Please complete the following exercises. You may collaborate with your classmates, consult your notes or text, and/or ask for help, but your write-up of the solutions must be <u>entirely</u> your own words/workings.

While you may also consult outside resources (Wikipedia, for example), you may find those sources often pitched to either a level that is too high or two low. You should <u>not</u> consult solutions manuals, Chegg, and other such sources – these are not resources, textbooks, guidelines, or advice, they are solutions. Copying solutions, from whatever source, will entirely bypass the learning process, and it may also constitute plagiarism.

Problems from the text are given by section (§). Problems not from the text (A) follow the most closely related section.

§2 : 2, 4

§3 : 1, 3$^\text{p}$

§5 : 1(a), 2$^\text{p}$, 3$^\text{p}$, 5, 6$^\text{b}$, 7$^\text{b}$

A1 : Consider $p(z) = z^2 - 2z + 1$. Find a value of R such that if $|z| > R$, $|p(z)| \leq 2|z|^2$.

A2 : If $z_0 = 1 + i$, compute z_0^8. Then compute $|z_0|$ and $|z_0^8|$ and explain what you see.

§6 : 1$^\text{p}$, 2, 9$^\text{b}$, 10(a)$^\text{b}$

§9 : 1, 2(a)$^\text{p}$, 10$^\text{b}$

§11 : 1, 2, 4, 6, 7$^\text{b}$

A3 : Consider the graph on the following page. Shown are the circles $|z| = k$ for each integer $k = 1$ to $k = 10$, along with the point $z_0 = 5 + \sqrt{39}i$. Using what you know about the geometry of roots, locate the cube roots of z_0. (You will need to visually estimate some angles. Do your best.)

§12 : 1, 2, 3, 5

$^\text{p}$ indicates a problem that is proofs-oriented. This course is not proofs-intensive, so we will not see many of these and they will be relatively simple. However, be sure to approach these problems in the appropriate manner – drawing a specific conclusion by doing just a few small steps, with each step clearly justified by a result, theorem, or formula from the text.

$^\text{b}$ indicates a bonus problem. Such a problem will contribute a small extra amount to your grade. Skipping these problems (or completing them incorrectly) will not cause you to lose points. Some of these are proofs-oriented also.