## ALGEBRA (Q 2 & 3, PAPER 1)

## 2008

2  (a)  Simplify $3(4x+5) - 2(6x+4)$.

   (b)  (i)  Solve $x^2 - 4x + 1 = 0$.

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

        (ii)  Find the value of $x$ for which
        $$\frac{5^x}{3} = \frac{5^6}{75}.$$

   (c)  (i)  Factorise $x^2 + 4x + 4$.

        (ii)  Simplify $\sqrt{x^2 + 4x + 4} + \sqrt{x^2 + 2x + 1}$, given that $x \geq 0$.

        (iii)  Given that $x \geq 0$, solve for $x$
        $$\sqrt{x^2 + 4x + 4} + \sqrt{x^2 + 2x + 1} = x^2.$$

3  (a)  Given that $a(x+5) = 8$, express $x$ in terms of $a$.

   (b)  (i)  Solve for $x$ and $y$
        $$x - y = 1$$
        $$x^2 + y^2 = 25.$$

        (ii)  Hence, find the two possible values of $x - y^2$.

   (c)  (i)  Let $f(x) = x^2 + bx + c$, $x \in \mathbf{R}$.
        The graph of the function $f$ intersects the $y$-axis at 3 and the $x$-axis at $-1$.
        Find the value of $b$ and the value of $c$.

        (ii)  The lengths of the sides of an isosceles triangle are $\sqrt{x^2 + 1}$, $\sqrt{x^2 + 1}$ and $2x$.
        Taking $2x$ as the base, find the perpendicular height of the triangle.

**ANSWERS**

2   (a)  7

  (b)  (i) $2 \pm \sqrt{3}$          (ii) $x = 4$

  (c)  (i) $(x + 2)(x + 2)$        (ii) $2x + 3$      (iii) $x = 3$

3   (a)  $x = \dfrac{8 - 5a}{a}$

  (b)  (i)  $x = 3,\ y = 4;\ x = -3,\ y = -4$          (ii) $-19,\ -5$

  (c)  (i) $b = 4,\ c = 3$          (ii) 1