MATH 1210 Assignment #2

Due: October 10 2008, In Class

Reminder: all assignments *must* be accompanied by an honesty declaration. This should be stapled to the FRONT of your assignment.

Show all your work. Unjustified answers will receive little or no credit. Use single sided white $8\frac{1}{2} \times 11\frac{1}{2}$ paper, staple the top left corner, include your lab section.

1. Solve. Express your answer in Cartesian form.

    (a)
    $$\frac{(4-3i)^3}{2+i} + \overline{7+2i}$$

    (b)
    $$(2-3i)(4+7i) - \left(\frac{2-i}{3+i}\right)^2$$

2. Solve. Express your answer in Polar form.

    (a)
    $$(2\sqrt{3}+2i)(\sqrt{2}-\sqrt{2}i)$$

    (b)
    $$\frac{\sqrt{3}-\sqrt{3}i}{2-2\sqrt{3}i}$$

3. Find all solutions. Express your answers in exponential form.

    (a)
    $$z^4 = 50\sqrt{2} - 50\sqrt{2}i$$

    (b)
    $$z^5 = -16\sqrt{3} + 16i$$

4. Given that $1-i$ is a root of $P(x) = 2x^4 - 6x^3 + 7x^2 - 2x + 2$, factor $P(x)$ into the product of linear terms.

5. For the polynomial $P(x) = 6x^4 - 13x^3 - 3x^2 + 12x - 4$:

    (a) Apply Descartes' rule of signs to $P(x)$. (Be specific about what information it gives)

    (b) Apply the bounds theorem to $P(x)$.

    (c) Give the set of all possible rational roots of $P(x)$. Include in your consideration both the rational root theorem and what additional information you obtained from parts (a) & (b).

    (d) Give all the roots of $P(x)$.