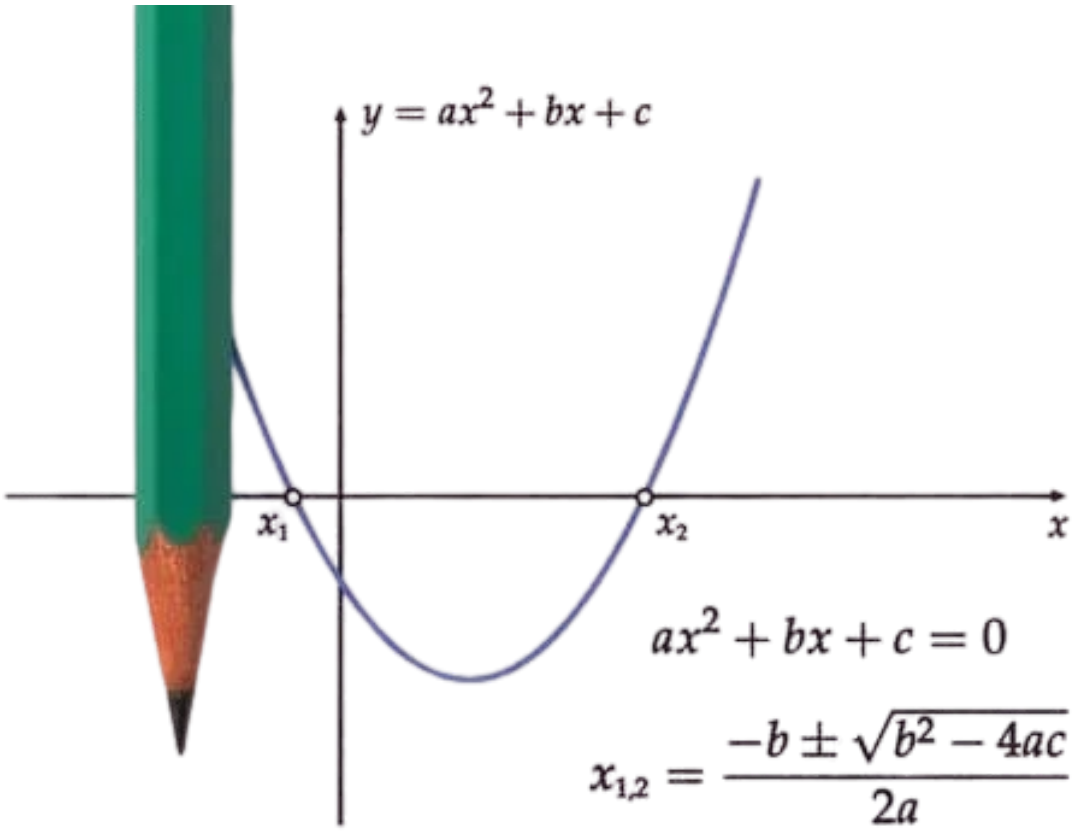
EDEXCEL IGCSE MATHEMATICS

UNIT 1 (MODULAR)

GEOMETRY – QUADRATICS

QP & MS (2018 - 2025)



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EDEXCEL IGCSE MATHEMATICS MODULAR FOR MAY & OCT 2026

by Sir Muhammad Abdullah Shah

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1.Nov 2025 1H/Q21

Express $5x^2 - 20x + 23$ in the form $a(x - b)^2 + c$ where a, b and c are integers.

.....

(Total for Question 21 is 3 marks)

2. June 2025 1H/Q 6b(ii)

(ii) Hence solve $y^2 - 11y + 30 = 0$

.....

(1)

3. June 2025 1HR/Q 8c

(c) (i) Factorise $y^2 - 10y + 21$

.....

(2)

(ii) Hence, solve $y^2 - 10y + 21 = 0$

.....

(1)

4. Nov 2024 1H/Q 8a

(a) (i) Factorise $x^2 + 5x - 24$

.....

(2)

(ii) Hence, solve $x^2 + 5x - 24 = 0$

.....

