EDEXCEL IGCSE MATHEMATICS

PAPER 2H & 2HR (LINEAR)

SOLVING QUADRATIC INQUALITIES

QP & MS (2018 - 2025)

COMPILED BY:

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EDEXCEL IGCSE MATHEMATICS LINEAR FOR MAY & OCT 2026

by Sir Muhammad Abdullah Shah

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1. June 2025 2H/Q19

Solve the inequality $4x^2 + 4x - 15 < 0$
Show clear algebraic working.

.....

(Total for Question 19 is 3 marks)

2. June 2025 2HR/Q21

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

Show clear algebraic working.

(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 $6x^2 + 37x \leqslant 35$
Show clear algebraic working.

.....

(Total for Question 22 is 3 marks)

7. June 2022 2H/Q15b

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

.....

(3)

8. Jan 2022 2H/Q22

Here is a rectangle.

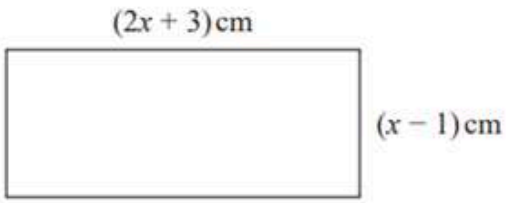

Diagram **NOT** accurately drawn

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.

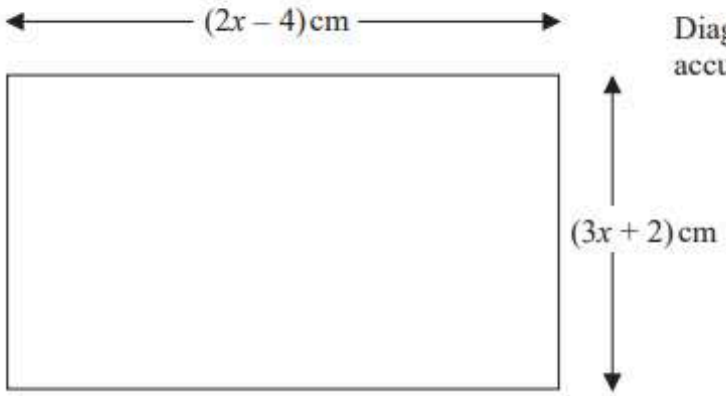

Diagram **NOT** accurately drawn

The area of the rectangle is A 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 $5y^2 - 17y \leqslant 40$

.....

(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 $\frac{-4\pm\sqrt{4^2-4\times4\times-15}}{2\times4}$ or $4\left[\left(x+\frac{1}{2}\right)^2-\left(\frac{1}{2}\right)^2\right]-15(=0)$ or $4\left(x+\frac{4}{2\times4}\right)^2-\frac{4^2}{4\times4}+-15(=0)$		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** $\frac{--7\pm\sqrt{(-7)^2-4\times2\times(-15)}}{2\times2}$ 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 ±) 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
	$(x=)\ -\frac{3}{2}$ **and** $(x=)\ 5$			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** $\left(-\infty,-\frac{3}{2}\right),(5,\times)$ **or** $]-\infty,-\frac{3}{2}[\ \cup\ ]5,\infty[$ **or** $]-\infty,-\frac{3}{2}[\ ,\ ]5,\infty[$ Acceptable notation: allow a comma, space, "or", "and" or "∪" to link the two regions Do **not** allow as a single inequality $-\frac{3}{2}>x>5$	
						Total 3 marks

3. Nov 2024 2H/Q20

20	$(10x+21)(x-1)$ or $\frac{-11\pm\sqrt{(11)^2-4\times10\times-21}}{2\times10}$ $10\left[\left(x+\frac{11}{20}\right)^2-\frac{121}{400}\right]-21(=0)$ 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 $\frac{-4\pm\sqrt{4^2-4\times3\times-32}}{2\times3}$ 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** $(x=)\frac{--7\pm\sqrt{(-7)^2-4\times6\times(-20)}}{2\times6}$ 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 $<, \leq, >$ or $\geq$ instead of =
				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
	Working required	$x<-\frac{4}{3}$ $x>\frac{5}{2}$		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

6. Jan 2023 2H/Q22

Question	Working	Answer	Mark	Notes
22	$(6x-5)(x+7)(=0)$ **or** $\frac{-37\pm\sqrt{37^2-4\times6\times-35}}{2\times6}$ $6\left[\left(x+\frac{37}{12}\right)^2-\left(\frac{37}{12}\right)^2\right]$... 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	$-7\le x\le\frac{5}{6}$		A1 dep on M1 oe eg $-7\le x\le0.83\ldots$, $\left[-7,\frac{5}{6}\right]$ Accept $x\le\frac{5}{6}$, $x\ge-7$
				Total 3 marks

7. June 2022 2H/Q15b

(b)	$(2y+5)(y-6)$ or $\frac{--7\pm\sqrt{(-7)^2-4\times2\times-30}}{2\times2}$ $2\left[\left(y-\frac{7}{4}\right)^2-\frac{49}{16}\right]-30(=0)$ oe		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
	$(y=)\ 6,\ (y=)\ -2.5$			A1 Correct critical values **dep on M1**
		$-2.5\ \square\ y\ \square\ 6$		A1 oe eg $y\ldots-2.5$ (and) $y\ldots6$ 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	$(2x+3)(x-1)<75$		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
	$2x^2+x-78<0$			M1 rearranged to form correct quadratic <0 (allow $=0$ or other incorrect inequality sign) oe
	$(x-6)(2x+13)\ (<0)$ **or** $x=\frac{-1\pm\sqrt{(1)^2-(4\times2\times-78)}}{2\times2}$ **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

9. Nov 2020 2H/Q17

17	$(3x+2)(2x-4) < 3x+27$ oe eg $6x^2-8x-8<3x+27$			M1	condone incorrect symbol
	eg $6x^2-11x-35<0$			M1	expanding and rearranging to get a correct 3 term quadratic, condone incorrect symbol
	$(2x-7)(3x+5)\ (=0)$ or $\frac{11\pm\sqrt{(-11)^2-4\times6\times(-35)}}{2\times6}$			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)
	$-\frac{5}{3}, \frac{7}{2}$			A1	oe the positive critical value only or both critical values (if both they must be correct)
		$2<x<\frac{7}{2}$	5	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 $(y=)\ \frac{--17\pm\sqrt{(-17)^2-4\times5\times-40}}{2\times5}$		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 $(x=)\ \frac{-(-5)\pm\sqrt{(-5)^2-4\times4\times(-6)}}{2\times4}$		4	M1	first step to finding the critical values
	$(x=)\ -\frac{3}{4}$ and 2			A1	for two correct critical values
				M1	(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** $\frac{-3}{4}>x>2$
		$x<-\frac{3}{4}$ $x>2$		A1	for both correct inequalities
					Total 4 marks