

ODD AND EVEN

OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

1.

13	$\frac{(2x) + (2x + 2) + (2x + 4) + (2x + 6)}{4}$ $= \frac{8x + 12}{4}$ $= 2x + 3$ <p>which is an integer</p> <p>OR</p> $(2x) + (2x + 2) + (2x + 4) + (2x + 6)$ $= 8x + 12$ $= 4(2x + 3)$ <p>which is divisible by 4 oe</p>	4	<p>M1 for $2x, 2x + 2, 2x + 4$ and $2x + 6$ seen and</p> <p>M1 for adding their four terms in x, eg. $(2x) + (2x + 2) + (2x + 4) + (2x + 6)$</p> <p>and</p> <p>M1 for <i>their</i> $(8x + 12) \div 4$ or better, condoning lack of brackets, or for $4(2x + 3)$</p> <p>and</p> <p>A1dep (dep on M0M1M1 or M1M1M1) for correct algebraic mean for <i>their</i> four terms and conclusion eg. $2x + 3$ is an integer or $4(2x + 3)$ which is divisible by 4</p> <p>If 0 scored, allow SC1 for a numerical example with any 4 consecutive even integers with mean correctly calculated</p>	<p>Or equivalent algebraic representations of 4 consecutive even numbers. In this case, x does not need to be defined as being an integer.</p> <p>Using $x, x + 2, x + 4, x + 6$ oe does not score the first M mark unless x stated as even integer, but can score up to 3 marks for $(x) + (x + 2) + (x + 4) + (x + 6)$ <i>their</i> $(4x + 12) \div 4$ or better, or for $4(x + 3)$ and the relevant conclusion</p> <p>Using $x + 1, x + 3, x + 5, x + 7$ oe does not score the first M mark unless x stated as odd integer but can score up to 3 marks similar to above.</p>
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OCR GSCE – Thursday 8 June 2017 – Paper 5 (Non - Calculator) Higher Tier

2.

21	(a)	<p>$2n$ is even and adding 1 gives an odd number oe</p>	1	<p>Must interpret the $2n$ as even or not odd and then the $+1$ giving odd oe</p>	<p>Accept '$2n$ is a multiple of 2' for $2n$ is even</p> <p>Accept 2 times any number is even oe for $2n$ is even (as n is defined as an integer in the stem of question)</p> <p>Accept 'next number' or 'odd' for $+1$</p> <p>Do not accept e.g. $2n = \text{even } 2n + 1$ is odd (does not interpret the 1)</p>
	(b)	$(2n + 3)^2 - (2n + 1)^2 \text{ oe}$ $4n^2 + 12n + 9 - 4n^2 - 4n - 1$ $8n \text{ or } 8n + 8 = 8(n + 1)$ <p>Or $8n + 8$ is a multiple of 8 oe</p>	M2	<p>Allow $(2n + a)^2 - (2n + (a \pm 2))^2$ where a is odd</p> <p>Or M1 for $2n - 1$ or $2n + 3$ used with $2n + 1$</p> <p>Allow $\{2n + (a \pm 2)\}$ used with $(2n + a)$ where a is odd</p>	<p>Could use alternate correct expressions for consecutive odd numbers. Allow M and A marks if correct.</p> <p>Could reverse the algebraic terms <i>their</i> $(2n + 1)^2 - (2n + 3)^2$ leading to $-8n - 8$, allow method and accuracy marks if correct.</p> <p>If brackets omitted allow recovery for M2 if correct expansion</p>
			M2	<p>Dep on M2 for expanding brackets in <i>their</i> expressions.</p> <p>Or M1indep for one correct expansion of <i>their</i> brackets</p>	<p>If seen alone and completely correct then implies previous M2</p> <p>Allow $4n^2 + 12n + 9 - (4n^2 + 4n + 1)$</p>
			A1	<p>With no errors or omissions seen.</p> <p>Correct for <i>their</i> two consecutive odd number expressions</p> <p>After 0 scored, Allow SC1 for two correctly evaluated numeric examples of subtracting consecutive odd squares isw</p>	<p>Accept $-8n$ or $-8n - 8$ oe if subtraction is reversed</p> <p>NB: M2M1A1 not possible – must earn all method marks for A mark</p> <p>e.g. $7^2 - 5^2 = 24$ and $3^2 - 5^2 = -16$</p>

OCR GSCE – Sample Papers – Paper 4 (Calculator) Higher Tier

3.

11	(a)	Any correct reason	1 1 AO2.4a		Exemplar responses: -1 and 1 both odd and either side of 0 Or can be divided by 2 exactly Or numbers that end in 0 are even Or zero remainder when divided by 2 Or next number in pattern of even numbers 8 6 4 2 Or added to an even number it gives even answer and added to odd number gives odd answer
	(b)	e.g. $a^2 + b^2 = c^2$ $a = 2x$ and $b = 2y$ implies $c^2 = 4x^2 + 4y^2$ So c is even	3 1 AO2.1a 1 AO2.4b 1 AO3.2	B1 for use of Pythagoras' theorem M1 for even × even = even soi	

OCR GSCE – Sample Papers – Paper 6 (Calculator) Higher Tier

4.

8	(a)	$x, x + 1, x + 2, x + 3$ $x + (x + 1) + (x + 2) + (x + 3)$ or $4x + 6$ $2(x + 3)$	1 1 1 3 AO2.4b	accept correct alternatives	
	(b)	e.g. $1 + 2 + 3 + 4$ $4x + 6$ is not a multiple of 4	1 1 2 AO2.4a	Allow e.g. $1 + 2 + 3 + 4 = 10$ is not a multiple of 4	

AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

5.

14(a)	(Ali) $5 \times 4 \times 3$ or 60 or (Mel) $4 \times 3 \times 2$ or 24	M1	oe eg (Ali) 5×12 or (Mel) 4!
	$5 \times 4 \times 3 - 4 \times 3 \times 2$ or $60 - 24$	M1dep	oe implies M2
	36 with no incorrect method seen	A1	SC1 answer 61
	Additional Guidance		
	Ignore any listing of possible codes		
	$48 - 12 = 36$ (incorrect method seen)		MOM0A0
	1st M1 Further work eg1 60 followed by 60×3 eg2 $6 \times 4 = 24$ followed by $24 \times 2 = 48$		M0

14(b)	<input checked="" type="checkbox"/> It is bigger than my answer to part (a)	B1	
	<input type="checkbox"/> It is smaller than my answer to part (a)		
	<input type="checkbox"/> It is the same as my answer to part (a)		
Additional Guidance			

AQA GCSE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

6.

17	could be even or odd	B1	
	Additional Guidance		

AQA GCSE – Sample Paper 2 (Calculator) Higher Tier

7.

16	$6c(c^2 + 5)$ or $3(c^2 + 5)$	M1	
	$\frac{6c(c^2 + 5)}{3(c^2 + 5)}$	M1	This mark implies first M1
	$2c$ and multiple of 2 so even	A1	oe statement Must see method