
EDEXCEL IGCSE MATHEMATICS

UNIT 2 (MODULAR)

ALGEBRA – REARRANGING FORMULAS

QP & MS (2018 – 2025)

Make k the subject of $p = \frac{8k^2 + 5}{7 - 3k^2}$

Make x the subject of $y = \sqrt{\frac{x+1}{x-4}}$

Make x the subject of the formula $y = \sqrt{\frac{3x-2}{x+1}}$

COMPILED BY:
SIR MUHAMMAD ABDULLAH SHAH



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by Sir Muhammad Abdullah Shah

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1. June 2025 2H/Q16

Make t the subject of the formula $c = \frac{t^2 + 3}{7 - 8t^2}$

(Total for Question 16 is 4 marks)

2. June 2025 2HR/Q17

Make k the subject of $p = \frac{8k^2 + 5}{7 - 3k^2}$

(Total for Question 17 is 4 marks)



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3. Nov 2024 2H/Q12b

(b) Make c the subject of the formula $f = \sqrt{\frac{a+bc}{c-d}}$

✓

.....
(4)

4. June 2024 2H/Q15a

(a) Make g the subject of $e = \sqrt{\frac{7g+5}{11+2g}}$

(Total for Question 12 is 7 marks)

.....
(4)

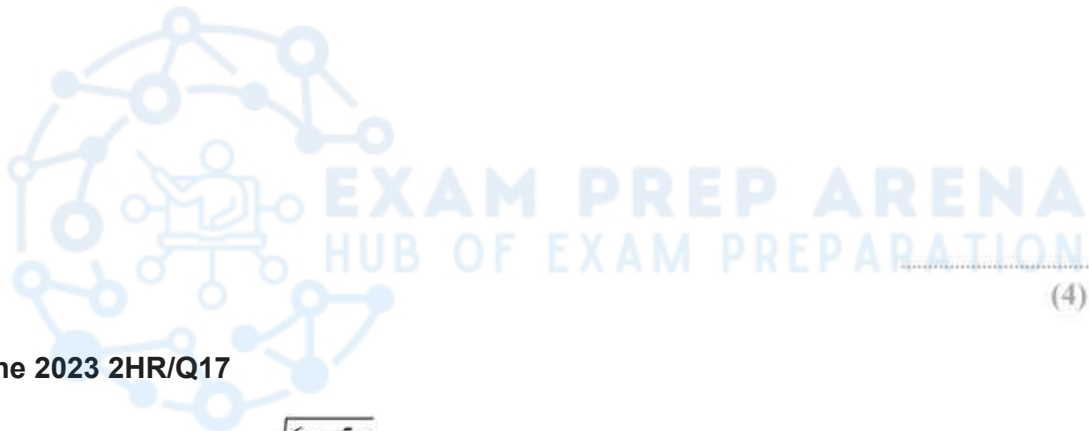


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5. June 2023 2H/Q17b

(b) Make e the subject of $w = \sqrt{\frac{e+g}{ef-d}}$



(4)

6. June 2023 2HR/Q17

Make x the subject of $y = \sqrt[3]{\frac{6+5x}{x+4}}$

(Total for Question 17 is 4 marks)

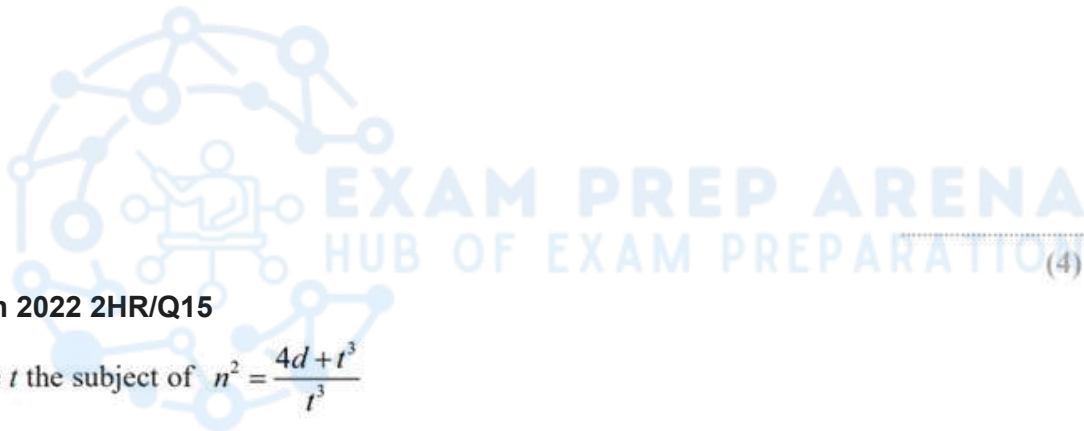


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7. June 2022 2H/Q14b

(b) Make c the subject of $g = \frac{c+3}{4+c} - 7$



8. Jan 2022 2HR/Q15

Make t the subject of $n^2 = \frac{4d+t^3}{t^3}$

(Total for Question 15 is 4 marks)



