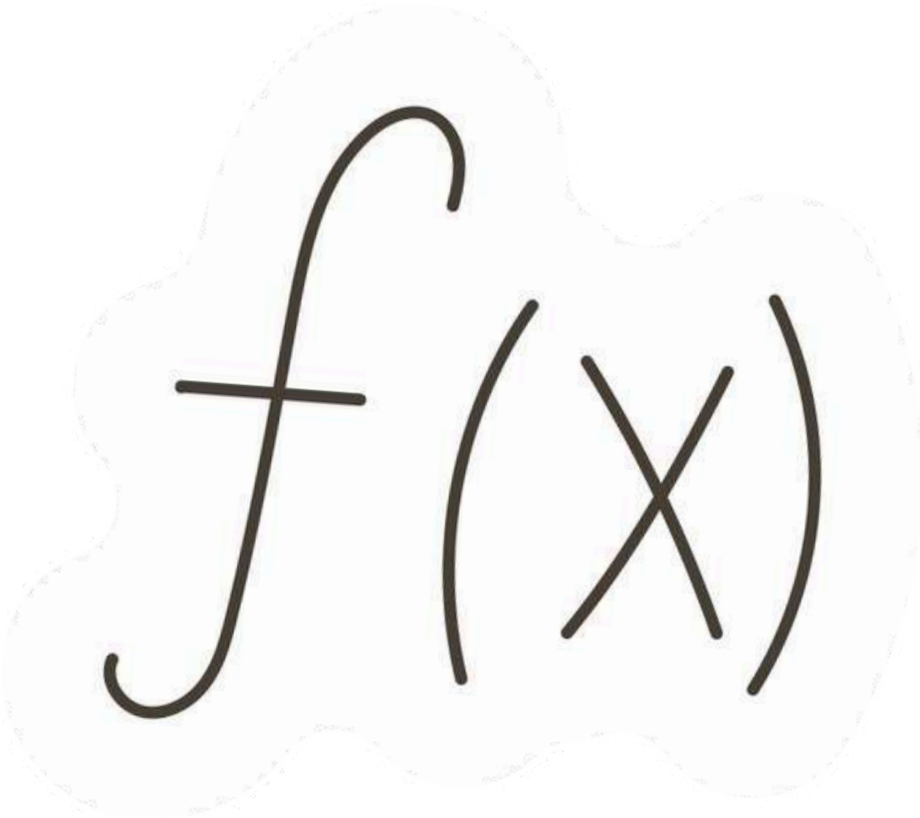
EDEXCEL IGCSE MATHEMATICS

UNIT 2 (MODULAR)

FUNCTIONS

QP & MS (2018 - 2025)



COMPILED BY:
SIR MUHAMMAD ABDULLAH SHAH

EXAM PREP ARENA
HUB OF EXAM PREPARATION

An Online Extensive Course

EDEXCEL IGCSE MATHEMATICS MODULAR FOR MAY & OCT 2026

by Sir Muhammad Abdullah Shah

Get ready for your **Edexcel IGCSE Mathematics Modular Unit 1 & 2** exams with our comprehensive course designed to cover the entire syllabus and provide intense practice with past exam questions.

Registrations Open

1. Available Sessions
   One-on-One
2. Class Modality
   Live classses on Google Meet
3. Starting From
   All year available
4. Contact Us
   +92 325 3595282

Register Now

+92 325 3595282 | exampreparena | Exam Prep Arena

EXAM PREP ARENA
HUB OF EXAM PREPARATION

1. Nov 2025 2H/Q19

The functions f and g are such that

$$f(x) = 3x - 2 \qquad g(x) = \frac{x}{2x - 1}$$

(a) Find g(3)

.....

(1)

(b) Find gf(x)
Give your answer in its simplest form.

gf(x) = ...

(2)

(Total for Question 19 is 3 marks)

2. June 2025 2HR/Q19

The functions f and g are such that

$$f(x) = 3x - 4 \text{ where } x > 2$$

$$g(x) = \frac{x}{2x+1}$$

(a) State the value of x that cannot be included in any domain of g

.....

(1)

(b) Find $gf(x)$
Give your answer in its simplest form.

$gf(x) =$ .....

