
1 - (MAT-S 2016-HL-Paper 2/1-Q2)-FUNCTIONS - ROOTS, QUADRATICS

(a) Express $x^2 + 4x - 2$ in the form $(x + a)^2 + b$ where $a, b \in \mathbb{Z}$. [2]

(b) If $f(x) = x + 2$ and $(g \circ f)(x) = x^2 + 4x - 2$ write down $g(x)$. [2]

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(a) Prove that the equation $3x^2 + 2kx + k - 1 = 0$ has two distinct real roots for all values of $k \in \mathbb{R}$. [4 marks]

(b) Find the value of k for which the two roots of the equation are closest together. [3 marks]

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3- (MAT-W 2012-HL-Paper 2-Q2)-QUADRATICS

[Maximum mark: 4]

Show that the quadratic equation $x^2 - (5-k)x - (k+2) = 0$ has two distinct real roots for all real values of k .

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