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9. Jan 2021 2H/Q14b

(b) Make c the subject of the formula $p = \sqrt{\frac{ac + 8}{3 + c}}$

.....
(4)

10. Nov 2020 2H/Q15

Make x the subject of $y = \frac{5 - 2x}{x + 3}$

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.....
(Total for Question 15 is 4 marks)



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11. Nov 2020 2HR/Q17

Given that $n > 0$

make n the subject of the formula $y = \frac{n^2 + d}{n^2}$

12. Jan 2020 2H/Q16

Make x the subject of $y = \frac{\sqrt{x+1}}{\sqrt{x-4}}$

(Total for Question 17 is 4 marks)

(Total for Question 16 is 4 marks)



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13. June 2019 2H/Q15

Make x the subject of the formula $y = \sqrt{\frac{3x-2}{x+1}}$

14. Jan 2019 2H/Q12d

(d) Make r the subject of $m = \sqrt{\frac{6a+r}{5r}}$

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(Total for Question 15 is 4 marks)

(4)



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15. June 2018 2H/Q1a

(a) Make a the subject of the formula $M = ac - bd$

.....
(2)

16. June 2018 2HR/Q7b

(b) Make e the subject of the formula $h = 3e + f$



17. Sample 2018 2H/Q13

Make b the subject of $P = \frac{1}{2}ab^2 + c$ where b is positive.



MARKING SCHEME

1. June 2025 2H/Q16

16*	$7c - 8ct^2 = t^2 + 3$ oe		4	M1 for multiplying both sides by denominator and expanding the brackets
	$7c - 3 = t^2 + 8ct^2$ oe or $-8ct^2 - t^2 = 3 - 7c$ oe			M1 ft dep on 2 terms in t^2 and 2 other terms for collecting t^2 terms on one side and other terms on the other side
	$7c - 3 = t^2(1 + 8c)$ oe or $t^2(-8c - 1) = 3 - 7c$ oe			M1 ft dep on previous M1 for factorising for t^2
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	$t = (\pm)\sqrt{\frac{7c-3}{1+8c}}$		A1 oe eg $t = (\pm)\sqrt{\frac{3-7c}{-8c-1}}$ or $t = (\pm)\left(\frac{7c-3}{1+8c}\right)^{\frac{1}{2}}$ or $t = (\pm)\left(\frac{7c-3}{1+8c}\right)^{0.5}$ NB To award A1 we must see $t = (\pm)\sqrt{\frac{7c-3}{1+8c}}$ in working if $(\pm)\sqrt{\frac{7c-3}{1+8c}}$ alone is given as an answer
				Total 4 marks

2. June 2025 2HR/Q17

17	$7p - 3k^2p = 8k^2 + 5$		4	M1 for correctly multiplying both sides by the denominator and expanding the brackets
	$7p - 5 = 8k^2 + 3k^2p$ or $-3k^2p - 8k^2 = 5 - 7p$			M1ft dep on 2 terms in k^2 and 2 other terms for correctly collecting their k^2 terms on one side and their other terms on the other side Note: eg $8k^2 + 3k^2$ does not count as 2 terms in k^2
	eg $7p - 5 = k^2(8 + 3p)$ or $k^2(-3p - 8) = 5 - 7p$			M1ft dep on previous M1 for correctly factorising for k^2 or $-k^2$ in their equation
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	$k = (\pm)\sqrt{\frac{7p-5}{8+3p}}$		A1 oe eg $k = (\pm)\sqrt{\frac{5-7p}{-3p-8}}$ or $k = (\pm)\left(\frac{7p-5}{8+3p}\right)^{\frac{1}{2}}$ or $k = (\pm)\left(\frac{7p-5}{8+3p}\right)^{0.5}$ (condone omission of \pm) NB: to award A1 we must see $k = (\pm)\sqrt{\frac{7p-5}{8+3p}}$ in working if $(\pm)\sqrt{\frac{7p-5}{8+3p}}$ alone is given as an answer
				Total 4 marks

3. Nov 2024 2H/Q12b

(b)	$f^2 = \frac{a+bc}{c-d}$		4	M1 for squaring both sides in a correct equation
	eg $cf^2 - df^2 = a + bc$			M1 for multiplying by the denominator and expanding in a correct equation
	eg $cf^2 - bc = a + df^2$			M1 for isolating terms in c on one side and other terms the other in a correct equation
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	$c = \frac{a+df^2}{f^2-b}$		A1 oe eg $c = \frac{-a-df^2}{b-f^2}$
				Total 7 marks



