Mathematics
مدرس المادة / د. عماد

كلية الهندسة الجامعة
Civil Engineering
1st. Year

ملاحظات واختصارات
عامة

Notations And Abbrevations ملاحظات واختصارات

$\alpha \equiv$ Alpha , $\beta \equiv$ Beta , γ or $\Gamma \equiv$ Gamma, δ or $\Delta \equiv$ delta

$\theta \equiv$ Theta , $\lambda \equiv$ lemda , $\zeta \equiv$ Eata , $\zeta \equiv$ Zeeta, $\mu \equiv$ Mou ,

σ or $\Sigma \equiv$ Segma , π or $\Pi \equiv$ Pi , ϕ or $\Phi \equiv$ Fi

ψ or $\Psi \equiv$ Epsi , $\epsilon \equiv$ Epsilent , $\tau \equiv$ Tow , $\rho \equiv$ Row

$\nabla \equiv$ Carol , ω or $\Omega \equiv$ Omega.

$1^{st} \equiv$ First , $2^{nd} \equiv$ second , $3^{rd} \equiv$ Third , $4^{th} \equiv$ Fourth, ...

no. $\equiv$ Number , nos. $\equiv$ Numbers , +ive $\equiv$ Positive , -ive $\equiv$ negat

$\ni \equiv$ Suchthat , $\forall \equiv$ For each , $\exists \equiv$ There exist ,

w.r.t. $\equiv$ with respect to , Lim $\equiv$ Limit , D $\equiv$ Domain

R $\equiv$ Range , Int. $\equiv$ Intercept, Symm. $\equiv$ Symmetry or Symmetric

Asy. $\equiv$ Asymptote , V. $\equiv$ Vertical , H. $\equiv$ Horizonal ,

$\mathbb{R} \equiv$ Set of real numbers $= \{x : -\infty < x < \infty\}$

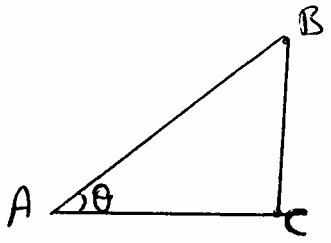
$\mathbb{C} \equiv$ Set of complex numbers.

$=$ Equal , $\equiv$ Identical , $\geq$ Greater than or equal

$\leq$ Less than or equal , $\Rightarrow$ Implies , $\longrightarrow$ Approach.

Some Trigonometric Identities

$$\sin\theta = \frac{BC}{AB} \quad , \quad \cos\theta = \frac{AC}{AB}$$



$$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{BC}{AC}$$

$$\cot\theta = \frac{1}{\tan\theta} = \frac{\cos\theta}{\sin\theta} = \frac{AC}{BC} .$$

$$\sec\theta = \frac{1}{\cos\theta} = \frac{AB}{AC} \quad , \quad \csc\theta = \frac{1}{\sin\theta} = \frac{AB}{BC} .$$

$-1 \leq \sin\theta \leq 1$ and $-1 \leq \cos\theta \leq 1$

$-\infty \leq \tan\theta \leq \infty$ and $-\infty \leq \cot\theta \leq \infty$

$\{ \sec\theta \leq -1 \text{ or } \sec\theta \geq 1 \}$ and $\{ \csc\theta \leq -1 \text{ or } \csc\theta \geq 1 \}$

$\sin^2\theta + \cos^2\theta = 1$, $\sec^2\theta = \tan^2\theta + 1$, $\csc^2\theta = \cot^2\theta + 1$

$\sin(\theta_1 \pm \theta_2) = \sin\theta_1 \cos\theta_2 \pm \sin\theta_2 \cos\theta_1$

~~$\cos(\theta_1 \pm \theta_2) = \sin\theta_1 \sin\theta_2 \mp \cos\theta_1 \cos\theta_2$~~

$\cos(\theta_1 \pm \theta_2) = \cos\theta_1 \cos\theta_2 \mp \sin\theta_1 \sin\theta_2$

$$\tan(\theta_1 \pm \theta_2) = \frac{\tan\theta_1 \pm \tan\theta_2}{1 \mp \tan\theta_1 \tan\theta_2}$$

$\sin(2\theta) = 2 \sin\theta \cos\theta$.

$$\sin^2(\theta) = \frac{1 - \cos 2\theta}{2} \quad , \quad \cos^2 = \frac{1 + \cos 2\theta}{2}$$

$\sin(-\theta) = -\sin\theta$, $\cos(-\theta) = \cos\theta$

$\tan(-\theta) = -\tan\theta$.

The solution of $ax^2+bx+c=0$ is $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

The Indeterminate forms

$\frac{0}{0}$, $\frac{\infty}{\infty}$, 0^0 , 1^∞ , ∞^0 , $\infty-\infty$, $0.\infty$

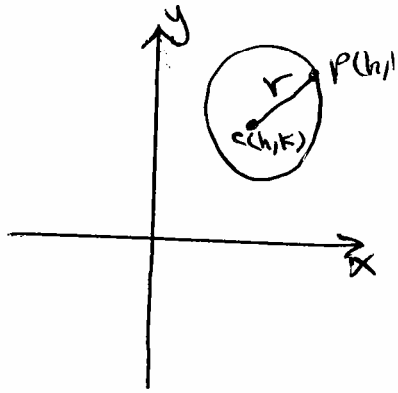
Equation of A straight Line

The eq. of a St. Line is $ax+by+c=0$
where a, b, c are constants.

Circle Is the locus of all points in plane whose distance from fixed point is constant.
The fixed point is called the center of the circle and denotee by $C(h,k)$ and the constant distance is called the radius of the circle and denoted by r.

The eq. of the circle with center at (h,k) and radius r is

$$r^2=(x-h)^2+(y-k)^2 \quad \text{——— (1)}$$



Note If $h=k=0$, then eq.(1) becomes

$$r^2=x^2+y^2$$