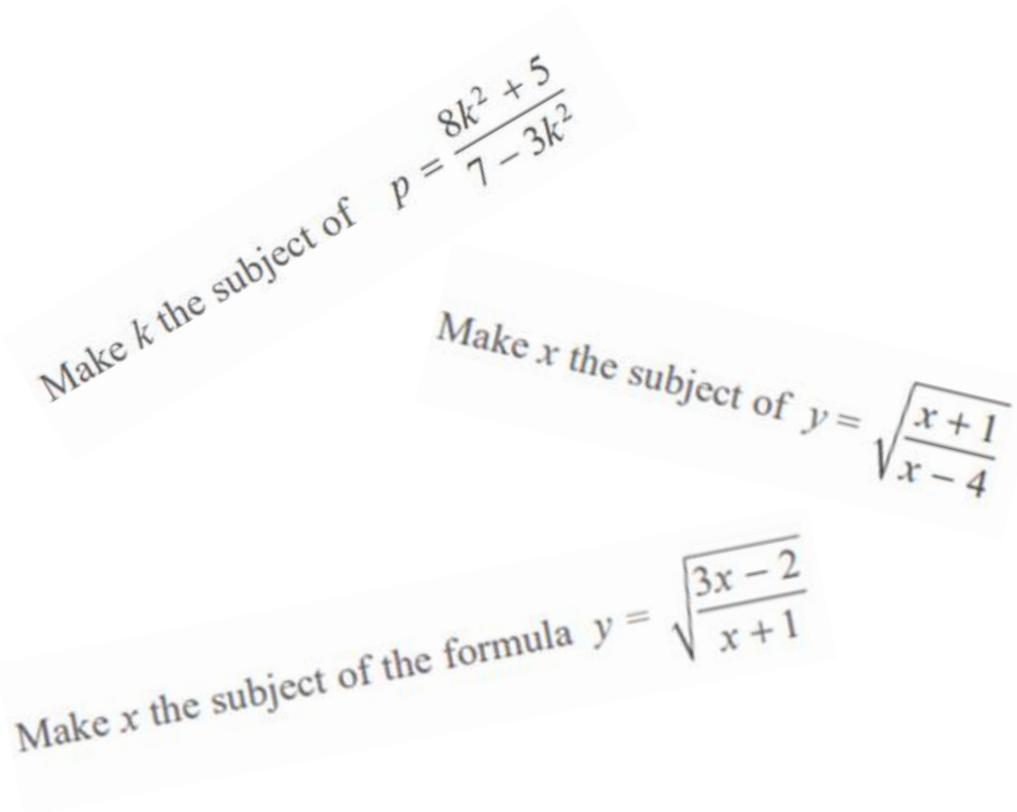
EDEXCEL IGCSE MATHEMATICS

PAPER 2H & 2HR (LINEAR)

ALGEBRA – REARRANGING FORMULAS

QP & MS (2018 – 2025)



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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/Q16

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

.....

(Total for Question 16 is 4 marks)

2. June 2025 2HR/Q17

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

.....

(Total for Question 17 is 4 marks)

3. Nov 2024 2H/Q12b

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

.....

(4)

(Total for Question 12 is 7 marks)

4. June 2024 2H/Q15a

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

.....

(4)

5. June 2023 2H/Q17b

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

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.....

(4)

6. June 2023 2HR/Q17

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

.....

(Total for Question 17 is 4 marks)

7. June 2022 2H/Q14b

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

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.....
(4)

8. Jan 2022 2HR/Q15

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

.....

(Total for Question 15 is 4 marks)

9. Jan 2021 2H/Q14b

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

.....

(4)

10. Nov 2020 2H/Q15

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

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.....

(Total for Question 15 is 4 marks)

11. Nov 2020 2HR/Q17

Given that $n > 0$

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

.....

(Total for Question 17 is 4 marks)

12. Jan 2020 2H/Q16

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

.....

(Total for Question 16 is 4 marks)

13. June 2019 2H/Q15

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

.....

(Total for Question 15 is 4 marks)

14. Jan 2019 2H/Q12d

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

.....

(4)

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 $h = 3e + f$

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.....

(2)

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
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$t=(\pm)\sqrt{\frac{7c-3}{1+8c}}$		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
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$k=(\pm)\sqrt{\frac{7p-5}{8+3p}}$		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 ±) 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
	Correct answer scores full marks (unless from obvious incorrect working)	$c=\frac{a+df^2}{f^2-b}$		A1	oe eg $c=\frac{-a-df^2}{b-f^2}$
					Total 7 marks

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 $g=\frac{\frac{5}{e^2}-11}{2-\frac{7}{e^2}}$ 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	ft 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

7. June 2022 2H/Q14b

(b)	$g+7=\frac{c+3}{4+c}$ or $g(4+c)=c+3-7(4+c)$ or $g=\frac{c+3}{4+c}-\frac{7(4+c)}{4+c}\left(=\frac{c+3-28-7c)}{4+c}\right)$		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	ft 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 $c=\frac{3-28-4g}{g+7-1}$ oe [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
	$t^3\left(n^2-1\right)=4d$ 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
	$t^3=\frac{4d}{\left(n^2-1\right)}$ oe	$t^3=\frac{4d}{\left(n^2-1\right)}$			M1 for making t^3 the subject
			$t=\sqrt[3]{\frac{4d}{\left(n^2-1\right)}}$		A1 oe eg. $t=\sqrt[3]{\frac{-4d}{\left(1-n^2\right)}}$ or $t=\left\{\frac{4d}{\left(n^2-1\right)}\right\}^{\frac{1}{3}}$ SC B2 for $t=\sqrt[3]{\frac{4d}{\left(n^2+1\right)}}$
					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 ft 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	ft 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	ft, 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

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 $\pm\surd$
				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 $\pm\surd$
				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)	$m^2 = \frac{6a+r}{5r}$ $m^2 \times 5r = 6a + r$ $5rm^2 - r = 6a$	$r = \frac{6a}{5m^2-1}$	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

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

17. Sample 2018 2H/Q13

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

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