TOPICAL PAST PAPER QUESTIONS WORKBOOK

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

## Chapter 1

## Quadratics

1. 9709\_m21\_qp\_12 Q: 2

By using a suitable substitution,	solve t	the equation
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[4]	$\frac{4}{(2x-3)^2} - 3 = 0.$	$(2x-3)^2$ –	

2. 9709_s21_qp_11 Q: 6
The equation of a curve is $y = (2k - 3)x^2 - kx - (k - 2)$ , where $k$ is a constant. The line $y = 3x - 4$ is a tangent to the curve.
Find the value of $k$ . [5]

3. 97	$109 \_s21 \_qp \_12 \ Q: 1$
(a)	Express $16x^2 - 24x + 10$ in the form $(4x + a)^2 + b$ . [2]
<b>(b)</b>	It is given that the equation $16x^2 - 24x + 10 = k$ , where k is a constant, has exactly one root.
	Find the value of this root. [2]

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

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Given instead that $m = -4$ , find the set of values of $c$ for which the line intersection	ects the curv
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The function f is defined by f(x	$(x) = x^2 - 4x + 8 \text{ for } x \in \mathbb{R}.$
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(i)	Express $x^2 - 4x + 8$ in the form $(x - a)^2 + b$ .	[2]
		• • • • • • •
(ii)	Hence find the set of values of x for which $f(x) < 9$ , giving your answer in exact form.	[3]
		• • • • • • • •
		•••••

6. 9709_s18_qp_13 Q: 1	
Express $3x^2 - 12x + 7$ in the form $a(x+b)^2 + c$ , where a, b and c are constants. [3]	J
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7. 9709 w18 qp 11 Q: i	7.	9709	w18	αp	11	Q:	1
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Showing all necessary working, solve the equation $4x - 11x^{\frac{1}{2}} + 6 = 0$ .	[3]

8. 9709_m17_qp_12 Q: 1	
Find the set of values of k for which the equation $2x^2 + 3kx + k = 0$ has distinct real roots. [4]	

 $9.\ 9709\_s16\_qp\_11\ Q:\ 6$ 

- (a) Find the values of the constant m for which the line y = mx is a tangent to the curve  $y = 2x^2 4x + 8$ .
- (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]

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]