COMPLEX NUMBERS

$i = \sqrt{-1}$ Note:- 'j' often used rather than 'i'.

Exponential Notation

$$e^{i\theta} = \cos\theta + i\sin\theta$$

De Moivre's theorem

$$[r(\cos\theta + i\sin\theta)]^n = r^n(\cos n\theta + i\sin n\theta)$$

nth roots of complex numbers

$$\text{If } \mathrm{z} = \mathrm{re}^{\mathrm{i}\theta} = \mathrm{r}(\cos\theta + \mathrm{i}\sin\theta) \text{ then}$$

$$z^{1/n} = \sqrt[n]{r}e^{i(\theta+2k\pi)/n}, \quad k = 0, \pm1, \pm2, ...$$