
EDEXCEL IGCSE MATHEMATICS

UNIT 2 (MODULAR)

ALGEBRA – SOLVING QUADRATIC INEQUALITIES

QP & MS (2018 – 2025)



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by Sir Muhammad Abdullah Shah

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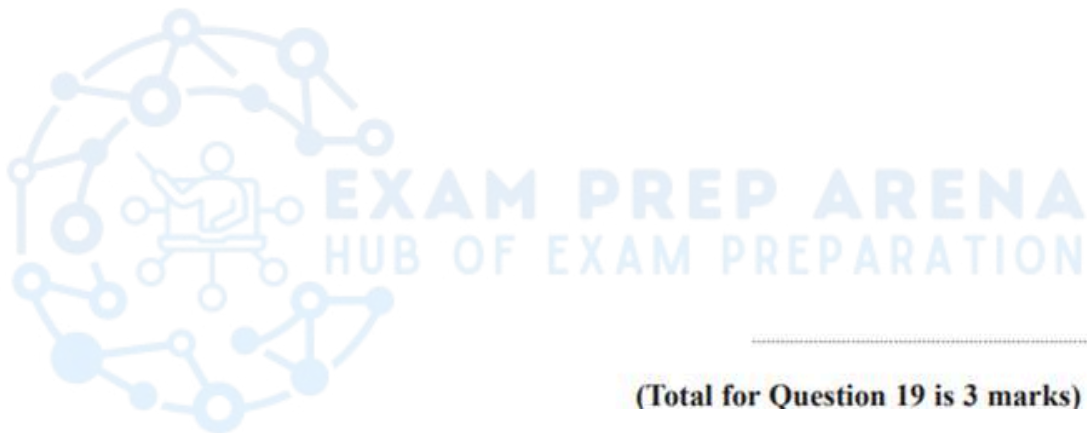


EXAM PREP ARENA
HUB OF EXAM PREPARATION

1. June 2025 2H/Q19

Solve the inequality $4x^2 + 4x - 15 < 0$

Show clear algebraic working.



2. June 2025 2HR/Q21

Solve the inequality $2x^2 - 7x - 15 > 0$

Show clear algebraic working.



EXAM PREP ARENA
HUB OF EXAM PREPARATION

(Total for Question 21 is 3 marks)



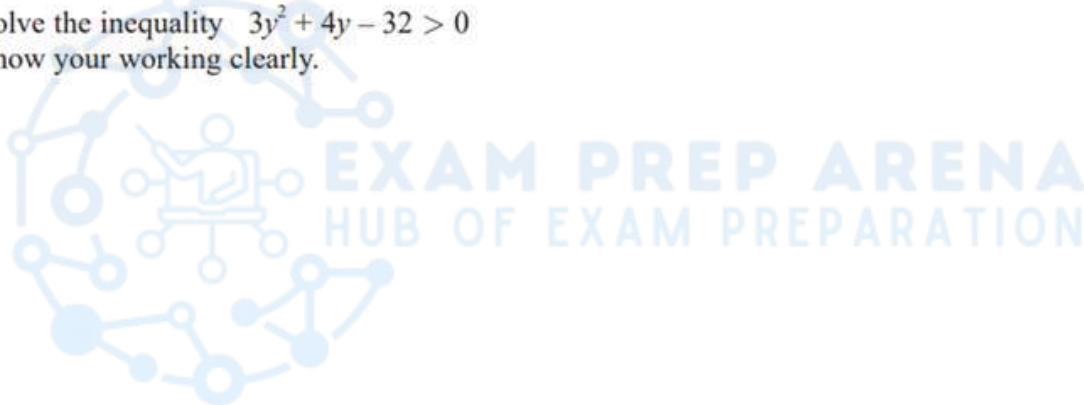
3. Nov 2024 2H/Q20

Solve the inequality $10x^2 + 11x - 21 < 0$
Show clear algebraic working.

.....
(Total for Question 20 is 3 marks)

4. June 2024 2H/Q15b

(b) Solve the inequality $3y^2 + 4y - 32 > 0$
Show your working clearly.



.....
(3)



5. June 2024 2HR/Q20

Solve $6x^2 - 7x - 20 > 0$

Show clear algebraic working.

