ALGEBRA (Q 2 & 3, PAPER 1)

2005

2 (a) Find the value of $x^2 - 5xy$ when $x = 3$ and $y = -2$.

   (b) Solve for x and y
   $$x + 3 = 2y$$
   $$xy - 7y + 8 = 0.$$

   (c) (i) Write $\sqrt{x} + \dfrac{1}{\sqrt{x}}$ as a single fraction.

       (ii) Hence, or otherwise, simplify $\left(\dfrac{2\sqrt{x}}{1+x} \right)\left(\sqrt{x} + \dfrac{1}{\sqrt{x}} \right)$.

       (iii) Solve for x
       $$\left(\frac{2\sqrt{x}}{1+x} \right)\left(\sqrt{x} + \frac{1}{\sqrt{x}} \right) = x - 3.$$

3 (a) Given that $ax + b = c$, express x in terms of a, b and c, where $a \neq 0$.

   (b) (i) Find A, the solution set of $3x - 2 \leq 4$, $x \in \mathbf{Z}$.

       (ii) Find B, the solution set of $\dfrac{1-3x}{2} < 5$, $x \in \mathbf{Z}$.

       (iii) List the elements of $A \cap B$.

   (c) Let $f(x) = 2x^3 - 3x^2 - 11x + 6$.
       (i) Verify that $f(3) = 0$.

       (ii) Solve the equation
       $$2x^3 - 3x^2 - 11x + 60 = 0.$$

ANSWERS

2 (a) 39

   (b) (−1, 1), (5, 4)

   (c) (i) $\dfrac{x+1}{\sqrt{x}}$ (ii) 2 (iii) $x = 5$

3 (a) $x = \dfrac{c-b}{a}$

   (b) (i) $x \leq 2$ or $\{.....-3,-2,-1,0,1,2\}$

       (ii) $x > -3$ or $\{-2,-1,0,1,2,3....\}$

       (iii) $\{-2,-1,0,1,2\}$

   (c) $x = -2, \tfrac{1}{2}, 3$