(1)

5. June 2024 1H/Q 25

$f(x) = 17 - 3x^2 + 12x$

Write $f(x)$ in the form $a - b(x - c)^2$ where a, b and c are constants.

$f(x) =$ .....

(Total for Question 25 is 4 marks)

6. June 2024 1HR/Q 20a,

(a) Express $2x^2 - 11x + 9$ in the form $a(x - b)^2 - c$ where a, b and c are numbers to be found.

.....

(3)

7. June 2024 1HR/Q7c

(c) (i) Factorise $x^2 - 2x - 63$

.....

(2)

(ii) Hence, solve $x^2 - 2x - 63 = 0$

.....

(1)

8. June 2023 1H/Q6d

(d) (i) Factorise $x^2 + 9x - 22$

.....

(2)

(ii) Hence solve $x^2 + 9x - 22 = 0$

.....

(1)

9. Jan 2023 1HR/Q16c

The function g is such that

$$g(x) = 5x^2 - 20x + 23$$

(c) Express $g(x)$ in the form $a(x - b)^2 + c$

.....

(3)

10. Jan 2023 1HR/Q8b

(b) (i) Factorise $y^2 - 3y - 18$

.....

(2)

(ii) Hence, solve $y^2 - 3y - 18 = 0$

.....

(1)

11. June 2022 1H/Q24

Express each of a, b and c in terms of q so that

$$q + 12x - qx^2$$

can be written as $a - b(x - c)^2$

$a =$ .....

$b =$ .....

$c =$ .....

(Total for Question 24 is 4 marks)

12. June 2022 1HR/Q5bii

(ii) Hence, solve $x^2 + 8x - 9 = 0$

.....

(1)

13. June 2022 1HR/Q23a

(a) Express $2x^2 - 12x + 3$ in the form $a(x + b)^2 + c$ where a, b and c are integers.

.....

(3)

14. Jan 2022 1H/Q6bii

(ii) Hence, solve $y^2 - 2y - 35 = 0$

.....

(1)

15. Jan 2022 1H/Q20a

(a) Express $7 + 12x - 3x^2$ in the form $a + b(x + c)^2$ where a, b and c are integers.

.....

(3)

16. Jan 2022 1HR/Q 19b

Given that a, b and c are integers,

(b) express $3x^2 + 12x + 19$ in the form $a(x + b)^2 + c$

.....

(2)

17. Nov 2021 1H/Q 17c

(c) Express $4x^2 - 8x + 7$ in the form $a(x + b)^2 + c$ where a, b and c are integers.

.....

(3)

18. May 2021 1H/Q9b

(b) Solve $(2x + 5)^2 = (2x + 3)(2x - 1)$

$x =$ .....

(3)

19. Jan 2021 1H/Q 9bii

(ii) Hence, solve $x^2 + 5x - 36 = 0$

.....

(1)

20. Jan 2021 1HR/Q 16b

(b) Express $x^2 - 10x + 40$ in the form $(x + a)^2 + b$, where a and b are integers.

.....

(2)

21. Nov 2020 1H/Q7c

(c) (i) Factorise $y^2 - 2y - 48$

.....

(2)

(ii) Hence, solve $y^2 - 2y - 48 = 0$

.....

(1)

22. Jan 2020 1HR/Q 6

Solve $x^2 - 5x - 36 = 0$
Show clear algebraic working.

.....

(Total for Question 6 is 3 marks)

23. June 2019 1H/Q22bi

(b) (i) Write $x^2 - 6x + 10$ in the form $(x - a)^2 + b$ where a and b are integers.

.....

(2)

24. June 2018 1H/Q3d

(d) (i) Factorise $x^2 + 2x - 24$

.....

(2)

(ii) Hence, solve $x^2 + 2x - 24 = 0$

.....

(1)

25. June 2018 1H/Q11b

(b) Solve $3x^2 + 6x - 5 = 0$
Show your working clearly.
Give your solutions correct to 3 significant figures.

.....