(2)

(Total for Question 19 is 3 marks)

3. June 2024 2HR/Q17

$f(x) = \dfrac{x}{2x-4}$ $\quad g(x) = 3x + 1$

Given that $fg(k) = 2$

work out the value of k

$k =$ .....

(Total for Question 17 is 3 marks)

4. Nov 2023 2H/Q19

The functions f and g are such that

$$f: x \mapsto 5x + 7$$
$$g: x \mapsto \frac{5}{2x - 9}$$

(a) State which value of x cannot be included in any domain of g

.....

(1)

(b) Find fg(4)

.....

(2)

The function h is such that

$$h: x \mapsto 3x^2 - 12x + 8 \quad \text{where } x > 2$$

(c) Express the inverse function h^{-1} in the form $h^{-1}: x \mapsto ...$

$h^{-1}: x \mapsto$ .....

(4)

(Total for Question 19 is 7 marks)

5. Jan 2023 2H/Q25

The function f is such that $f(x) = 3x^2 - 12x + 7$ where $x \leqslant 2$

Express the inverse function f^{-1} in the form $f^{-1}(x) = \ldots$

$f^{-1}(x) =$ .....

(Total for Question 25 is 4 marks)

6. Jan 2022 2H/Q25

The function g is defined as

$$g: x \mapsto 5 + 6x - x^2 \quad \text{with domain } \{x : x \geqslant 3\}$$

(a) Express the inverse function g^{-1} in the form $g^{-1}: x \mapsto \ldots$

$g^{-1}: x \mapsto$ .....

(4)

(b) State the domain of g^{-1}

.....

(1)

(Total for Question 25 is 5 marks)

7. Jan 2022 2HR/Q23

The functions f and g are such that

$$f(x) = x + 25 \qquad g(x) = x^2 - 12x$$

The function h is such that $h(x) = fg(x)$

The domain of h is $\{x : x \leqslant 6\}$

Express the inverse function h^{-1} in the form $h^{-1}(x) = ...$

$h^{-1}(x) =$ .....

(Total for Question 23 is 4 marks)

8. Oct 2021 2H/Q15

The functions f and g are such that

$$f(x) = 2x - 3$$

$$g(x) = \frac{x}{3x + 1}$$

(a) State the value of x that cannot be included in any domain of g

.....

(1)

(b) Find $gf(x)$
Simplify your answer.

$gf(x) =$ .....

(2)

(c) Express the inverse function g^{-1} in the form $g^{-1}(x) = ...$

$g^{-1}(x) =$ .....

(3)

(Total for Question 15 is 6 marks)

9. Jan 2021 2HR/Q17

The functions f and g are defined as

$f(x) = x^2 + 6$
$g(x) = x - 10$

(a) Find fg(3)

.....
(2)

(b) Solve the equation $fg(x) = f(x)$
Show clear algebraic working.

.....
(3)

The function h is defined as

$$h(x) = \frac{2x - 4}{x}$$

(c) State the value of x that cannot be included in the domain of h

.....
(1)

(d) Express the inverse function h^{-1} in the form $h^{-1}(x) = \ldots$

$h^{-1}(x) =$ .....
(3)

(Total for Question 17 is 9 marks)

10. Nov 2020 2H/Q21

The function f is such that $f(x) = 5 + 6x - x^2$ for $x \leqslant 3$

(a) Express $5 + 6x - x^2$ in the form $p - (x - q)^2$ where p and q are constants.

.....

(2)

(b) Using your answer to part (a), find the range of values of x for which $f^{-1}(x)$ is positive.

.....

(5)

(Total for Question 21 is 7 marks)

11. June 2019 2H/Q24

The function f is such that $f(x) = 3x - 2$

(a) Find f(5)

.....

(1)

The function g is such that $g(x) = 2x^2 - 20x + 9$ where $x \geqslant 5$

(b) Express the inverse function g^{-1} in the form $g^{-1}(x) = ...$

$g^{-1}(x) =$ .....

(4)

(Total for Question 24 is 5 marks)

12. June 2019 2HR/Q18

The functions f and g are defined as

$$f(x) = \frac{x}{4x-3} \quad \text{and} \quad g(x) = x - 5$$

(a) State which value of x must be excluded from any domain of the function f.

.....

(1)

(b) Find $fg(x)$.
Simplify your answer.

$fg(x) =$ .....

