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A LEVEL MATHS

(7) Completing the Square for Quadratics Expressions

WORKING AT D/E

(1) Complete the square on the expression $x^2 + 6x - 8$

(2) By first factoring out the HCF, complete the square for $4x^2 - 8x$.

(3) Solve the quadratic equation $x^2 - 10x + 8 = 0$ giving your answer in the form $x = 5 \pm \sqrt{q}$ where q is a prime number. You must complete the square.

WORKING AT B/C

(1) Write the expression $x^2 - 5x + 1$ in the form $(x + p)^2 + r$

(2) Write the expression $-5x^2 + 10x + 7$ in the form $p(x + r)^2 + q$

(3) Show, by completing the square, that there are no real solutions to the equation $x^2 - 9x + 30 = 0$

WORKING AT A*/A

(1) By completing the square, solve the equation $2x^2 - 4px + 1 = 0$ giving your solutions in terms of p.

(2) By completing the square, find the maximum value of the function $f(x) = -x^2 - 3x + 8$ giving your answer as a rational fraction in its simplest form.

(3) Alan completes the square for a quadratic equation. He writes that $(2x - 3)^2 + 8 - k = 0$. He says there are two real roots to the equation. Explain why $k > 8$ for this to be true.