(3)

26. Sample 2018 1H/Q6b

(b) Solve $x^2 - 4x - 12 = 0$
Show clear algebraic working.

.....

(3)

MARKING SCHEME

1. Nov 2025 1H/Q21

21	$5(x-2)^2$ ..... **or** $5[(x-2)^2$ .....] **or** $5\left(x+\frac{-20}{5\times 2}\right)^2+$.... **or** $5(x-b)^2+c$		3	M1	for a start to completing the square **or** correct substitution into $a\left(x+\frac{b}{2a}\right)^2+$.... from the formula $a\left(x+\frac{b}{2a}\right)^2-\frac{(b)^2}{4a}+c$ **or** $a=5$ embedded in an incorrect final answer in the form $5(x-d)^2+e$ (must be these signs)
	$5[(x-2)^2-2^2]$..... **or** $5[(x-2)^2-4]$..... **or** $5[(x-2)^2-2^2$.....] **or** $5[(x-2)^2-4$.....] **or** $5(x-2)^2-20$.....			M1	for correctly completing the square but terms do not need to be simplified and 23 may or may not be present correct simplification **or** of the first two parts of $a\left(x+\frac{b}{2a}\right)^2-\frac{(b)^2}{4a}(+c)$ **NB: Please refer to ALT mark scheme for comparison of coefficients method**
	Correct answer scores full marks (unless from obvious incorrect working)	$5(x-2)^2+3$		A1	oe eg $3+5(x-2)^2$ (if student continues to solve a quadratic equation, ISW)
					Total 3 marks

2. June 2025 1H/Q6b(ii)

(ii)		$(y=)\ 6,\ (y=)\ 5$	1	B1	must ft from their answer in (b)(i) ft from their factors in the form $(y+a)(y+b)$
					Total 6 marks

3. June 2025 1HR/Q8c

(c)(i)			2	M1	for $(y\pm 3)(y\pm 7)$ **or** for $(y\pm a)(y\pm b)$ with $ab=21$ or $a+b=-10$
	Correct answer scores full marks (unless from obvious incorrect working)	$(y-3)(y-7)$		A1	for correct factors
(ii)		3, 7	1	B1	ft dep on factorising in the form $(y\pm p)(y\pm q)$
					Total 5 marks

4. Nov 2024 1H/Q8a

8	(a)(i)	$(x\pm 8)(x\pm 3)$ or $x(x-3)+8(x-3)$ or $x(x+8)-3(x+8)$		2	M1 for $(x\pm 8)(x\pm 3)$ or $(x+a)(x+b)$ where $ab=-24$ or $a+b=5$ and, a and b are integers
		Correct answer scores full marks (unless from obvious incorrect working)	$(x+8)(x-3)$		A1 for $(x+8)(x-3)$ Allow any letter for x Must be in the form $(x+a)(x+b)$ where a and b are integers
	(ii)		–8 and 3	1	B1 must ft from their answer in (a)(i) ft from their incorrect factors in the form $(x+a)(x+b)$ Award B0 for –8 and 3 if no marks scored in (a)(i)

5. June 2024 1H/Q 25

25	$\pm 3(x^2 \pm 4x)$.....or $\pm 3(x^2 \pm 4x$.....) or $b = 3$		4	M1 for factorising $-3x^2 + 12x$ or stating the correct value of b or $b = 3$ embedded in an incorrect final answer in the form $a - 3(x - c)^2$
	$-3[(x-2)^2$ .....] or $-3(x-2)^2$			M1 for a **correct** first step to complete the square
	$-3[(x-2)^2 - (2)^2]$.....oe or $-3(x-2)^2 + 12$..... or $-3[(x-2)^2 - (2)^2$ .....]oe			M1 for a **correct** second step to complete the square
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$29 - 3(x-2)^2$		A1 oe eg $-3(x-2)^2 + 29$
				Total 4 marks

