COMPLEX NUMBERS REFERENCE

ADVANCED ALGEBRA QUICK-STUDY GUIDE

The Imaginary Unit

$$i = \hat{a}\check{s}\text{-}1$$

$$i\hat{A}^2 = -1$$

$$i\hat{A}^3 = -i$$

$$i\hat{a}\square' = 1$$

Standard Form

$$z = a + bi$$

Where **a** is the real part (Re) and **bi** is the imaginary part (Im).

Fundamental Operations

Operation	Definition / Formula
Addition	(a + bi) + (c + di) = (a + c) + (b + d)i
Subtraction	(a + bi) - (c + di) = (a - c) + (b - d)i
Multiplication	(a + bi)(c + di) = (ac - bd) + (ad + bc)i
Conjugate	z = a + bi â†’ zÌ… = a - bi
Division	Multiply numerator and denominator by zÌ…

Absolute Value (Modulus)

$$|z| = \hat{a}\check{s}(a\hat{A}^2 + b\hat{A}^2)$$

Polar Form

$$z = r(\cos \hat{I}_{,} + i \sin \hat{I}_{,})$$

r = |z|, Î¸ = tanâ»Â¹(b/a)

EULER'S FORMULA

$$e^{i\hat{I}_{,}} = \cos \hat{I}_{,} + i \sin \hat{I}_{,}$$