

- Notes
- Angle in a semicircle
  - $\angle$  at centre =  $2 \times \angle$  at circumference
  - $\angle$  in same segment are equal
  - $\angle$  in opp segment are supplementary
  - Intersecting chord theorem
  - Tangent-Secant Theorem
  - Alternate Segment Theorem

## Trigonometry

	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
	$30^\circ$	$45^\circ$	$60^\circ$	$90^\circ$	$180^\circ$	$270^\circ$	$360^\circ$
Sin	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
Cos	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0	1
Tan	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$		0		0

$$\begin{aligned}\sin(A+B) &= \sin A \cos B + \cos A \sin B \\ \sin(A-B) &= \sin A \cos B - \cos A \sin B \\ \cos(A+B) &= \cos A \cos B - \sin A \sin B \\ \cos(A-B) &= \cos A \cos B + \sin A \sin B \\ \tan(A+B) &= \frac{\tan A + \tan B}{1 - \tan A \tan B}\end{aligned}$$

$$\begin{aligned}\sin 2A &= 2 \sin A \cos A \\ \cos 2A &= \cos^2 A - \sin^2 A = 1 - 2 \sin^2 A = 2 \cos^2 A - 1 \\ \tan 2A &= \frac{2 \tan A}{1 - \tan^2 A}\end{aligned}$$

### R-Formula

$$\begin{aligned}a \cos \theta + b \sin \theta &= R \cos(\theta - \alpha) \\ a \sin \theta + b \cos \theta &= R \sin(\theta + \alpha) \\ R &= \sqrt{a^2 + b^2} \quad \tan \alpha = \frac{b}{a}\end{aligned}$$

$$\begin{aligned}\sin(90^\circ - \theta) &= \cos \theta \\ \cos(90^\circ - \theta) &= \sin \theta \\ \tan(90^\circ - \theta) &= \frac{1}{\tan \theta}\end{aligned}$$

$$\begin{aligned}\frac{dy}{dx} &= \frac{dy}{du} \times \frac{du}{dx} \\ \frac{d}{dx} u^n &= n u^{n-1} \frac{du}{dx} \\ \frac{d}{dx} (uv) &= u \frac{dv}{dx} + v \frac{du}{dx} \\ \frac{d}{dx} \frac{u}{v} &= \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}\end{aligned}$$

$$\begin{aligned}\cos(-\theta) &= \cos \theta \\ \sin(-\theta) &= -\sin \theta \\ \tan(-\theta) &= -\tan \theta\end{aligned}$$

$$\begin{aligned}\sec \theta &= \frac{1}{\cos \theta} \\ \operatorname{cosec} \theta &= \frac{1}{\sin \theta} \\ \cot \theta &= \frac{1}{\tan \theta}\end{aligned}$$

$$\begin{aligned}\sin^2 \theta + \cos^2 \theta &= 1 \\ 1 + \cot^2 \theta &= \operatorname{cosec}^2 \theta \\ 1 + \tan^2 \theta &= \sec^2 \theta\end{aligned}$$

y	$\frac{dy}{dx}$	y	$\int y$
$\sin x$	$\cos x$	$a x^n$	$\frac{a x^{n+1}}{n+1}$
$\cos x$	$-\sin x$	$(ax+b)^n$	$\frac{(ax+b)^{n+1}}{a(n+1)}$
$\tan x$	$\sec^2 x$	$e^{fx}$	$\frac{1}{f} e^{fx}$
$\sin(fx)$	$f \cos(fx)$	$\frac{1}{f(x)} e^{fx}$	$\int \frac{1}{f(x)} e^{fx} dx$
$e^{fx}$	$f e^{fx}$		
$\ln(fx)$	$\frac{1}{fx}$		

$$\begin{aligned}\sin P + \sin Q &= 2 \sin \frac{1}{2}(P+Q) \cos \frac{1}{2}(P-Q) \\ \sin P - \sin Q &= 2 \cos \frac{1}{2}(P+Q) \sin \frac{1}{2}(P-Q) \\ \cos P + \cos Q &= 2 \cos \frac{1}{2}(P+Q) \cos \frac{1}{2}(P-Q) \\ \cos P - \cos Q &= -2 \sin \frac{1}{2}(P+Q) \sin \frac{1}{2}(P-Q)\end{aligned}$$

### Integrals

$$\begin{aligned}\int_0^a f(x) dx &= 0 \\ \int_0^b f(x) dx &= -\int_b^0 f(x) dx \\ \int_0^b f(x) dx + \int_0^c f(x) dx &= \int_0^c f(x) dx\end{aligned}$$

### Kinematics

$$\begin{aligned}\frac{d}{dt} &\rightarrow \\ D &\quad v \quad a \\ &\quad \leftarrow \int\end{aligned}$$