ALGEBRA (Q 2 & 3, PAPER 1)

2002

2 (a) Solve for x: $\dfrac{x-7}{2} = \dfrac{x+3}{6}$.

(b) (i) Show that $x + 2$ is a factor of $2x^3 + 7x^2 + x - 10$.

(ii) Hence, or otherwise, find the three roots of $2x^3 + 7x^2 + x - 10 = 0$.

(c) (i) Express b in terms of a and c where $\dfrac{8a - 5b}{b} = c$.

(ii) Hence, or otherwise, evaluate b when $a = 2^{\frac{5}{2}}$ and $c = 3^3$.

3 (a) Solve the inequality $5x + 1 \geq 4x - 3$, $x \in \mathbf{R}$ and illustrate the solution set on a number line.

(b) (i) Solve for x and y
$$y = 10 - x$$
$$x^2 + y^2 = 25,$$

(ii) Hence, find the two possible values of $x^3 + y^3$.

(c) Let $f(x) = x^2 + ax + t$ where $a, t \in \mathbf{R}$.
(i) Find the value of a, given that $f(-5) = f(-1)$.

(ii) Given that there is only one value of x for which the $f(x) = 0$, find the value of t.

ANSWERS
2 (a) $x = 12$
(b) (ii) $x = -2, -\frac{5}{2}, 1$
(c) (i) $b = \dfrac{8a}{c+5}$ (ii) $2^{\frac{1}{2}}$

3 (a) $x \geq -4$
(b) (i) (3, 4), (5, 0)   (ii) 91, 125
(c) (i) $a = 6$ (ii) $t = 9$