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4. June 2024 2H/Q15a

15 (a)	$e^2 = \frac{7g+5}{11+2g}$		4	M1	for removing square root
	$11e^2 + 2e^2g = 7g + 5$			M1	For multiplying by denominator and expanding in a correct equation
	eg $2e^2g - 7g = 5 - 11e^2$ or $11e^2 - 5 = 7g - 2e^2g$ oe			M1	For gathering terms in g on one side and other terms the other side in a correct equation.
	Correct answer scores full marks (unless from obvious incorrect working)	$g = \frac{5-11e^2}{2e^2-7}$		A1	or $g = \frac{11e^2-5}{7-2e^2}$ oe eg $g = \frac{5-11}{2-\frac{7}{e^2}}$ or $g = \left(\frac{5-11e^2}{e^2-3.5}\right) \div 2$ etc

5. June 2023 2H/Q17b

17 (b)	$w^2 = \frac{e+g}{ef-d}$		4	M1	for removing square root
	$w^2ef - w^2d = e + g$ oe			M1	for multiplying by denominator and expanding in a correct equation
	$w^2ef - e = g + w^2d$ oe			M1ft	fit their equation dep on 2 terms in e and two other terms for gathering terms in e on one side and other terms the other side
	Correct answer scores full marks (unless from obvious incorrect working)	$e = \frac{g+w^2d}{w^2f-1}$		A1	oe eg $e = \frac{-g-w^2d}{1-w^2f}$, $e = -\frac{g+w^2d}{1-w^2f}$ oe must see $e =$ on answer line or in working.
Total 7 marks					

6. June 2023 2HR/Q17

17	$y^3 = \frac{6+5x}{x+4}$		4	M1	for removing cube root
	$xy^3 + 4y^3 = 6 + 5x$ oe or $x - \frac{5x}{y^3} = \frac{6}{y^3} - 4$			M1	for multiplying by denominator and expanding in a correct equation or for gathering x terms on one side and the other terms on the other side in a correct equation in fractional form
	$xy^3 - 5x = 6 - 4y^3$			M1	for gathering terms in x on one side and other terms the other side in a correct equation or for removing all fractions
	Correct answer scores full marks (unless from obvious incorrect working)	$x = \frac{6-4y^3}{y^3-5}$		A1	or $x = \frac{4y^3-6}{5-y^3}$ SCB2 for $x = \frac{6-4y^{\frac{1}{3}}}{y^{\frac{1}{3}}-5}$ or $x = \frac{4y^{\frac{1}{3}}-6}{5-y^{\frac{1}{3}}}$ $y^{\frac{1}{3}}$ can also be y^2
Total 4 marks					



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7. June 2022 2H/Q14b

(b)	$g+7 = \frac{c+3}{4+c}$ or $g(4+c) = c+3-7(4+c)$ or $g = \frac{c+3}{4+c} - \frac{7(4+c)}{4+c} = \frac{c+3-28-7c}{4+c}$		4	M1 Adding 7 to both sides as a first step or removing fraction correctly
	eg $4g+gc+28+7c=c+3$ or $4g+gc=c+3-28-7c$ oe			M1 removing fraction and expanding all brackets in an equation with no more than one error
	eg $gc+7c-c=3-28-4g$ or $28-3+4g=c-7c-gc$			M1ft fit dep on previous M1 - terms in c on one side and other terms on the other side in an equation
		$c = \frac{-(4g+25)}{g+6}$		A1 oe eg $c = \frac{25+4g}{-6-g}$ or $c = \frac{3-28-4g}{g+7-1}$ [if c = is missing allow full marks if seen in working otherwise 3 marks] (SCB2 for an answer of $c = \frac{-4-4g}{g-1}$ oe or $c = \frac{31-4g}{g-8}$ oe SCB1 in working for $4g+cg=c+3-7$ oe or $4g+cg-28-7c=c+3$ oe
Total 7 marks				

8. Jan 2022 2HR/Q15

15	$n^2t^3 = 4d + t^3$	$n^2 = \frac{4d}{t^3} + 1$		4	M1 for multiplying by the denominator or for dividing the RHS by t^3
	$t^3(n^2-1) = 4d$ oe	$n^2-1 = \frac{4d}{t^3}$			M1 for isolating terms in t^3 and factorising the correct expression of the equation or for isolating the $\frac{4d}{t^3}$ term
	$t^3 = \frac{4d}{(n^2-1)}$ oe	$t^3 = \frac{4d}{(n^2-1)}$			M1 for making t^3 the subject
		$t = \sqrt[3]{\frac{4d}{(n^2-1)}}$			A1 oe eg $t = \sqrt[3]{\frac{-4d}{(1-n^2)}}$ or $t = \left(\frac{4d}{(n^2-1)}\right)^{\frac{1}{3}}$ SC B2 for $t = \sqrt[3]{\frac{4d}{(n^2+1)}}$
Total 4 marks					

