

WEEK 9

Section 5.1

1. Find roots of the following quadratic polynomials:

(a) $x^2 + \pi = 0$.

(b) $3x^2 - x + 5 = 0$.

2. Simplify the following complex numbers by clearing the denominator:

(a) $\frac{\pi+i}{1-\pi i}$

(d) $\frac{1}{(2+i)(3-i)}$

(b) $\frac{3+i}{-i}$

(e) $\frac{1}{(2+i)}$

(c) $\frac{2+i}{18-5i}$

(f) $\frac{\overline{(2-i)}}{(2+i)}$

Section 5.2

3. Calculate the determinant

(a) $A = \begin{bmatrix} i & -3+i & -1+i \\ 6i & -7 & 2+5i \\ 2+3i & 0 & -2+6i \end{bmatrix}$

(b) $B = \begin{bmatrix} 1 & -i & 1+2i \\ 6-i & 0 & 9+5i \\ 2+i & -2+3i & -8-6i \end{bmatrix}$

4. Find all solutions to the system of linear equations

(a)

$$(i)x + (-3+i)y + (-1+i)z = 10$$

$$(6i)x + -7y + (2+5i)z = 13$$

$$(2+3i)x + (-2+6i)z = 6$$

(b)

$$x + (-i)y + (1+2i)z = 1$$

$$(6-i)x + (9+5i)z = 3$$

$$(2+i)x + (-2+3i)y + (-8-6i)z = 0$$

Section 5.4

5. Evaluate $z_1 z_2$ for the following

(a) $z_1 = e^{i\frac{\pi}{4}}$ and $z_2 = 2e^{i\frac{3\pi}{4}}$

(b) $z_1 = \pi e^{i\frac{\pi}{14}}$ and $z_2 = \frac{2}{3}e^{i\frac{\pi}{16}}$

(c) $z_1 = \frac{1}{\sqrt{2}}e^{i\frac{\pi}{2}}$ and $z_2 = -2e^{i\frac{3\pi}{2}}$

(d) $z_1 = \frac{1}{2\pi}e^{i\frac{\pi}{7}}$ and $z_2 = \frac{1+\pi}{3}e^{i\frac{\pi}{13}}$