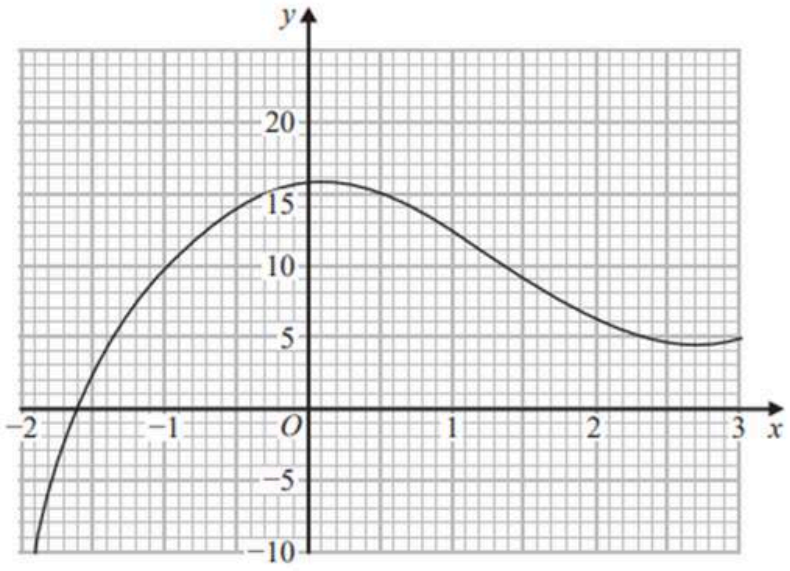
(2)

(c) Express the inverse function f^{-1} in the form $f^{-1}(x) = \ldots$

$f^{-1}(x) =$ .....

(3)

Part of the curve with equation $y = h(x)$ is shown on the grid.



(d) Find an estimate for the gradient of the curve at the point where $x = -0.5$
Show your working clearly.

.....

(3)

(Total for Question 18 is 9 marks)

13. Jan 2019 2H/Q17

f is the function such that $f(x) = 4 - 3x$

(a) Work out f(5)

.....

(1)

g is the function such that $g(x) = \frac{1}{1-2x}$

(b) Find the value of x that cannot be included in any domain of g

.....

(1)

(c) Work out fg(−1.5)

.....

(2)

(Total for Question 17 is 4 marks)

14. Sample 2018 2H/Q17

The function f is such that $f(x) = \frac{3}{x-2}$

(a) Find f(1)

.....

(1)

(b) State which value of x must be excluded from any domain of f

.....

(1)

The function g is such that $g(x) = x + 4$

(c) Calculate fg(2)

.....

(2)

(Total for Question 17 is 4 marks)

MARKING SCHEME

1. Nov 2025 2H/Q19

19 (a)		$\frac{3}{5}$	1	B1 oe eg 0.6
(b)	$\frac{3x-2}{2(3x-2)-1}$ oe		2	M1
	Correct answer scores full marks (unless from obvious incorrect working)	$\frac{3x-2}{6x-5}$		A1 must be a simplified single fraction eg $\frac{-2+3x}{-5+6x}$
				Total 3 marks

2. June 2025 2HR/Q19

19	(a)		$-\frac{1}{2}$	1	B1 oe Accept $x=-\frac{1}{2}$, accept $x\neq-\frac{1}{2}$ Do not allow inequalities, eg $x>-\frac{1}{2}$ or $x\leq-\frac{1}{2}$
	(b)	$\frac{3x-4}{2(3x-4)+1}$		2	M1 for a correct unsimplified expression for gf(x)
		Correct answer only scores full marks (unless from obviously incorrect working)	$\frac{3x-4}{6x-7}$		A1 oe eg $\frac{4-3x}{7-6x}$ Correct answer seen followed by incorrect subsequent working scores M1A0
					Total 3 marks

3. June 2024 2HR/Q17

17	$(\text{fg}(k)=)\frac{3k+1}{2(3k+1)-4}$ oe or $\frac{3k+1}{2(3k+1)-4}=2$ oe or $(\text{fg}(k)=)\frac{3k+1}{6k-2}$ oe or $\frac{3k+1}{6k-2}=2$ oe or $x=2(2x-4)$ or $x=4x-8$ or $x=\frac{8}{3}$ oe		3	M1 for a correct expression for fg(k) or fg(x) or for f(x) = 2 Allow x instead of k for all marks
	$3k+1=2(6k-2)$ oe or $3k+1=2(2(3k+1)-4)$ oe or $3k+1=12k-4$ oe or $3k+1=\frac{8}{3}$ oe			M1 dep on M1 for **correctly** removing the denominator to form a correct equation or for g(k) = $\frac{8}{3}$
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$\frac{5}{9}$		A1 oe eg 0.55(555…) rounded or truncated or $0.\dot{5}$ (must show recurring)
				Total 3 marks