25 ALT	$-bx^2 + 2bcx - bc^2 + a$ oe or $b = 3$		4	M1 for multiplying out $a - b(x - c)^2$ or stating the correct value of b or $b = 3$ embedded in an incorrect final answer in the form $a - 3(x - c)^2$
	$2bc = 12$ or $a - bc^2 = 17$ oe			M1 for equating coefficients
	$2 \times$"3"$\times c = 12$ or $a -$ "3" $\times$ "2"$^2 = 17$ oe			M1 for finding at least 2 from a or b or c
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$29 - 3(x-2)^2$		A1 oe eg $-3(x-2)^2 + 29$
				Total 4 marks

6. June 2024 1HR/Q20a

20 (a)	$2\left(x^2 - \frac{11}{2}x\right) + \ldots$ **or** $2\left(x^2 - \frac{11}{2}x + \ldots\right)$ oe		3	M1	for taking out a factor of 2
	$2\left[\left(x - \frac{11}{4}\right)^2 - \frac{11^2}{4^2}\right] + \ldots$ **or** $2\left[\left(x - \frac{11}{4}\right)^2 - \frac{11^2}{4^2} + \ldots\right]$ oe			M1	for correctly completing square
	Correct answer scores full marks (unless from obvious incorrect working)	$2\left(x - \frac{11}{4}\right)^2 - \frac{49}{8}$		A1	oe, eg $2(x-2.75)^2 - 6.125$ allow $a = 2$, $b = \frac{11}{4}$ oe, $c = \frac{49}{8}$ oe if no other marks awarded, award SCB1 for $2\left(x - \frac{11}{4}\right)^2 + \ldots$
	ALTERNATIVE				
ALT (a)	$ax^2 - 2bax + b^2a - c$		3	M1	for correctly expanding $a(x - b)^2 - c$ to give $ax^2 - 2bax + b^2a - c$
	$-2ba = -11$ or $2ba = 11$ and $b^2a - c = 9$			M1	for setting up 2 equations using the coefficient of x and the numerical term
	Correct answer scores full marks (unless from obvious incorrect working)	$2\left(x - \frac{11}{4}\right)^2 - \frac{49}{8}$		A1	oe, eg $2(x-2.75)^2 - 6.125$ allow $a = 2$, $b = \frac{11}{4}$ oe, $c = \frac{49}{8}$ oe if no other marks awarded, award SCB1 for $2\left(x - \frac{11}{4}\right)^2 + \ldots$

7. June 2024 1HR/Q7c

(c) (i)	$(x \pm 7)(x \pm 9)$		2	M1	for $(x \pm 7)(x \pm 9)$ **or** for $(x + a)(x + b)$ where $ab = -63$ **or** $a + b = -2$ where a and b are integers
	Correct answer scores full marks (unless from obvious incorrect working)	$(x + 7)(x - 9)$		A1	for correct factors
(ii)		$-7, 9$	1	B1	must ft from (c)(i) dep on factorising in the form $(x+p)(x+q)$ where p and q are integers

8. June 2023 1H/Q 6d

(d)(i)	$(x \pm 11)(x \pm 2)$		2	M1	for $(x \pm 11)(x \pm 2)$ **or** for $(x + a)(x + b)$ with $ab = -22$ or $a + b = 9$
	Correct answer scores full marks (unless from obvious incorrect working)	$(x + 11)(x - 2)$		A1	for correct factors
(ii)		$-11, 2$	1	B1ft	ft dep on factorising in the form $(x+p)(x+q)$
					Total 8 marks

9. Jan 2023 1HR/Q16c

(c)	$5(x^2 - 4x)$ ..... **or** $5(x^2 - 4x$ .....$)$ **or** $5(x-2)^2 \ldots$		3	M1
	$5\left[(x-2)^2 - (-2)^2\right]$ ..... **or** $5\left[(x-2)^2 - (-2)^2 \ldots\ldots\right]$ **or** $5(x-2)^2 - 20$ ..... **or** $5\left[(x-2)^2 + \frac{3}{5}\right]$			M1 $(-2)^2$ can be 2^2 or 4 or $\left(\pm\frac{4}{2}\right)^2$
	Correct answer scores full marks (unless from obvious incorrect working)	$5(x-2)^2 + 3$		A1