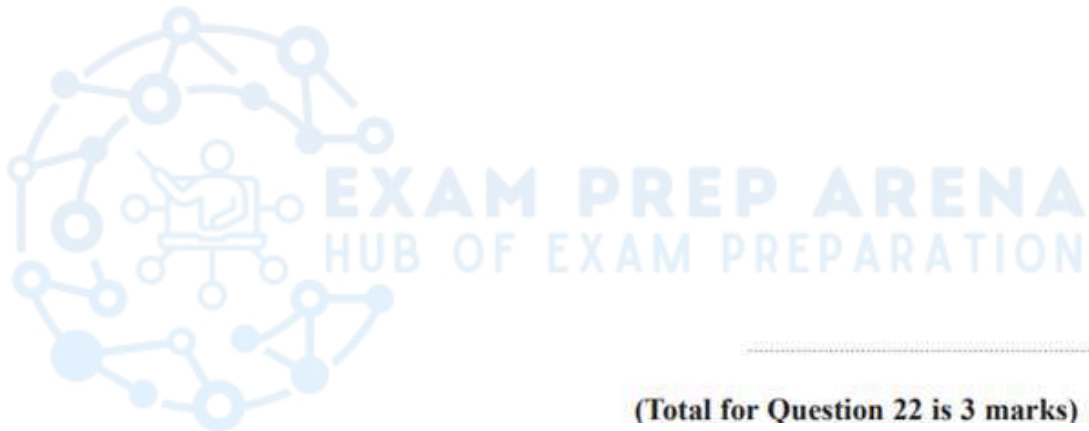


(Total for Question 20 is 4 marks)



6. Jan 2023 2H/Q22

Solve the inequality $6x^2 + 37x \leq 35$
Show clear algebraic working.



(Total for Question 22 is 3 marks)



7. June 2022 2H/Q15b

- (b) Solve the inequality $2y^2 - 7y - 30 \leq 0$
Show your working clearly.

.....
(3)



8. Jan 2022 2H/Q22

Here is a rectangle.

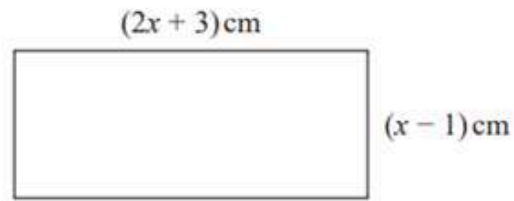


Diagram **NOT**
accurately drawn

Given that the area of the rectangle is less than 75 cm^2

find the range of possible values of x

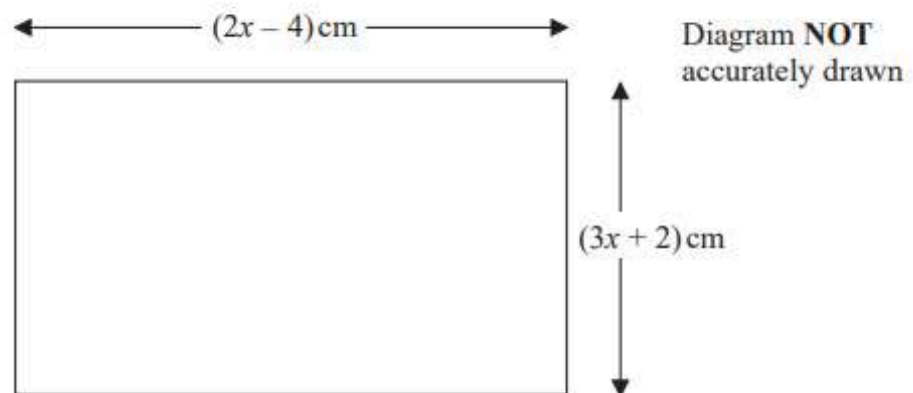


(Total for Question 22 is 5 marks)



9. Nov 2020 2H/Q17

The diagram shows a rectangle.

The area of the rectangle is $A \text{ cm}^2$ Given that $A < 3x + 27$ find the range of possible values for x .

