

# Trig

## De Moivre's Theorem

$$z^n = r^n \text{cis}(n \cdot \theta)$$

## n<sup>th</sup> Root of $\mathbb{C}$ Numbers

Given  $z = r \text{cis} \theta$

$$\sqrt[n]{z} = n \text{ roots}$$

$$w_1 = \sqrt[n]{r} \text{cis}\left(\frac{\theta}{n}\right)$$

$$w_2 = \sqrt[n]{r} \text{cis}\left(\frac{\theta + 2\pi}{n}\right)$$

### Exam 3

8.1 The Law of Sines

8.2 The Law of Cosines

8.5 Trigonometric Form for Complex Numbers

8.6 De Moivre's Theorem and  $n$ th Roots of Complex Numbers

10.4 Mathematical Induction

11.5 Polar Coordinates

$$x = r \cdot \cos \theta$$

$$y = r \cdot \sin \theta$$

$$\tan \theta = \left| \frac{y}{x} \right|$$

## Law of Sines

$$\frac{\sin \alpha}{a} = \frac{\sin \beta}{b} = \frac{\sin \gamma}{c}$$

## Induction

①  $n=1$

② Assume  $n=k$

③  $n=k+1$

③ for all  $n \geq 1$

deg	rad	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\cot \theta$	$\sec \theta$	$\csc \theta$
$0^\circ$	0	0	1	0	-	1	-
$30^\circ$	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2
$45^\circ$	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1	$\sqrt{2}$	$\sqrt{2}$
$60^\circ$	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{1}{\sqrt{3}}$	2	$\frac{2\sqrt{3}}{3}$
$90^\circ$	$\frac{\pi}{2}$	1	0	-	0	-	1

## Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos \alpha$$

$$b^2 = a^2 + c^2 - 2ac \cos \beta$$

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