4. Nov 2023 2H/Q19

Question	Working	Answer	Mark	Notes
19 (a)		4.5	1	B1oe $4.5, x = 4.5, x \neq 4.5$ Allow anything with 4.5, $\frac{9}{2}$ or $4\frac{1}{2}$ apart from $x < 4.5, x > 4.5, x \leq 4.5, x \geq 4.5$
(b)	$(g(4)) = \frac{5}{2\times4-9}(=-5)$ **or** $5\left(\frac{5}{2\times4-9}\right)+7$ oe		2	M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	–18		A1
(c)	$(y=)3(x^2-4x)+\ldots..$ **or** $y=3(x^2-4x+\ldots..)$ where ….can be number(s) or nothing		4	M1 **or** $3x^2-12x+(8-y)=0$oe
	$(y=)3(x-2)^2\ldots..$ **or** $y=3[(x-2)^2....]$ could have: $y-8=3[(x-2)^2....]$ oe			M1 **or** $(x=)\frac{12\pm\sqrt{144-12(8-y)}}{6}$ may have + rather than ±
	$(x-2)^2=\frac{y+4}{3}$ oe or an answer of $2\pm\sqrt{\frac{4+x}{3}}$			M1 **or** $(x=)2\pm\sqrt{\frac{4+y}{3}}$ may have + rather than ±
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$2+\sqrt{\frac{x+4}{3}}$		A1 oe eg $2+\frac{\sqrt{12+3x}}{3}$
NB: Allow candidates to swap x and y (or other letter) at any stage when finding the inverse – but the answer must be in terms of x				
				Total 7 marks

5. Jan 2023 2H/Q25

Q	Working	Answer	Mark	Notes	
25	$y=3\left(x^2-4x\right)+7$ **or** $y=3\left(x^2-4x+\frac{7}{3}\right)$ or $\frac{y-7}{3}=x^2-4x$ or $y=3(x-2)^2\ldots..$		4	M1	for a correct equation for a first step to complete the square
	eg $y=3\left(\left(x-2\right)^2-2^2\right)+7$ **or** $y=3\left(\left(x-2\right)^2-2^2+\frac{7}{3}\right)$ **or** $y=3\left(x-2\right)^2-5$ oe or			M1	
	$\left(x-2\right)^2=\frac{y+5}{3}$ oe eg $(x-2)^2=\frac{y-7}{3}+4$ or $x-2=(\pm)\sqrt{\frac{y+5}{3}}$ oe			M1	
	Correct answer scores full marks (unless from obvious incorrect working)	$2-\sqrt{\frac{x+5}{3}}$		A1 oe	NB: note only negative square root. Must be in terms of x **any equivalent form**
	Note: Allow candidates to swap x and y when finding the inverse				**Total 4 marks**
25 Alt	$3x^2-12x+(7-y)=0$		4	M1	for a correct first step
	$(x=)\frac{12\pm\sqrt{144-12(7-y)}}{6}$			M1	
	$(x=)2\pm\sqrt{\frac{60+12y}{36}}$ oe			M1	
	Correct answer scores full marks (unless from obvious incorrect working)	$2-\sqrt{\frac{x+5}{3}}$		A1 oe	NB: note only negative square root. Must be in terms of x **any equivalent form**
					Total 4 marks

6. Jan 2022 2H/Q25

25 (a)	$(x-3)^2$ or $(3-x)^2$ or $(y-3)^2$ or $(3-y)^2$		4	M1	
	14 or – 14			M1	As part of an expression in x or y or an equation in x and y
	$3\pm\sqrt{14-x}$ or $3\pm\sqrt{14-y}$			M1	Can be ± or – or +
		$3+\sqrt{14-x}$		A1	oe must be in x
25 alt (a)	Alternative method: $x^2-6x+(y-5)=0$ oe or $y^2-6y+(x-5)=0$ oe		4	M1	rearrange to form a quadratic in x or y terms can be in any order but must be in an equation equal to zero
	$y=\frac{6\pm\sqrt{36-4(x-5)}}{2}$ or $x=\frac{6\pm\sqrt{36-4(y-5)}}{2}$			M1	correct substitution into quadratic formula
	$3\pm\sqrt{14-x}$ or $3\pm\sqrt{14-y}$			M1	Can be ± or – or +
		$3+\sqrt{14-x}$		A1	oe must be in x
(b)		$x \leqslant 14$	1	B1	oe **must** ft from part (a) dep on an answer in correct form
					Total 5 marks