(Total for Question 17 is 5 marks)



10. Jan 2020 2HR/Q19b

(b) Solve the inequality $5y^2 - 17y \leq 40$

.....
(3)



11. June 2018 2HR/Q20

Solve the inequality $4x^2 - 5x - 6 > 0$



(Total for Question 20 is 4 marks)



MARKING SCHEME

1. June 2025 2H/Q19

Question	Working	Answer	Mark	Notes
19	$(2x - 3)(2x + 5)$ or $\frac{-4 \pm \sqrt{4^2 - 4 \times 4 \times -15}}{2 \times 4}$ or $4 \left[\left(x + \frac{1}{2}\right)^2 - \left(\frac{1}{2}\right)^2 \right] - 15 (= 0)$ or $4 \left(x + \frac{4}{2 \times 4}\right)^2 - \frac{4^2}{4 \times 4} + 15 (= 0)$		3	M1 for a correct method to solve the quadratic equation $4x^2 + 4x - 15 = 0$ Allow $(4x - 6)(x + 2.5)$ or $(4x + 10)(x - 1.5)$ or $(4x - 6)(4x + 10)$ leading to $(x - 1.5)(x + 2.5)$ or $(4x - 6)(4x + 10)$ leading to correct values of x Do not allow $(x - 1.5)(x + 2.5)$ without previous working (If using formula allow some simplification – allow as far as $\frac{-4 \pm \sqrt{16 + 240}}{8}$)
	1.5, -2.5 oe			A1 oe dep on M1
		$-2.5 < x < 1.5$		A1 oe dep on M1 Allow $x > -2.5$ (and) $x < 1.5$ oe Allow any variable as long used all the way through
Total 3 marks				

2. June 2025 2HR/Q21

21	eg $(2x + 3)(x - 5)$ oe or $\frac{-7 \pm \sqrt{(-7)^2 - 4 \times 2 \times (-15)}}{2 \times 2}$ oe or $2 \left[\left(x - \frac{7}{4}\right)^2 - \left(\frac{7}{4}\right)^2 \right] - 15$ oe		3	M1 for a correct method to find the critical values Minimum evidence for quadratic formula is a two-term discriminant, eg $\frac{7 \pm \sqrt{49 + 120}}{4}$ (must have the \pm) Allow $(x + 1.5)(2x - 10)$ as a correct factorisation, but do not allow $\left(x + \frac{3}{2}\right)(x - 5)$ unless preceded by division of the quadratic by 2	Allow M1A1 for the correct critical values AND evidence of another algebraic method that has led to these: eg $x(2x + 3) - 5(2x + 3)$ and the correct critical values or $2x(x - 5) + 3(x - 5)$ and the correct critical values or $(2x + 3)(2x - 10)$ and the correct critical values
	$\left(x = -\frac{3}{2} \text{ and } x = 5\right)$			A1 dep on M1 for correct critical values oe	
	Working required	$x < -\frac{3}{2}, x > 5$		A1 dep on M1 for correct inequalities (must be separate inequalities)	
				allow interval notation eg $\left(-\infty, -\frac{3}{2}\right) \cup (5, \infty)$ or $\left(-\infty, -\frac{3}{2}\right), (5, \infty)$ or $]-\infty, -\frac{3}{2}[\cup]5, \infty[$ or $]-\infty, -\frac{3}{2}[,]5, \infty[$	
				Acceptable notation: allow a comma, space, "or", "and" or " \cup " to link the two regions Do not allow as a single inequality $-\frac{3}{2} > x > 5$	
Total 3 marks					



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3. Nov 2024 2H/Q20

20	$(10x + 21)(x - 1)$ or $\frac{-11 \pm \sqrt{(11)^2 - 4 \times 10 \times -21}}{2 \times 10}$ $10 \left[\left(x + \frac{11}{20} \right)^2 - \frac{121}{400} \right] - 21 (= 0)$ oe		3	M1 A correct method to solve the quadratic; correct factors or correct substitution into the formula or can be simplified as far as $\frac{-11 \pm \sqrt{121 + 840}}{20}$ or correctly completing the square. (10)(x + 2.1)(x - 1) is not a correct factorisation – it is working backwards from calculator answers.
	(x =) 1, (x =) -2.1			A1 dep on M1 for correct critical values
	Working required	-2.1 < x < 1		A1 dep on M1 oe eg x > -2.1 (and) x < 1 (do not penalise 'or') or $\frac{-21}{10} < x < 1$ etc including the open interval (-2.1, 1) or]-2.1, 1[
Total 3 marks				