9. Jan 2021 2H/Q14b

(b)	$p^2 = \frac{ac+8}{3+c}$			4	M1 for removing square root
	$3p^2+cp^2=ac+8$				M1 for multiplying by denominator and expanding in a correct equation
	$cp^2-ac=8-3p^2$ or $3p^2-8=ac-cp^2$				M1ft for gathering terms in c on one side and other terms the other side fit their equation dep on 2 terms in c and two other terms
		$c = \frac{8-3p^2}{p^2-a}$			A1 or $c = \frac{3p^2-8}{a-p^2}$
Total 7 marks					

10. Nov 2020 2H/Q15

15	$xy+3y=5-2x$ oe				M1 multiplying both sides by $(x+3)$ and expanding the brackets correctly
	e.g. $xy+2x=5-3y$				M1 fit dep on 2 terms on left and $(5-2x)$ on right, for collecting all x terms on one side and non-x terms on the other side
	eg $x(y+2)=5-3y$				M1 fit, dep on 2 terms in x, for factorising for x
		$x = \frac{5-3y}{2+y}$		4	A1 oe allow $\frac{5-3y}{2+y}$ as answer so long as previously seen $x = \frac{5-3y}{2+y}$
Total 4 marks					



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11. Nov 2020 2HR/Q17

17	$yn^2 = n^2 + d$ or $y = 1 + \frac{d}{n^2}$		4	M1
	$yn^2 - n^2 = d$ or $-d = n^2 - yn^2$ or $y - 1 = \frac{d}{n^2}$			M1
	$n^2(y - 1) = d$ or $-d = (1 - y)n^2$			M1 for factorising n^2 from a suitable expression. or $n^2 = \frac{d}{y - 1}$
		$n = \sqrt{\frac{d}{y - 1}}$		A1 Accept $n = \sqrt{\frac{-d}{1 - y}}$ Penalise $\pm\sqrt{\quad}$
Total 4 marks				

12. Jan 2020 2H/Q16

17	$yn^2 = n^2 + d$ or $y = 1 + \frac{d}{n^2}$		4	M1
	$yn^2 - n^2 = d$ or $-d = n^2 - yn^2$ or $y - 1 = \frac{d}{n^2}$			M1
	$n^2(y - 1) = d$ or $-d = (1 - y)n^2$			M1 for factorising n^2 from a suitable expression. or $n^2 = \frac{d}{y - 1}$
		$n = \sqrt{\frac{d}{y - 1}}$		A1 Accept $n = \sqrt{\frac{-d}{1 - y}}$ Penalise $\pm\sqrt{\quad}$
Total 4 marks				

13. June 2019 2H/Q15

15	$y^2 = \frac{3x - 2}{x + 1}$			M1 squaring both sides to get a correct equation
	$xy^2 + y^2 = 3x - 2$ oe			M1 for multiplying by the denominator and expanding the bracket
	$y^2 + 2 = x(3 - y^2)$ oe			M1 for isolating terms in x and factorising the correct expression of the equation
		$x = \frac{2 + y^2}{3 - y^2}$	4	A1 accept $x = \frac{-2 - y^2}{y^2 - 3}$ oe
Total 4 marks				

14. Jan 2019 2H/Q12d

(d)	$m^2 = \frac{6a + r}{5r}$ $m^2 \times 5r = 6a + r$ $5rm^2 - r = 6a$		4	M1 M1 M1 A1 or for $r = \frac{-6a}{1 - 5m^2}$ oe NB: to award A1 we must see $r = \frac{6a}{5m^2 - 1}$ in working if $\frac{6a}{5m^2 - 1}$ alone is given as answer
		$r = \frac{6a}{5m^2 - 1}$		



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15. June 2018 2H/Q1a

1	(a)	$ac=M+bd$ or $-ac = -M - bd$ or $\frac{M}{c} = a - \frac{bd}{c}$		2	M1 For a correct first stage
			$a = \frac{M+bd}{c}$		A1 oe, eg $a = \frac{M}{c} + \frac{bd}{c}$, $a = \frac{-M-bd}{-c}$ [must have been seen with $a =$ to award accuracy mark]

16. June 2018 2HR/Q7b

	(b)	$h - f = 3e$ or $\frac{h}{3} = e + \frac{f}{3}$ or $\frac{h-f}{3}$		2	M1
			$e = \frac{h-f}{3}$		A1 oe, accept $e = \frac{f-h}{-3}$
Total 4 marks					

17. Sample 2018 2H/Q13

13		$P-c = \frac{1}{2}ab^2$ $\frac{2(P-c)}{a} = b^2$			AO1	M1 Isolate term in b
			$b = \sqrt{\frac{2(P-c)}{a}}$	3		M1 Isolate b^2
						A1 oe with b as the subject

