Quadratic Functions - Edexcel Past Exam Questions 2

1. $4x - 5 - x^2 = q - (x + p)^2$,

where p and q are integers.

(a) Find the value of p and the value of q. **(3)**

(b) Calculate the discriminant of $4x - 5 - x^2$. **(2)**

(c) Sketch the curve with equation $y = 4x - 5 - x^2$, showing clearly the coordinates of any points where the curve crosses the coordinate axes. **(3)**

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2. $4x^2 + 8x + 3 \equiv a(x + b)^2 + c$.

(a) Find the values of the constants a, b and c. **(3)**

(b) Sketch the curve with equation $y = 4x^2 + 8x + 3$, showing clearly the coordinates of any points where the curve crosses the coordinate axes. **(4)**

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3. Given that $f(x) = 2x^2 + 8x + 3$,

(a) find the value of the discriminant of $f(x)$. **(2)**

(b) Express $f(x)$ in the form $p(x + q)^2 + r$ where p, q and r are integers to be found. **(3)**

The line $y = 4x + c$, where c is a constant, is a tangent to the curve with equation $y = f(x)$.

(c) Calculate the value of c. **(5)**

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4. The curve C has equation $y = \frac{1}{3}x^2 + 8$.

The line L has equation $y = 3x + k$, where k is a positive constant.

(a) Sketch C and L on separate diagrams, showing the coordinates of the points at which C and L cut the axes. **(4)**

Given that line L is a tangent to C,

(b) find the value of k. **(5)**

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