4. June 2024 2H/Q15b

(b)	(3y - 8)(y + 4)		3	M1 For correct factorisation or correct use of quadratic formula $\frac{-4 \pm \sqrt{4^2 - 4 \times 3 \times -32}}{2 \times 3}$ or as far as $\frac{-4 \pm \sqrt{400}}{6}$ $\left(y - \frac{8}{3} \right)(y + 4)$ is not valid factorisation, unless preceded by division of quadratic by 3, so no marks
	$y = \frac{8}{3}, y = -4$			A1 dep on M1 for correct critical values (allow 2.6 or better or 2.7)
	working required	$y < -4, y > \frac{8}{3}$		A1 oe dep on M1 (allow use of x rather than y) or $(-\infty, -4), \left(\frac{8}{3}, (+)\infty \right)$ or $(-\infty, -4) \cup \left(\frac{8}{3}, (+)\infty \right)$ oe
Total 7 marks				

5. June 2024 2HR/Q20

20	eg $(3x + 4)(2x - 5)$ or $(x =) \frac{-7 \pm \sqrt{(-7)^2 - 4 \times 6 \times (-20)}}{2 \times 6}$ oe or $6 \left[\left(x - \frac{7}{12} \right)^2 - \left(\frac{7}{12} \right)^2 \right] - 20$ oe		4	M1 first step to finding the critical values - if factorising (in the form (ax + b) where a and b are integers), allow brackets which expanded give 2 out of 3 terms correct (if using formula or completing the square allow one sign error and some simplification – allow as far as $\frac{7 \pm \sqrt{49 + 480}}{12}$ oe or $6 \left(x - \frac{7}{12} \right)^2 - \frac{529}{24}$ oe or $\left(x - \frac{7}{12} \right)^2 - \frac{529}{144}$ oe
	(x =) $-\frac{4}{3}$ and $\frac{5}{2}$ oe			A1 dep on M1 for two correct critical values Accept -1.3..... May use <, ≤, > or ≥ instead of =
	Working required	$x < -\frac{4}{3}$ $x > \frac{5}{2}$		M1ft (dep on M1 and two critical values found) for x < a and x > b where a is their lower critical value and b is their upper critical value or $x > \frac{5}{2}$ oe or $x < -\frac{4}{3}$ oe or $-\frac{4}{3} > x > \frac{5}{2}$ oe
				A1 oe dep on previous M1 Accept -1.3..... or $\left(-\infty, -\frac{4}{3} \right), \left(\frac{5}{2}, (+)\infty \right)$ or $\left(-\infty, -\frac{4}{3} \right) \cup \left(\frac{5}{2}, (+)\infty \right)$ Do not ISW
Total 4 marks				



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6. Jan 2023 2H/Q22

Question	Working	Answer	Mark	Notes
22	$(6x - 5)(x + 7) = 0$ or $\frac{-37 \pm \sqrt{37^2 - 4 \times 6 \times -35}}{2 \times 6}$ $6 \left[\left(x + \frac{37}{12} \right)^2 - \left(\frac{37}{12} \right)^2 \right] \dots$ oe		3	M1 A correct method to solve the quadratic equation $6x^2 + 37x - 35 = 0$ using any correct method (if factorising, allow brackets which expanded give 2 out of 3 terms correct) (if using formula allow one sign error in substitution and some simplification – allow as far as $\frac{-37 \pm \sqrt{1369 + 840}}{12}$) or completing the square as far as shown on left
	$\frac{5}{6}$ oe and -7			A1 dep on M1 correct critical values (allow 0.83...)
	Working must be seen for both accuracy marks as asked for in question	$-7 \leq x \leq \frac{5}{6}$		A1 dep on M1 oe eg $-7 \leq x \leq 0.83\dots$, $\left[-7, \frac{5}{6} \right]$ Accept $x \leq \frac{5}{6}$, $x \geq -7$
Total 3 marks				

