Quadratics Expressions and Equations Past Paper Answers GCSE Edexcel – Non Calculator

1.

	$x^2 + 6x = 1$	M1	writes the area using algebraic terms e.g. $(x + 3) \times (x + 3)$ or at least two correct area expressions which may be written on the diagram or x given as $\sqrt{10} - 3$
		M1	expands and includes the given 10 e.g. $x^2 + 3x + 3x + 9 = 10$; condone one error in the four terms when expanding or $10 - 3\sqrt{10} - 3\sqrt{10} + 9 + 6\sqrt{10} - 18 (=1)$ condone 1 error in the 6 terms
		A1	rearranges to give the given equation or shows surd expression simplifies to 1

2.

	M1	for substitution of a rearrangement of $y - 3x = 13$ e.g. $(3x + 13)^2 + x^2 = 25$
$x = -\dfrac{24}{5}$		
$y = -\dfrac{7}{5}$	M1	(dep M1) for expansion of bracket after substitution (at least 3 terms correct out of the 4 terms) e.g. $9x^2 + 39x + 39x + 169$
$x = -3,$	M1	for forming quadratic ready for solving e.g. $10x^2 + 78x + 144 (= 0)$
$y = 4$	M1	for factorising e.g. $(5x + 24)(x + 3) (= 0)$ oe
	A1	$x = -\dfrac{24}{5}, y = -\dfrac{7}{5}$ and $x = -3, y = 4$ SC: B1 (if M0) for all 4 values mis-associated or one correct pair of values or values given as coordinates.

3.

Answer	Notes	
$\dfrac{2x - 5}{x + 5}$	M1	factorising to give $(2x - 5)(x + 1)$
	M1	factorising to give $(x + 5)(x + 1)$
	A1	cao

4.

Answer	Notes	
$3 \pm \sqrt{17}$	M1	For $(x-3)^2 - 9 - 8 \ (=0)$ or $(x =) \dfrac{-(-6)\pm\sqrt{(-6)^2-4(1)(-8)}}{2(1)}$ allow sign error for b
	M1	For $x - 3 = \pm \sqrt{17}$ or $x = \dfrac{6\pm\sqrt{68}}{2}$
	A1	cao

5.

Answer	Notes	
$3x$	M1	Factorising numerator and denominator of first fraction $\dfrac{3(x+2)}{(x-5)(x+2)} \ \left(=\dfrac{3}{(x-5)}\right)$
	M1	Factorising denominator of second fraction $\dfrac{x+5}{x(x+5)(x-5)} \ \left(=\dfrac{1}{x(x-5)}\right)$
	M1	Multiplication by reciprocal $\dfrac{3(x+2)}{(x-5)(x+2)} \times \dfrac{x(x+5)(x-5)}{(x+5)}$
	A1	Completing algebra to reach $3x$

6.

$5(2x + 1)(2x - 1)$	M1	for $5(4x^2 - 1)$
	A1	

7.

(a)	$\dfrac{1}{5(x-1)}$	B1	for $\dfrac{1}{5(x-1)}$ or $\dfrac{1}{5x-5}$
(b)	$2(5+y)(5-y)$	M1	for partial factorisation, eg $2(25 - y^2)$ oe or $(10 + 2y)(5 - y)$ oe or $(5 + y)(10 - 2y)$ oe or $-2(y^2 - 25)$ oe
		A1	for $2(5 + y)(5 - y)$ or $-2(5 + y)(y - 5)$

8.

on	Answer	Mark	Mark scheme	Additional guidance
(a)	$(a-b)(a+b)$	B1	cao	Accept reversed brackets
(b)	$12(x^2 + 1)$	M1	for using 'a' $= x^2 + 4$ and 'b' $= x^2 - 2$ **OR** multiplying out both brackets, at least one fully correct	Correct 4 terms if not simplified or 3 terms if simplified
		M1	(dep) for a correct expression for ('a' + 'b')('a' − 'b') with no additional brackets, simplified or unsimplified eg $(x^2 + 4 + x^2 - 2)(x^2 + 4 - x^2 + 2)$ **or** $(2x^2 + 2) \times 6$ **OR** ft for a correct expression without brackets, simplified or unsimplified eg $x^4 + 8x^2 + 16 - x^4 + 4x^2 - 4$	
		A1	for $12(x^2 + 1)$ **or** $12x^2 + 12$ oe	

9.

$\dfrac{3x+1}{2x}$	M1	for $(3x + 1)(x - 3)$ or $2x(x - 3)$	Accept $(2x + 0)$ for the first two marks but not for the final answer
	A1	for $(3x + 1)(x - 3)$ **and** $2x(x - 3)$	
	A1	$\dfrac{3x+1}{2x}$ oe	

10.

$x > 2$	P1	for process to derive algebraic expressions for area of both rectangle and triangle eg $(x - 1)(3x - 2)$ and $(2x \times x) \div 2$ (condone missing brackets)
	M1	for method to rearrange inequality to $2x^2 - 5x + 2 > 0$ oe providing in the form $ax^2 + bx + c > 0$
	M1	for a correct method to solve $2x^2 - 5x + 2 > 0$
	M1	for establishing critical values 2 and $\frac{1}{2}$
	A1	$x > 2$

11.

2, 6	3	M1 for $(x^2 =)$ $4(x^2 - 6x + 9)$ or $4x^2 - 24x + 36$ oe or for $\dfrac{x^2}{4} = x^2 - 6x + 9$ M1 (dep) for $3x^2 - 24x + 36 = 0$ or $3(x^2 - 8x + 12) = 0$ or $(x - 2)(x - 6) = 0$ or $(3x - 6)(x - 6) = 0$ oe A1 cao **OR** M1 for $x = (\pm)2(x - 3)$ or $\dfrac{x}{2} = (\pm)(x - 3)$ M1(dep) for correct solution of one equation A1 cao

12.

(a)		$x^2 + 2x$	1	B1 cao
(b)		$3y + 4x + 2$	2	M1 for a method to expand a bracket, e.g. $3y + 6$ or $4x - 4$ A1 cao
(c)	$2t^2 + 10t - 3t - 15$	$2t^2 + 7t - 15$	2	M1 for 4 terms correct ignoring signs or 3 out of no more than 4 terms with signs correct unless ambiguous A1 cao
(d)		$4a(2a + 3)$	2	M1 for $4a(na+c)$ or $2a(4a+6)$ or $a(8a+12)$ [n,c integers, c≠0] A1 cao
(e)		$(y + 1)(y - 2)$	2	M1 for $(y \pm 1)(y \pm 2)$ unless ambiguous A1 cao