

Advanced Math

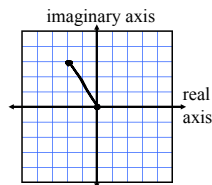
6-5

(Day 1)

DeMoivre's Theorem

Complex Number : a number with a real part a and an imaginary part b written in the form $a + bi$.

Complex Plane :



Absolute value of a Complex Number :

$$|a + bi| = \sqrt{a^2 + b^2}$$

modulus

*1) Place $-2 + 3i$ in the complex plane.

*2) $|-2 + 3i| = \sqrt{(-2)^2 + (3)^2} = \sqrt{13}$

Trigonometric form of a Complex Number :

Compare to the trig form of a vector. Very similar.

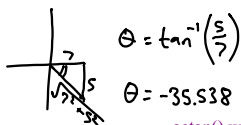
$$a + bi = r(\cos\theta + i\sin\theta)$$

$r = \sqrt{a^2 + b^2}$ and is called the modulus.

θ is called the argument.

$$\| \|(i\cos\theta + j\sin\theta)$$

*3) Write the trig form of $7 - 5i$. $\sqrt{74} (\cos(-35.5^\circ) + i\sin(-35.5^\circ))$



actan() will only give you results in quadrants I or IV. If your picture is in quadrant II or III, you have to adjust your answer to the correct quadrant.

Multiplying and Dividing Complex Numbers :

When multiplying two complex numbers, z_1 and z_2 ,

$$z_1 z_2 = r_1 r_2 [\cos(\theta_1 + \theta_2) + i \sin(\theta_1 + \theta_2)]$$

multiply the moduli add the arguments

When dividing two complex numbers, z_1 and z_2 ,

$$\frac{z_1}{z_2} = \frac{r_1}{r_2} [\cos(\theta_1 - \theta_2) + i \sin(\theta_1 - \theta_2)]$$

divide moduli subtract arguments

*4) $\frac{2(\cos 30^\circ + i \sin 30^\circ)}{5(\cos 75^\circ + i \sin 75^\circ)}$
 $= \frac{2}{5} (\cos 105^\circ + i \sin 105^\circ)$

Assignment:
 pg. 563
 2-26 even,
 46-56 even.