7. Jan 2022 2HR/Q23

23	$x^2-12x+25$		4	M1 for substituting g(x) into f(x)
	$(x-6)^2-6^2$ (+ 25) **or** $(x-6)^2-11$ **or** $x^2-12x+(25-y)=0$ oe **or** $y^2-12y+(25-x)=0$ oe			M1 ft (dep on M1) for a correct first step in order to complete the square. Allow y in place of x. **or** Correctly setting up an equation = 0
	$(x-6)^2=y+11$ **or** $(y-6)^2=x+11$ **or** $x=\frac{12\pm\sqrt{144-4(25-y)}}{2}$ oe or $x=6\pm\sqrt{11+y}$			M1 ft (dep on M2) for a correct rearrangement for their completed the square quadratic **or** correctly substituting into the quadratic formula (allow just + or just – instead of ±) Allow same equations with x and y swapped
		$6-\sqrt{11+x}$		A1 oe must be in terms of x and have minus only before the square root.
				Total 4 marks

8. Oct 2021 2H/Q15

15 (a)			$-\frac{1}{3}$	1	B1 oe allow $-0.\dot{3}$ or –0.33 or better allow $x=-\frac{1}{3}$ or $x\neq-\frac{1}{3}$
(b)	$\frac{2x-3}{3(2x-3)+1}$			2	M1 for substituting f(x) into g(x) Allow $\frac{f}{3f+1}$
	Correct answer scores full marks (unless from obvious incorrect working)		$\frac{2x-3}{6x-8}$		A1 oe (do not isw incorrect cancelling)
(c)	$y(3x+1)=x$ and $3xy+y=x$	or $x(3y+1)=y$ and $3xy+x=y$		3	M1 for moving the denominator to the other side of the equation and expanding correctly
	$x(1-3y)=y$ or $x(3y-1)=-y$	or $y(1-3x)=x$ or $y(3x-1)=-x$			M1 for collecting and factorising the variable on one side in a correct equation
	Correct answer scores full marks (unless from obvious incorrect working)		$\frac{x}{1-3x}$		A1 oe eg $-\frac{x}{3x-1}$ or $\frac{-x}{-1+3x}$ oe
					Total 6 marks

9. Jan 2021 2HR/Q17

17	(a)	$g(3) = -7$ **or** $f(3-10) = (3-10)^2 + 6$ **or** $3^2 - 20\times3 + 106$ oe		2	M1	
			55		A1	
	(b)	$(x-10)^2 + 6 = x^2 + 6$		3	M1	Using $f(x-10)$ and setting equal to $x^2 + 6$
		$x^2 - 10x - 10x + 100$ oe			M1	for $(x-10)^2$ expanded correctly.
			5		A1	dep 1st M1
	(c)		0	1	B1	accept $x \neq 0$ or $x = 0$
	(d)	eg $yx = 2x - 4$ oe or $xy = 2y - 4$ oe or $4 = 2x - yx$ or $4 = 2y - yx$		3	M1	Removing denominator equation may be rearranged
		eg $4 = x(2-y)$ oe or $4 = y(2-x)$ oe or $\frac{4}{x} = 2 - y$ or $\frac{4}{y} = 2 - x$ or $\frac{4}{2-y} = x$ or $\frac{4}{2-x} = y$			M1	for correct factorisation or implied factorisation
			$\frac{4}{2-x}$ or $\frac{-4}{x-2}$		A1	oe
						Total 9 marks

