FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

A11: Quadratic graphs

Solve problems using roots, intercepts and turning points of quadratics

20 marks · 25 minutes · Non-calculator

1) A ball's height is $h = 20t - 5t^2$ metres after t seconds. Find its maximum height and how long it is in the air.

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[Question 1: 3 marks]

2) The graph of $y = x^2 - 6x + c$ touches the x-axis at one point. Find c.

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[Question 2: 3 marks]

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3) The turning point of $y = x^2 + bx + c$ is $(3, -4)$. Find b and c.

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[Question 3: 3 marks]

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4) A rectangle has perimeter 20 cm. Show that its area is $A = x(10 - x)$ and find the greatest possible area.

..... cm^2

[Question 4: 3 marks]

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5) The graph of $y = x^2 - 2x - 8$ crosses the x-axis at A and B and the y-axis at C. Find the area of triangle ABC.

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[Question 5: 4 marks]

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6) A quadratic graph has roots 1 and 5 and passes through (0, 10). Find its equation in the form $y = ax^2 + bx + c$

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[Question 6: 2 marks]

7) Find the turning point of $y = 2x^2 - 8x + 3$

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[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	20 m; 4 s	$h = 0$ at $t = 0, 4$ (P1); max at $t = 2$ (P1); 20 (A1).
2	9	$(x - 3)^2 + c - 9$ (P1); $c - 9 = 0$ (P1); A1.
3	$b = -6$, $c = 5$	$(x - 3)^2 - 4$ (P1); expand (P1); A1.
4	25	Width $10 - x$ (P1); turning point at $x = 5$ (P1); 25 (A1).
5	24	Roots -2 and 4 (P1); $C(0, -8)$ (P1); base 6, height 8 (P1); 24 (A1).
6	$y = 2x^2 - 12x + 10$	$y = a(x - 1)(x - 5)$, $5a = 10$ (P1); A1.
7	$(2, -5)$	$2(x - 2)^2 - 5$ (P1); A1.