10. Jan 2023 1HR/Q 8b

(b) (i)	eg $(y \pm 6)(y \pm 3)$ or $y(y + 3) - 6(y + 3)$ or $y(y - 6) + 3(y - 6)$		2	M1	or $(y + a)(y + b)$ where $ab = -18$ **or** $a + b = -3$ or factorisation which expands to give 2 out of 3 correct terms
	[allow use of x rather than y]	$(y-6)(y+3)$		A1	
(ii)		$6, -3$	1	B1	ft must come from their factors in (b)(i)
					Total 5 marks

11. June 2022 1H/Q 24

24	$-q\left(x^2 - \frac{12}{q}x\right) + q$ or $-q\left(x^2 - \frac{12}{q}x - \frac{q}{q}\right)$ oe		4	M1 for a correct factorisation of the expression or $b = q$ (must be stated)
	$-q\left[\left(x - \frac{12}{2q}\right)^2 \ldots\ldots\right]$ oe or $-q\left[\left(x - \frac{6}{q}\right)^2 \ldots\ldots\right]$ oe			M1 for starting the correct process to complete the square
	E.g. $-q\left(x - \frac{6}{q}\right)^2 + \frac{36}{q} + q$ oe or $-q\left(x - \frac{12}{2q}\right)^2 + \frac{144q}{4q^2} + q$ oe			M1 for a complete process of completing the square. (Does not need to be simplified)
		$a = \frac{36}{q} + q$ $b = q$ $c = \frac{6}{q}$		A1 oe a and c must come from a correct process of completing the square. (Does not need to be simplified)
				Total 4 marks

12. June 2024 1HR/Q7c

(ii)		−9, 1	1	B1 ft dep on factorising in the form $(x+p)(x+q)$

13. June 2022 1HR/Q23a

23 (a)	$2(x^2-6x)+3$ **or** $2(x^2-6x+\frac{3}{2})$		3	M1	**or** for one of a, b or c correct **OR** expanding $a(x^2+2bx+b^2)+c$
	$2\left[(x-3)^2-9\right]+3$ **or** $2\left[(x-3)^2-3^2+\frac{3}{2}\right]$ oe			M1	**or** for two of a, b or c correct **OR** $-12=2ab$ **or** $3=ab^2+c$
		$2(x-3)^2-15$		A1	accept $a=2$, $b=-3$, $c=-15$

14. Jan 2022 1H/Q6bii

(ii)		7, −5	1	B1ft answer must ft from their $(y+a)(y+b)$ in (b)(i). Award B0 for 7, −5 if no marks scored in (i)

15. Jan 2022 1H/Q 20

20 (a)	$7-3(x^2-4x)$		3	M1	**or** for one of a, b or c correct
	$7-3[(x-2)^2-4]$			M1	**or** for two of a, b or c correct
		$19-3(x-2)^2$		A1	

16. Jan 2022 1HR/Q19b

	$3\left(x^2+4x+\frac{19}{3}\right)$ **and** $3\left((x+2)^2-2^2+\frac{19}{3}\right)$ **or** $a=3$ and $2ab=12$ oe and $b^2a+c=19$ oe **or** $a=3$ and $b=\frac{12}{2\times3}$ oe and $c=-\frac{12^2}{4\times3}+19$ oe			correctly completing the square **or** for equating coefficients by expanding $a(x+b)^2+c=ax^2+2abx+b^2a+c$ **or** for equating coefficients by using $ax^2+bx+c=a\left(x+\frac{b}{2a}\right)^2-\frac{b^2}{4a}+c$
		$3(x+2)^2+7$		A1 accept $a=3$, $b=2$, $c=7$

17. Nov 2021 1H/Q17c

(c)	$4(x^2-2x)+7$ or $4\left(x^2-2x+\frac{7}{4}\right)$ oe		3	M1
	$4\left[(x-1)^2-1^2\right]+7$ oe or $4\left[(x-1)^2-1^2+\frac{7}{4}\right]$ oe			M1 for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	$4(x-1)^2+3$		A1 allow $a=4$, $b=-1$ and $c=3$