10. Nov 2020 2H/Q21

21	a	$5 - (x \pm q)^2 + 9$ oe **or** $p - (x-3)^2$ oe **or** $p - q^2 + 2qx - x^2$ and one of $2q = 6$ **or** $p - q^2 = 5$			M1	may be seen in working eg $-[(x-3)^2 - 9 - 5]$ **or** expanding $p - (x-q)^2$ correctly and equating one of the coefficient of x or the constant term
			$14 - (x-3)^2$	2	A1	fully correct SCB1 for $(x-3)^2 - 14$
	b	e.g. $(x-3)^2 = 14 - y$ [or $(y-3)^2 = 14 - x$]			M1	correct steps to isolate their bracket ft from (a) dep on expression in form $\pm p \pm (x-q)^2$
		$x = 3 \pm \sqrt{14-y}$ [or $y = 3 \pm \sqrt{14-x}$]			M1	complete method to find y in terms of x or x in terms of y. Condone + for $\pm$ ft from (a) dep on expression in form $\pm p \pm (x-q)^2$
		$(f^{-1}(x) =) 3 - \sqrt{14-x}$			M1	for the correct inverse
					M1	method to solve $0 < 3 - \sqrt{14-x}$ or a lower bound of 5 clearly shown, eg $x > 5$ as part of the answer
			$5 < x \leq 14$	5	A1	cao
						Total 7 marks

11. June 2019 2H/Q24

24	(a)	$-3(x^2-4x)+7$ or $-3\left(x^2-4x-\frac{7}{3}\right)$		4	M1	for factorising the expression to find b or $b=-3$ stated or shown clearly in answer.
		$-3[(x-2)^2.....]$ or c = –2 $-3[(x-2)^2-4]+7$ or $-3\left[(x-2)^2-4-\frac{7}{3}\right]$			M1	or for c shown clearly in answer.
		$-3(x-2)^2+12+7$ or $-3\left[(x-2)^2-\frac{19}{3}\right]$			M1	fully correct method.
			$19-3(x-2)^2$		A1	for $19-3(x-2)^2$ oe
	(b)		(2, 19)	1	B1 ft	dep on M1 in part (a) answer must follow answer from (a) if given
						Total 5 marks

Alternative mark scheme for 24						
24	(a)	$a+bx^2+2bcx+bc^2$		4	M1	for multiplying out $a+b(x+c)^2$ to obtain $a+bx^2+2bcx+bc^2$ oe
		$b=-3$ or $2bc=12$ or $a+bc^2=7$ oe			M1	for equating coefficients
		$b=-3$ and $c=-2$			M1	for correctly finding b and c
		$a=19$	$19-3(x-2)^2$		A1	for $19-3(x-2)^2$ oe
	(b)		(2, 19)	1	B1 ft	dep on M1 in part (a)
						Total 5 marks

12. June 2019 2HR/Q18

18	(a)		$\frac{3}{4}$ oe	1	B1	
	(b)	$\frac{x-5}{4(x-5)-3}$	$\frac{x-5}{4x-23}$	2	M1 A1	cao
	(c)	$y=\frac{x}{4x-3}$ or $x=\frac{y}{4y-3}$ $y(4x-3)=x$ or $x(4y-3)=y$ $4xy-3y=x$ or $4xy-3x=y$ $4xy-x=3y$ or $4xy-y=3x$ $x(4y-1)=3y$ or $y(4x-1)=3x$	$\frac{3x}{4x-1}$ oe	3	M1 M1 A1	Moving the denominator to the other side of the equation Factorising the variable on one side in a correct expression
	(d)	Tangent drawn at $x=-0.5$ (G =) 18 ÷ 3 oe	5 → 7	3	M1 M1 A1	Drawing a tangent at $x=-0.5$ Correct method to work out the gradient of the tangent at $x=-0.5$ or $x=+0.5$ Dep on 1st M1 **SC B1 B1 for drawing a tangent at $x=+0.5$ and gradient = – 3 → –4**
						Total 9 marks

13. Jan 2019 2H/Q17

17	(a)		−11	1	B1	
	(b)		0.5 oe	1	B1	
	(c)	$g(-1.5)=1\div(1-2\times-1.5)$ (=0.25) **or** $fg(x)=4-3\times\left(\frac{1}{1-2x}\right)$ oe			M1	g(−1.5) must be the correct calculation alone.
			3.25 oe	2	A1	

14. Sample 2018 2H/Q17

17	a		−3	1	AO1	B1
	b		2	1	AO1	B1
	c	g(2) = 6			AO1	M1
			0.75 oe	2		A1