MATHS EXAM
(COMPLEX NUMBER, QUADRATIC EQUATION, LINEAR INEQUALITIES)

TIME = 60MINS

FM=25

1. **EXPRESS IN THE FORM a + ib**

   a. i^{-39} (1)

   b. [(1/3 + i7/3) + (4 + i1/3)] - (- 4/3 + i) (2)

   c. (3 + i√5)(3 - i√5)/(√3 + √2i) - (√3 - i√2) (2)

2. **SOLVE THE FOLLOWING**

   $x^2 + x/\sqrt{2} + 1 = 0$ (2)

3. If x - iy = √(a - ib/c - id) prove that $(x^2 + y^2)^2 = (a^2 + b^2)/(c^2 + d^2)$ (3)

4. **LET $Z_1 = 2 - i$, $Z_2 = -2 + i$ (2x2=4)**

   $Re(Z_1Z_2/\overline{z}_1)$

   $Im(1/z_1\,\overline{z}_1)$

5. If $(x + iy)^3 = u + iv$, then show that $u/x + v/y = 4(x^2 - y^2)$ (3)

6. **SOLVE THE FOLLOWING SYSTEM OF INEQUALITIES GRAPHICALLY** (4)

$3x + 2y \leq 150$, $x + 4y \leq 80x \leq 15y \geq 0$, $x \geq 0$

7. **EVALUATE:** (4)

$\sqrt{(16-30i)}$