18. May 2021 1H/Q9b

	(b)	$4x^2+10x+10x+25=4x^2-2x+6x-3$ $4x^2+20x+25=4x^2+4x-3$		3	M1 Correct expansion of $(2x+5)^2$ **or** $(2x+3)(2x-1)$ **or** expansion of **both** sets of brackets with at least 3 of 4 terms correct in both (NB: if written as a 3 term quadratic (and not seen as 4 terms) then the middle term must be correct as it is equivalent to 2 correct terms) (eg (RHS) $4x^2+4x+3$ has 1 error, $2x^2+4x-3$ has 1 error, $4x^2+10x-3$ has 2 errors)
		$10x+10x-6x+2x=-3-25$ **or** $3+25=-16x$ **or** $16x=-28$ oe			M1 ft if previous mark awarded. For terms in x on one side and number terms on the other side in a correct ft equation dependent on a linear equation
		Working not required, so correct answer scores full marks (unless from obvious incorrect working eg -1.75 oe from $2x^2+20x+25=2x^2+4x-3$ scores M2A0)	−1.75		A1 **or** $-1\frac{3}{4}$ **or** $-\frac{7}{4}$ **or** $-\frac{28}{16}$ **or** $-1\frac{12}{16}$ oe

19. Jan 2021 1H/Q9bii

(ii)		–9, 4	1	B1	ft from (b)(i)

20. Jan 2021 1HR/Q 16b

b	E.g. $(x-5)^2-5^2(+40)$ or $(x-5)^2-25(+40)$ $\left(x^2+2ax+a^2\left(+b^2\right)\right)$ $2a=-10$ or $a=-5$		2	M1	for a correct first step **or** for equating coefficients
		$(x-5)^2+15$		A1	accept $a=-5$, $b=15$ SC B1 for $(-x+5)^2+15$ or $(5-x)^2+15$

21. Nov 2020 1H/Q7c

(c)(i)	$(y\pm6)(y\pm8)$		2	M1	
		$(y-8)(y+6)$		A1	
(c)(ii)		8, –6	1	B1	**must** ft from their factors in (c)(i)

22. Jan 2020 1HR/Q6

6	e.g. $a=(-3+47)\div2\ (=22)$ **or** $\frac{11+b}{2}=-19$ $(b=-38-11=-49)$ **or** method to add 25 to –3 **or** method to subtract 25 from 47 **or** method to subtract 30 from –19 **or** method to subtract 60 from 11		2	M1	for a correct method to find either coordinate or one coordinate correct. Look for correct method on their diagram, if used.
		$a=22$, $b=-49$		A1	both correct
					Total 2 marks

23. June 2019 1H/Q22bi

bi		(2, 5)	1	B1

24. June 2018 1H/Q3d

	(d)		$4cp^2(4c^3+5p)$	2	B2	if not B2 then award B1 for any correct factorisation with at least 2 factors outside the bracket eg $4cp(4c^3p+5p^2)$, $cp^2(16c^3+20p)$, $2p(8pc^4+10cp^2)$ etc **or** the correct common factor **and** a 2 term expression with just one error

25. June 2018 1H/Q11b

11		5.5 or 6.5 or 12.5 or 17.5		3	M1	Accept $6.4\dot{9}$ for 6.5 and $17.4\dot{9}$ for 17.5
		17.5 – 5.5			M1	for UB – LB where $15 < UB \le 17.5$ and $5.5 \le LB < 6$
			12		A1	dep on M2
						Total 3 marks

26. Sample 2018 1H/Q6b

b	$(x\pm6)(x\pm2)$			AO1	M1	or correct substitution into quadratic formula (condone one sign error)
	$(x-6)(x+2)$				M1	or $\frac{4\pm\sqrt{64}}{2}$
		6, –2	3		A1	dep. on at least M1