
GCSE Mathematics

The Quadratic Formula

Mark Scheme - Higher | Grades 6-8

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

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Edexcel-style questions

Q1 Grade 6 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 1.27$	A1
(a)	$x = -2.77$	A1

Q2 Grade 7 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 2.11$	A1
(a)	$x = -0.36$	A1

Q3 Grade 7 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 1.21$	A1
(a)	$x = -3.71$	A1

Q4 Grade 8 Edexcel style

Total: 2

Part	Mark scheme	Marks
(a)	$b^2 - 4ac = 3^2 - 4(2)(5) = 9 - 40 = -31$	M1
(a)	no real solutions, since the discriminant is negative	A1

Q5 Grade 8 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$x(x + 4) = 30$	M1
(a)	$x^2 + 4x - 30 = 0$, so $x = (-4 \pm \sqrt{4^2 - 4(1)(-30)}) \div 2$	M1
(a)	$x = 3.83$ (2 d.p.)	A1
(a)	the negative root (-7.83) is rejected since $x > 0$	A1

AQA-style questions

Q6 Grade 6 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 0.65$	A1
(a)	$x = -4.65$	A1

Q7 Grade 7 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 4.14$	A1
(a)	$x = 0.36$	A1

Q8 Grade 7 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 0.230$	A1
(a)	$x = -2.90$	A1

Q9 Grade 8 AQA style**Total: 2**

Part	Mark scheme	Marks
(a)	$b^2 - 4ac = (-6)^2 - 4(1)(9) = 36 - 36 = 0$	M1
(a)	one repeated real solution, since the discriminant is 0	A1

Q10 Grade 8 AQA style**Total: 4**

Part	Mark scheme	Marks
(a)	$x(x + 5) = 20$	M1
(a)	$x^2 + 5x - 20 = 0$, so $x = (-5 \pm \sqrt{5^2 - 4(1)(-20)}) \div 2$	M1
(a)	$x = 2.62$ (2 d.p.)	A1
(a)	the negative root (-7.62) is rejected since $x > 0$	A1

OCR-style questions

Q11 Grade 6 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 1.85$	A1
(a)	$x = -0.18$	A1

Q12 Grade 7 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 0.91$	A1
(a)	$x = -1.31$	A1

Q13 Grade 7 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 1.55$	A1
(a)	$x = -0.804$	A1

Q14 Grade 8 OCR style

Total: 2

Part	Mark scheme	Marks
(a)	$b^2 - 4ac = 5^2 - 4(3)(-2) = 25 + 24 = 49$	M1
(a)	two real solutions, since the discriminant is positive	A1

Q15 Grade 8 OCR style

Total: 4

Part	Mark scheme	Marks
(a)	$x(x + 2) = 25$	M1
(a)	$x^2 + 2x - 25 = 0$, so $x = (-2 \pm \sqrt{2^2 - 4(1)(-25)}) \div 2$	M1
(a)	$x = 4.10$ (2 d.p.)	A1
(a)	the negative root (-6.10) is rejected since $x > 0$	A1

Teachably-style questions

Q16 Grade 6 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 5.24$	A1
(a)	$x = 0.76$	A1

Q17 Grade 7 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 2.12$	A1
(a)	$x = -0.79$	A1

Q18 Grade 7 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	correct substitution into $x = (-b \pm \sqrt{b^2 - 4ac}) \div 2a$	M1
(a)	$x = 1.27$	A1
(a)	$x = -6.27$	A1

Q19 Grade 8 Teachably style

Total: 2

Part	Mark scheme	Marks
(a)	$b^2 - 4ac = 2^2 - 4(1)(4) = 4 - 16 = -12$	M1
(a)	no real solutions, since the discriminant is negative	A1

Q20 Grade 8 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$x(x + 6) = 15$	M1
(a)	$x^2 + 6x - 15 = 0$, so $x = (-6 \pm \sqrt{6^2 - 4(1)(-15)}) \div 2$	M1
(a)	$x = 1.90$ (2 d.p.)	A1
(a)	the negative root (-7.90) is rejected since $x > 0$	A1

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