

Math 42 L₊
Homework 9

1. For a, b, c and d, find the number of roots of the given equations inside the circle $|z| = 1$.

a) $z^5 + 8z + 10 = 0$

b) $z^8 - 2z^5 + z^3 - 8z^2 + 3 = 0$

c) $z^6 + 3z^5 - 2z^2 + 2z - 9 = 0$

d) $z^7 - 7z^6 + 4z^3 - 1 = 0$

2. How many of the roots of the equations given in Question 1. a, b, c, and d, lie inside $|z| = 2$?

3. How many roots of the equation

$$3z^4 - 6iz^3 + 7z^2 - 2iz + 2 = 0$$

lie in the upper half plane ?

4. Prove that all roots of $z^7 - 5z^3 + 12 = 0$ lie between the circles $|z|=1$ and $|z|=2$.
