Calculus II

MAT187 Student Slides

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Exercise 1

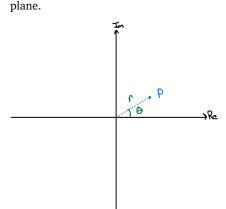
Consider the plot of the complex numbers p_1 , p_2 , p_3 , p_4 in the complex plane.



- 1.1 For which complex numbers is the real part grater than the imaginary part?
- 1.2 Which complex number has the smallest *modulus/absolute value*?
- 1.3 Which complex number has the largest *argument*? Is your answer at all ambiguous?

Exercise 2

Consider the plot of the complex number p in the complex 2.1 Sketch the complex number 2p.



- 2.2 Sketch the complex number p^2 .
- 2.3 Sketch the complex numbers p^n for n = 3, 4, ... Will your answer depend on r?
- 2.4 Use the geometry of the complex plane to find \sqrt{i} . Express your answer in both polar and rectangular form.

Consider the equation

3.3 Find all solutions to Equation (1).

 $z^3 = -1$

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- 3.2 If $z = re^{i\theta}$ is a solution to Equation (1), what conditions must r and θ satisfy? Justify your conclusions.

(1)

Consider the equation

4.3 Let n = 4. Geometrically, what should the *sum* of the roots of unity be? Verify your answer algebraically.

- 4.2 Find the roots of unity for n = 4.
- 4.4 Let n = 5. What should the sum of the roots of unity be?

 $z^{n} = 1$

4.1 Solutions to Equation (2) are called *roots of unity*. How many roots of unity are there (for a fixed value of n)?

(2)