7. June 2022 2H/Q15b

(b)	$(2y + 5)(y - 6)$ or $\frac{-7 \pm \sqrt{(-7)^2 - 4 \times 2 \times -30}}{2 \times 2}$ $2 \left[\left(y - \frac{7}{4} \right)^2 - \frac{49}{16} \right] - 30 = 0$ oe $(y =) 6, (y =) -2.5$		3	M1 A correct method to solve the quadratic - allow factorisation that gives 2 out of 3 terms correct when expanded or use of quadratic formula – if using formula, allow one sign error and allow if simplified as far as $\frac{7 \pm \sqrt{49 + 240}}{4}$ or use of completing the square with one sign error as far as shown
				A1 Correct critical values dep on M1
		$-2.5 \square y \square 6$		A1 oe eg $y \dots -2.5$ (and) $y, 6$ or $[-2.5, 6]$ (do not penalise change of variable eg y to x) dep on M1
Total 7 marks				

8. Jan 2022 2H/Q22

22	$(2x + 3)(x - 1) < 75$ $2x^2 + x - 78 < 0$		5	B1 For writing the correct inequality sign with a correct calculation or correct value – this could be initially or saying that $x < 6$ at the end
				M1 rearranged to form correct quadratic < 0 (allow = 0 or other incorrect inequality sign) oe
	$(x - 6)(2x + 13) (< 0)$ or $x = \frac{-1 \pm \sqrt{(1)^2 - (4 \times 2 \times -78)}}{2 \times 2}$ or $2 \left(x + \frac{1}{4} \right)^2 - 2 \left(\frac{1}{4} \right)^2 - 78 = 0$			M1 first step to find critical values from the correct quadratic
		$x = 6$		A1 $x = 6$ identified as critical value, ignore -6.5 if given
		$1 < x < 6$		A1 correct inequality
Total 5 marks				



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9. Nov 2020 2H/Q17

17	$(3x+2)(2x-4) < 3x+27$ oe eg $6x^2 - 8x - 8 < 3x + 27$ eg $6x^2 - 11x - 35 < 0$			M1 condone incorrect symbol
	$(2x-7)(3x+5) (= 0)$ or $\frac{11 \pm \sqrt{(-11)^2 - 4 \times 6 \times (-35)}}{2 \times 6}$			M1 expanding and rearranging to get a correct 3 term quadratic, condone incorrect symbol
	$-\frac{5}{3}, \frac{7}{2}$			M1 first step to find the critical values dep on M1 for solving their 3 term quadratic using any correct method (allow one sign error and some simplification – allow as far as the equivalent of $\frac{11 \pm \sqrt{121+840}}{12}$) or if factorising, allow brackets which expanded give 2 out of 3 terms correct)
		$2 < x < \frac{7}{2}$	5	A1 oe the positive critical value only or both critical values (if both they must be correct)
				A1 accept $2 \leq x < \frac{7}{2}$ may be seen as two separate inequalities $x > 2$ ($x \leq 2$) and $x < \frac{7}{2}$
Total 5 marks				

10. Jan 2020 2HR/Q19b

(b)	$(5y+8)(y-5) (\leq 0)$ or $(y =) \frac{-17 \pm \sqrt{(-17)^2 - 4 \times 5 \times -40}}{2 \times 5}$		3	M1 Correct method to solve 3 term quadratic – factorising or correct use of formula
	$-1.6, 5$ oe			A1 Correct critical values
		$-1.6 \leq y \leq 5$ oe		A1 Condone change of variable in place of y throughout this question.
Total 6 marks				

11. June 2018 2HR/Q20

20	eg $(4x+3)(x-2)$ or $(x =) \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 4 \times (-6)}}{2 \times 4}$ $(x =) -\frac{3}{4}$ and 2		4	M 1 first step to finding the critical values
				A 1 for two correct critical values
		$x < -\frac{3}{4}$ $x > 2$		M 1 (dep on two critical values having been found) for a diagram showing the inequalities OR $x < a$ and $x > b$ where a is their lower critical value and b is their upper critical value OR $x > 2$ OR $x < \frac{-3}{4}$ OR $\frac{-3}{4} > x > 2$
				A 1 for both correct inequalities
Total 4 marks				

