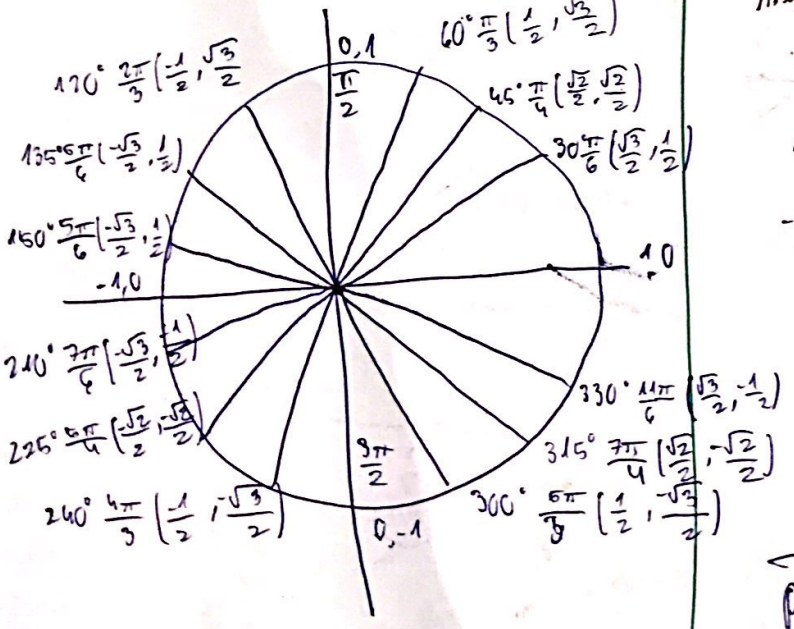
d = + then go up

b = higher the more frequency

Find upper limit of graph: $d + a$

C = − is right

Area $= \frac{ab\sin C}{2}$



Measurements

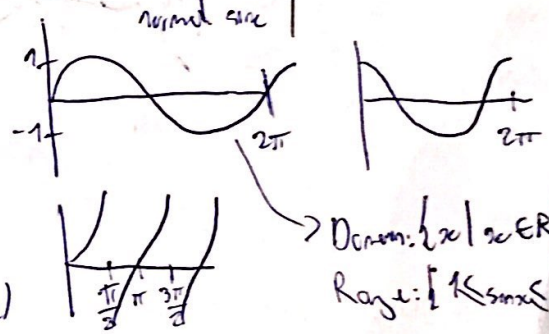
Degree	Radian
① Perimeter $C = 2\pi r$	① Perimeter —
② Length of arc • $arc = \frac{\theta}{360} \times 2\pi r$	② Length of arc $L = r\theta$
③ Area of sector $Area = \frac{\theta}{360} \times \pi r^2$	③ Area of sector $Area = \frac{1}{2} r^2 \theta$
④ Area of segment $\frac{\theta}{360} \times \pi r^2 - \frac{r^2 \sin\theta}{2}$	④ Area of segment $\frac{1}{2} r^2 (\theta - \sin\theta)$

soh cah toa

Area of trig

$s = \frac{a+b+c}{2}$

Area, $A_2 \sqrt{s(s-a)(s-b)(s-c)}$



Domain: $\{x \mid x \in \mathbb{R}\}$

Range: $[-1 \leq \sin x \leq 1]$

Pythagorean Identity

$\sin^2\theta + \cos^2\theta = 1$

Right Triangles Trip Ideas

3, 4, 5
5, 12, 13
8, 15, 17
7, 24, 25
...

Ratios or multiply circle

area law (Area)

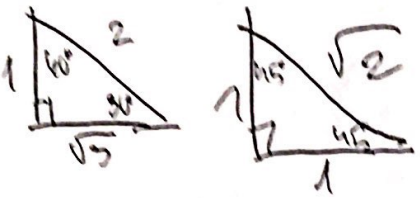
$\frac{1}{2} \times ab \times \sin C = \text{Area}$

cosine law (Cabinet)

$c^2 = a^2 + b^2 - 2ab\cos C$

$\frac{a}{\sin A} = \frac{b}{\sin B}$

Beautiful Triangles



$S = \frac{1}{2}ab\sin C$

Reference Angles

Quadrant 1: $\theta_{ref} = \theta_1$

Quadrant 2: $\theta_{ref} = 180 - \theta_2$

Quadrant 3: $\theta_{ref} = \theta_3 - 180$

Quadrant 4: $\theta_{ref} = 360 - \theta_4$

A S T C

all students take calculus

Rules

$\sin = y$

$\cos = x$

$\text{tangent} = \frac{y}{x}$

Split

$\cos(A-B) = \cos A\cos B + \sin A \sin B$

$\cos(A+B) = \cos A\cos B - \sin A \sin B$

$\sin(A+B) = \sin A\cos B + \cos A \sin B$

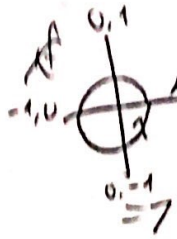
$\sin(A-B) = \sin A\cos B - \cos A \sin B$

$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$

$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$

Radians

$\text{Radians} = \frac{\text{Arc length}}{\text{Radius}} = (\text{rad})$



$1\text{rev} = 2\pi \text{ rad}$

$180° = \pi \text{ rad}$

~~rad to~~ Degree to rad

$\theta \times \frac{\pi}{180} = (\text{rad})$ $\quad 60° \times \frac{\pi}{180°} = \frac{60\pi}{180} = \frac{\pi}{3}$ rad

rad to degree

$\theta \times \frac{180}{\pi} = °$ $\quad \frac{2\pi}{3} \times \frac{180}{\pi} = \frac{360}{3} = 120°$

$1 \text{ rad} = 57,2958$

Grads

$90° = 100$ grads

RPM

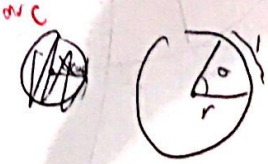
15 revolutions/minute → radians/s

$\frac{15}{40}$ revolutions/seconds / $1\text{rev} = 2\pi$ rads

$\frac{15}{40} \cdot 2\pi \text{ rad} = 0.75\pi$ rad

Length of arc

$\theta = \frac{l}{r}$



Sector Area: $\frac{1}{2} r^2 \theta$

Segment Area: $\frac{1}{2} r^2 (\theta - \sin\theta)$

Length of Chord: $2r \sin\frac{\theta}{2}$