

Spring 2025 Laird Homework 7

Section 1

- (A) Convert the polar point $(4, \frac{\pi}{3})$ to rectangular coordinates.
- (B) Convert the rectangular point $(3, -3)$ to polar coordinates. Express the angle in radians.
- (C) Convert the polar point $(4, \frac{\pi}{20})$ to rectangular coordinates. Round to 4 decimal places.
- (D) Convert the rectangular point $(1, 9)$ to polar coordinates. Express the angle in radians. Round to 4 decimal places.
- (E) Convert the rectangular point $(-1, -9)$ to polar coordinates. Express the angle in radians. Round to 4 decimal places.

Section 2

- (A) The complex number $z = 3 + 8i$ is rotated 90° counterclockwise about the origin. Express the resulting complex number in rectangular form.
- (B) The above rotation is equivalent to multiplying z by what complex number?
- (C) Find the polar form of the complex number $r = 1 - 2i$.
- (D) The complex number $r = 1 - 2i$ is rotated 180° about the origin. Express the resulting complex number in polar form.
- (E) The complex number $p = -4 + 4i$ is rotated $\frac{\pi}{3}$ radians counterclockwise about the origin. Express the resulting complex number in rectangular form.
- (F) The above rotation is equivalent to multiplying p by what complex number?

Section 3

- (A) The complex number $m = 0 + i$ is raised to the fourth power. Express m^4 in polar form $r(\cos(\theta) + i \sin(\theta))$.
- (B) The complex number $n = 2 + 2i$ is raised to the fifth power. Express n^5 in polar form $r(\cos(\theta) + i \sin(\theta))$.
- (C) Find all values of w that satisfy $w^3 = 8(\cos(\frac{\pi}{2}) + i \sin(\frac{\pi}{2}))$. Express each answer in polar form.

Section 4

- (A) Is 4 a complex number?
- (B) Is $0 + 3i$ a complex number?
- (C) Is $2 + 3i$ a complex number?