
GCSE Mathematics

Completing the Square

Mark Scheme - Higher | Grades 7-8

M = method mark, A = accuracy mark (dependent on the preceding M mark), B = independent mark.

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Edexcel-style questions

Q1 Grade 7 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	$(x + 4)^2$ seen	M1
(a)	$a = 4$, $b = -11$, i.e. $(x + 4)^2 - 11$	A1
(b)	$(-4, -11)$, follow through from part (a)	B1

Q2 Grade 7 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	$(x - 3)^2$ seen	M1
(a)	$a = -3$, $b = -8$, i.e. $(x - 3)^2 - 8$	A1
(b)	$(3, -8)$, follow through from part (a)	B1

Q3 Grade 8 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$2(x^2 + 4x) + 3$	M1
(a)	$2[(x + 2)^2 - 4] + 3$	M1
(a)	$p = 2$, $q = 2$, $r = -5$, i.e. $2(x + 2)^2 - 5$	A1
(b)	$(-2, -5)$, follow through from part (a)	B1

Q4 Grade 8 Edexcel style

Total: 5

Part	Mark scheme	Marks
(a)	$(x + 3)^2$ seen	M1
(a)	$(x + 3)^2 - 7$	A1
(b)	$(x + 3)^2 = 7$	M1
(b)	$x + 3 = \pm\sqrt{7}$	M1
(b)	$x = -3 + \sqrt{7}$ or $x = -3 - \sqrt{7}$	A1

Q5 Grade 8 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$(x + 5)^2$ seen	M1
(a)	$(x + 5)^2 - 7$	A1
(b)	$A = (-5, -7)$	B1
(b)	line of symmetry: $x = -5$	B1

AQA-style questions

Q6 Grade 7 AQA style

Total: 3

Part	Mark scheme	Marks
(a)	$(x + 5)^2$ seen	M1
(a)	$a = 5$, $b = -22$, i.e. $(x + 5)^2 - 22$	A1
(b)	$(-5, -22)$, follow through from part (a)	B1

Q7 Grade 7 AQA style

Total: 3

Part	Mark scheme	Marks
(a)	$(x - 5)^2$ seen	M1
(a)	$a = -5$, $b = -21$, i.e. $(x - 5)^2 - 21$	A1
(b)	$(5, -21)$, follow through from part (a)	B1

Q8 Grade 8 AQA style

Total: 4

Part	Mark scheme	Marks
(a)	$3(x^2 + 4x) + 7$	M1
(a)	$3[(x + 2)^2 - 4] + 7$	M1
(a)	$p = 3$, $q = 2$, $r = -5$, i.e. $3(x + 2)^2 - 5$	A1
(b)	$(-2, -5)$, follow through from part (a)	B1

Q9 Grade 8 AQA style

Total: 5

Part	Mark scheme	Marks
(a)	$(x + 2)^2$ seen	M1
(a)	$(x + 2)^2 - 7$	A1
(b)	$(x + 2)^2 = 7$	M1
(b)	$x + 2 = \pm\sqrt{7}$	M1
(b)	$x = -2 + \sqrt{7}$ or $x = -2 - \sqrt{7}$	A1

Q10 Grade 8 AQA style

Total: 4

Part	Mark scheme	Marks
(a)	$(x + 3)^2$ seen	M1
(a)	$(x + 3)^2 - 5$	A1
(b)	$A = (-3, -5)$	B1
(b)	line of symmetry: $x = -3$	B1

OCR-style questions

Q11 Grade 7 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	$(x + 2)^2$ seen	M1
(a)	$a = 2, b = 3$, i.e. $(x + 2)^2 + 3$	A1
(b)	$(-2, 3)$, follow through from part (a)	B1

Q12 Grade 7 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	$(x - 4)^2$ seen	M1
(a)	$a = -4, b = -7$, i.e. $(x - 4)^2 - 7$	A1
(b)	$(4, -7)$, follow through from part (a)	B1

Q13 Grade 8 OCR style

Total: 4

Part	Mark scheme	Marks
(a)	$2(x^2 - 6x) + 5$	M1
(a)	$2[(x - 3)^2 - 9] + 5$	M1
(a)	$p = 2, q = -3, r = -13$, i.e. $2(x - 3)^2 - 13$	A1
(b)	$(3, -13)$, follow through from part (a)	B1

Q14 Grade 8 OCR style

Total: 5

Part	Mark scheme	Marks
(a)	$(x - 1)^2$ seen	M1
(a)	$(x - 1)^2 - 6$	A1
(b)	$(x - 1)^2 = 6$	M1
(b)	$x - 1 = \pm\sqrt{6}$	M1
(b)	$x = 1 + \sqrt{6}$ or $x = 1 - \sqrt{6}$	A1

Q15 Grade 8 OCR style

Total: 4

Part	Mark scheme	Marks
(a)	$(x - 2)^2$ seen	M1
(a)	$(x - 2)^2 + 5$	A1
(b)	$A = (2, 5)$	B1
(b)	line of symmetry: $x = 2$	B1

Teachably-style questions

Q16 Grade 7 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	$(x + 6)^2$ seen	M1
(a)	$a = 6$, $b = -35$, i.e. $(x + 6)^2 - 35$	A1
(b)	$(-6, -35)$, follow through from part (a)	B1

Q17 Grade 7 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	$(x - 7)^2$ seen	M1
(a)	$a = -7$, $b = -47$, i.e. $(x - 7)^2 - 47$	A1
(b)	$(7, -47)$, follow through from part (a)	B1

Q18 Grade 8 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$5(x^2 + 4x) + 3$	M1
(a)	$5[(x + 2)^2 - 4] + 3$	M1
(a)	$p = 5$, $q = 2$, $r = -17$, i.e. $5(x + 2)^2 - 17$	A1
(b)	$(-2, -17)$, follow through from part (a)	B1

Q19 Grade 8 Teachably style

Total: 5

Part	Mark scheme	Marks
(a)	$(x + 4)^2$ seen	M1
(a)	$(x + 4)^2 - 13$	A1
(b)	$(x + 4)^2 = 13$	M1
(b)	$x + 4 = \pm\sqrt{13}$	M1
(b)	$x = -4 + \sqrt{13}$ or $x = -4 - \sqrt{13}$	A1

Q20 Grade 8 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$(x + 1)^2$ seen	M1
(a)	$(x + 1)^2 + 5$	A1
(b)	$A = (-1, 5)$	B1
(b)	line of symmetry: $x = -1$	B1

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