

TOPICAL PAST PAPER QUESTIONS WORKBOOK

AS & A Level Mathematics (9709) Paper 1 [Pure Mathematics 1]

May/June 2015 – February/March 2022

Chapter 1

Quadratics

4. 9709_s20_qp_11 Q: 5

The equation of a line is $y = mx + c$, where m and c are constants, and the equation of a curve is $xy = 16$.

- (a) Given that the line is a tangent to the curve, express m in terms of c . [3]

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- (b) Given instead that $m = -4$, find the set of values of c for which the line intersects the curve at two distinct points. [3]

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9. 9709_s16_qp_11 Q: 6

- (a) Find the values of the constant m for which the line $y = mx$ is a tangent to the curve $y = 2x^2 - 4x + 8$. [3]
- (b) The function f is defined for $x \in \mathbb{R}$ by $f(x) = x^2 + ax + b$, where a and b are constants. The solutions of the equation $f(x) = 0$ are $x = 1$ and $x = 9$. Find
- (i) the values of a and b , [2]
- (ii) the coordinates of the vertex of the curve $y = f(x)$. [2]
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10. 9709_w16_qp_11 Q: 1

(i) Express $x^2 + 6x + 2$ in the form $(x + a)^2 + b$, where a and b are constants. [2]

(ii) Hence, or otherwise, find the set of values of x for which $x^2 + 6x + 2 > 9$. [2]

11. 9709_s15_qp_13 Q: 1

Express $2x^2 - 12x + 7$ in the form $a(x + b)^2 + c$, where a , b and c are constants. [3]

12. 9709_w15_qp_13 Q: 3

(i) Express $3x^2 - 6x + 2$ in the form $a(x + b)^2 + c$, where a , b and c are constants. [3]

(ii) The function f , where $f(x) = x^3 - 3x^2 + 7x - 8$, is defined for $x \in \mathbb{R}$. Find $f'(x)$ and state, with a reason, whether f is an increasing function, a decreasing function or neither. [3]
