

ALGEBRA (Q 2 & 3, PAPER 1)

2003

2 (a) Given that $3x - 2y = 4$, find the value of y when $x = -2$.

(b) (i) Evaluate $9^{\frac{1}{2}}$.

(ii) Express $\sqrt{8}$ in the form 2^k , $k \in \mathbf{Q}$.

(iii) Solve for x the equation $25^x = 5^{6-x}$.

(c) Solve for x the equation

$$\frac{3}{x+1} + \frac{1}{x+1} = 1.$$

Give your answers in the form $a \pm \sqrt{b}$, where $a, b \in \mathbf{N}$.

3 (a) Find the solution set of
 $5x - 3 < 12$, $x \in \mathbf{N}$.

(b) (i) Show that $x + 2$ is a factor of $x^3 + 3x^2 - 4x - 12$.

(ii) Hence, or otherwise, solve the equation $x^3 + 3x^2 - 4x - 12 = 0$.

(c) (i) Simplify $(x + \sqrt{a-x})(x - \sqrt{a-x})$, where $a - x \geq 0$.

(ii) Given that $x = 3$ is a solution of the equation $(x + \sqrt{a-x})(x - \sqrt{a-x}) = 0$,
find the value of a .

(iii) Hence, find the other solution of the equation in part (ii), and verify your answer.

ANSWERS

2 (a) $y = -5$

(b) (i) ± 3 (ii) $2^{\frac{3}{2}}$ (iii) $x = 2$

(c) $2 \pm \sqrt{3}$

3 (a) $x < 3$ or $\{0, 1, 2\}$

(b) (ii) $x = -3, -2, 2$

(c) (i) $x^2 - (a - x)$ (ii) $a = 12$