

LAST Name \_\_\_\_\_ FIRST Name \_\_\_\_\_

Lab Time \_\_\_\_\_

- **(5 Points)** Print your name and lab time in legible, block lettering above.
- This quiz should take up to 20 minutes to complete. You will be given at least 20 minutes, up to a maximum of 30 minutes, to work on the quiz.
- **This quiz is closed book.** Collaboration is not permitted. You may not use or access, or cause to be used or accessed, any reference in print or electronic form at any time during the quiz. Computing, communication, and other electronic devices (except dedicated timekeepers) must be turned off. Noncompliance with these or other instructions from the teaching staff—including, for example, commencing work prematurely or continuing beyond the announced stop time—is a serious violation of the Code of Student Conduct.
- We will provide you with scratch paper. Do not use your own.
- **The quiz printout consists of pages numbered 1 through 4.** When you are prompted by the teaching staff to begin work, verify that your copy of the quiz is free of printing anomalies and contains all of the four numbered pages. If you find a defect in your copy, notify the staff immediately.
- Please write neatly and legibly, because *if we can't read it, we can't grade it.*
- For each problem, limit your work to the space provided specifically for that problem. *No other work will be considered in grading your quiz. No exceptions.*
- Unless explicitly waived by the specific wording of a problem, you must explain your responses (and reasoning) succinctly, but clearly and convincingly.
- We hope you do a *fantastic* job on this quiz.

Problem	Points	Your Score
Name	5	
1	20	
2	20	
<b>Total</b>	<b>45</b>	

**Q1.1 (20 Points)** For each set defined below, provide a well-labeled diagram identifying all the points on the complex plane that belong to it.

The symbol  $\mathbb{C}$  denotes the set of complex numbers. To receive full credit, you must explain your reasoning succinctly, but clearly and convincingly. You may tackle each part independently.

(a) (10 Points)

$$A = \{z \in \mathbb{C} \mid 0.5 \leq |z - i| \leq 1\}.$$

(b) (10 Points)

$$B = \{z \in \mathbb{C} \mid |z - i| = |z + i|\}.$$

**Q1.2 (20 Points)** Consider the quartic (fourth-order) equation

$$z^4 - 4z^2 + 16 = 0.$$

- (a) (16 Points) Determine the four solutions (roots) of the equation, and express each root in both a simple rectangular and a simple polar form. Explain your work succinctly, but clearly and convincingly.

Your trigonometry teacher rightfully used to insist that  $\cos(\pi/3) = \sin(\pi/6) = 1/2$  and  $\sin(\pi/3) = \cos(\pi/6) = \sqrt{3}/2$ .

- (b) (4 Points) Identify the four solutions as points on a single, well-labeled diagram of the complex plane.

You may use this page for scratch work only.  
Without exception, subject matter on this page will *not* be graded.