

Math 331: Homework 8, Due Oct 28

1. Let $z = x + iy$. Find the real and imaginary parts for the polynomials

(a) $z^4 + 5z^2 + 6$

(b) $z^3 + i$

2. Factor completely over \mathbb{C} . Hint: i is a root.

(a) $z^3 - iz^2 + 3iz + 3$

(b) $z^3 + (2 - i)z^2 + (1 - 4i)z - i - 2$

3. Let $p(x) = 1 - z^4$. Prove that $|p(z)|$ does not have a maximum at $z = 0$.

4. Use Cardano's Method to solve

(a) $x^3 - 6x - 6 = 0$

(b) $x^3 + 6x^2 + 9x + 8 = 0$

(c) $x^3 + 6x^2 - 36 = 0$

5. Solve

(a) $x^4 + 8x^2 + 8x + 2 = 0$

(b) $x^3 - x^2 - 2x - 1 = 0$