

Assignment 2

(5 questions
x 2 = 10 marks)

1 For each of the following, find $|z|$, z^* , r & θ
where $z = r e^{i\theta}$.

a) $z = 3 + 4i$

b) $z = -3 + 4i$

2 Find a and b if $z_1 = z_2^* + z_3$ where:

$$z_1 = a + 4i$$

$$z_2 = 6 + 2i$$

$$z_3 = 4 + bi$$

3. Solve the following:

a) $z^2 - 2z + 2 = 0$

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

4. Simplify the following into the form $a + ib$.

a) $\frac{3+4i}{5+i}$

b) $\frac{-i}{1+i}$

c) $(z+3i)^4$

d) $\left(\frac{4-i}{2+i}\right)^2$

5. Solve for the complex variables z and w .

a) $z\bar{z} - iw = i$

$$iz + 3w = 2$$

b) $(1+i)z - w = z+i$

$$3iz + (z-i)w = 1$$