

A/A* - Quadratic Formula



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Question	Maximum Mark	Mark Awarded
1	3	
2	6	
3	5	
4	4	
5	3	
Total Mark		



1.

Use the quadratic formula to solve the following equation.
Give your answers correct to 2 decimal places.

[3]

$$4x^2 + 7x - 5 = 0$$

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2.

(a) Factorise the expression $6x^2 - 5x - 21$ and hence solve the equation $6x^2 - 5x - 21 = 0$.

[3]

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(b) Solve the equation $5x^2 + 12x + 3 = 0$, giving your answers correct to 2 decimal places.

[3]

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5.

Solve the quadratic equation $5x^2 - 10x + 3 = 0$, giving your answers correct to 2 decimal places. [3]

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Marking Scheme

1.

$x = \frac{-7 \pm \sqrt{7^2 - 4 \times 4 \times -5}}{2 \times 4}$ $= \frac{-7 \pm \sqrt{129}}{8}$ $x = 0.54 \text{ and } x = -2.29 \text{ (Answers to 2dp)}$	M1 A1 A1	Allow one error in sign or substitution, not in the formula CAO. Accept from sight of 0.5447... with -2.2947... CAO
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2.

Unitised Unit 3 – Nov 2015 Higher Tier		FINAL MARK SCHEME Comments
15. (a) $(3x - 7)(2x + 3)$ $x = 2\frac{1}{3}$ AND $x = -1\frac{1}{2}$ or equivalents	B2 B1	B1 for $(3x \dots 7)(2x \dots 3)$ FT from B1. Allow 2.33(...) but not 2.3 for $2\frac{1}{3}$. Mark final answer.
(b) $(x =) \frac{-12 \pm \sqrt{12^2 - 4 \times 5 \times 3}}{2 \times 5}$ $(x =) \frac{-12 \pm \sqrt{84}}{10}$ $x = -0.28$ AND $x = -2.12$	M1 A1 A1 6	Allow 1 slip in substitution. CAO. CAO.

3.

$(2x + 5)(x + 3) = 10$ $2x^2 + 5x + 6x + 15 (=10)$ $2x^2 + 11x + 5 = 0$ $(2x + 1)(x + 5) = 0$ $x = -1/2 \text{ AND } x = -5$	S1 B1 B1 M1 A1	<i>Alternative:</i> At least 2 suitable trials with product evaluated, 1 above & 1 below First value found At least 2 suitable trials, 1 above & 1 below Second value found
	5	

4.

$10. x(x + 5) = 2100 \text{ or } x^2 + 5x - 2100 = 0$ $x = \frac{-5 \pm \sqrt{5^2 - 4 \times 1 \times -2100}}{2}$ $= (-5 \pm \sqrt{8425})/2$ Width 43.4 (cm)	S1 M1 A1 A1	Brackets must be intended Allow 1 slip in substitution. FT for their quadratic with no zero terms and with sight of 2100 and 5 in the equation FT from S0, M1 CAO. Ignore -48.4 as not required Must be from evidence of using the quadratic formula
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5.

$x = \frac{10 \pm \sqrt{(-10)^2 - 4 \times 5 \times 3}}{2 \times 5}$ $x = \frac{10 \pm \sqrt{40}}{10}$ $x = 1.63, x = 0.37$	M1	Allow 1 slip in substitution.
	A1	CAO.
	A1	CAO. Both answers must be given.

Examiner's Comments

1. Although there was evidence of much correct work, there was evidence of much incorrect work often stemming from starting with an incorrect formula. It seems that a small number of candidates are now taught to consider from the start two different formulae, one with '+ $\sqrt{}$ ' and one with '- $\sqrt{}$ ', rather than considering in one the ' $\pm\sqrt{}$ ' part of the formula. With this method candidates often omitted one part of the formula, hence they are not showing a fully correct formula to start. The other usual error is not to have the numerator all over the 2a.

This comment originally referred to question 18 on paper 4370/06 (09/06/2016)

2. This question assessed candidates' ability to solve quadratic equations. Part (a) proved difficult as candidates had to work with a number of possible factor pairs. Part (b) was far more straightforward, but a number of candidates made errors in substitution into the formula, resulting in wrong solutions.

This comment originally referred to question 15 on paper 4353/02 (10/11/2015)

3. Many of the candidates entered showed poor algebraic skills, and also many did not understand the meaning of 'product'.

This comment originally referred to question 17 on paper 4363/02 (09/01/2017)

4. Q10 Many candidates were able to write an equation. However, there were many errors in substitution in to the quadratic formula.

Trial and improvement methods are not accepted in a question that states that the candidate should use the quadratic formula

This comment originally referred to question 10 on paper 4352/02 (06/05/2014)

5. This standard question involving the solving of a quadratic equation using the formula was not well answered. Candidates who were unsuccessful in this question did not deal properly with the negative coefficient of x in the main.

This comment originally referred to question 17 on paper 4353/02 (14/06/2016)