WRITING A FORMULA

OCR GSCE – Thursday 5 November 2020 – Paper 5 (Non-Calculator) Higher Tier

1.

12	(a)		She has reduced the price by 10% **oe**	**B1**		e.g. She has decreased by 1000 each year She took 10%/ found 90% [of 20 000]
						See AG
			18 050	**B3**	**M2** for $20\,000 \times 0.95^2$ **oe** or **B1** for 1000 or 19 000 **seen**	
12	(b)	(i)	$20\,000 \times 0.95^n$ **oe**	**2**	**M1** for 0.95 **oe** or for $20\,000 \times k^n$ $(k \neq 0)$	
12	(b)	(ii)	Second graph indicated	**1**		

OCR GSCE – Monday 12 November 2018 – Paper 6 (Calculator) Higher Tier

2.

13			$8\pi + t\pi + 16 - 2t$ oe including unsimplified expressions	**3**	**B2** for two of $\dfrac{16\pi}{2}$ oe, $\dfrac{2t\pi}{2}$ oe, or $16 - 2t$ oe seen or **B1** for one of $\dfrac{16\pi}{2}$ oe, $\dfrac{2t\pi}{2}$ oe, or $16 - 2t$ oe seen	Mark final answer Equivalent simplified expressions include: $\pi(8 + t) + 16 - 2t$ or $t(\pi - 2) + 8(\pi + 2)$ Penalise use of 3.14 once e.g. 25.1… and 3.14t scores **B1**

AQA GSCE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

3.

	$h = 3n + 20$ or $h = 20 + 3n$	B3	oe in the form $h =$ B2 correct equation not in the form $h =$ or $3n + 20$ or $20 + 3n$ or $h = 3n \, (+ \, k)$ (k is a number or letter) or $h = (k \, +) \, 3n$ (k is a number or letter) or $h = an + 20$ $(a \neq 0)$ or $h = 20 + an$ $(a \neq 0)$ B1 $3n \, (+ \, k)$ (k is a number or letter) or $(k \, +) \, 3n$ (k is a number or letter) or $an + 20$ $(a \neq 0)$ or $20 + an$ $(a \neq 0)$ SC1 $n = 3h + 20$

Additional Guidance

17	Allow $h =$ in working but omitted on answer line For an equation in the form $h =$ in working, but rearranged (correctly or incorrectly) for the answer line, award 1 mark less than the $h =$ form	
	Condone an unsimplified fraction for 3 if it has integer numerator and denominator eg $h = \dfrac{12}{4} n + 20$	B3
	An unsimplified fraction for 3 can still score marks if it does not have integer numerator and denominator eg $h = \dfrac{32 - 20}{4} n + 20$	B2
	Allow $3 \times n$ or $n \times 3$ for $3n$	
	Ignore units	
	Condone capital H or N, but for incorrect variable(s) award 1 mark less than correct variable(s) would get eg1 $h = 3x + 20$ or $y = 3x + 20$ eg2 $3x + 20$ eg3 $3x$	B2 B1 B0

AQA GSCE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier

4.

	$y^2 = \frac{1}{2}y(y + 3)$	B2	oe equation eg $2y^2 = y^2 + 3y$ or $y^2 = 3y$ or $y = 0$ or $y = 3$ or $y = 0$ or 3 **B1** $\frac{1}{2}y(y + 3)$ oe expression or an otherwise correct equation using a different unknown or combination of unknowns

Additional Guidance

17(a)	Allow multiplication signs eg $y \times y = \frac{y}{2} \times (y + 3)$	B2
	$y^2 = \frac{1}{2}y(y + 3)$ followed by incorrect simplification or attempt to solve the equation	B2
	$y^2 = \frac{1}{2}y + y + 3$	B0
	3 only or 0 only or 0 and 3 only	B0
	Do not allow missing or partially missing brackets unless recovered eg1 $y^2 = \frac{1}{2}y \times y + 3$ without correct equation seen	B0
	eg2 $y^2 = \frac{1}{2}y(y + 3$ without correct equation seen	B0

	Correct comment or shows correct working	B1	eg1 he hasn't square rooted (correctly) eg2 it should be $\sqrt{8}\,x = 3$ eg3 he should have divided (by 8) before square rooting

Additional Guidance	
$\sqrt{8}$ may be given as $2\sqrt{2}$	
Comment that he shouldn't have a negative answer	B0
Mathematically incorrect statement	B0
Correct comment and an incorrect comment	B0

Example responses	
He has taken it as $(8x)^2$	B1
He has divided $8x^2$ by x (instead of square rooting) and square rooted the 9	B1
He $\sqrt{}$ first when supposed to divide it by 8	B1
He didn't divide 9 by 8 to get x^2	B1
At the start he took the 8 over when you want $\sqrt{\dfrac{9}{8}}$	B1
Toby should have got $\pm\sqrt{\dfrac{9}{8}}$	B1
He should have divided by 8	B0
Toby didn't square root $8x$	B0
He hasn't square rooted the $8x^2$ to leave x on its own	B0
He hasn't square rooted the other side to just get x	B0
Didn't divide by 8	B0
He should have divided by $8x$	B0
He found the square root of 9 but didn't write $\sqrt{8x} = 9$	B0

17(b)

AQA GSCE – Tuesday 12 June 2018 – Paper 3 (Calculator) Higher Tier

5.

	$4(x + 3)$	B1	
15	**Additional Guidance**		

AQA GSCE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

6.

	$\frac{1}{2}(b + 2b)h$ or $3 \times \frac{1}{2}bh$	M1	oe
	$1.5bh$ or $\frac{3}{2}bh$ or $\frac{3bh}{2}$ or $1\frac{1}{2}bh$	A1	accept hb for bh
	Additional Guidance		
10(a)	Correct expression with ×, ÷ or brackets		M1A0
	Condone units within expressions for M1 only		
	Condone the expression given within a formula eg $A = 1.5hb$		M1A1
	Condone correct expression stated and then equated to a value or with values substituted		M1A1

	$3b + 2s$ or $3b = 2s$ or $4s$	M1	oe
10(b)	$6b$	A1	oe eg $b + b + b + b + b + b$
	Additional Guidance		
	Condone the expression given within a formula eg $P = 6b$		M1A1

7.

	$C = 0.6(0)n + 2.5(0)$	B3	oe Must have $C =$ for B3 B2 $C = 0.6n + k$ $(k \neq 0)$ or $C = an + 2.5$ $(a \neq 0)$ or $0.6n + 2.5$ B1 $0.6n$ or $an + 2.5$ $(a \neq 0)$ or $C = 60n + 250$	

Additional Guidance		
Allow correct fractions eg $\dfrac{3}{5}$ or $\dfrac{1}{1.6}$ for 0.6 and/or $\dfrac{5}{2}$ for 2.5		
Allow $0.6 \times n$ or $n \times 0.6$ for $0.6n$ eg $C = 0.6 \times n + 2.5$ $n \times 0.6 + 2.5$ $0.6 \times n$	B3 B2 B1	
Penalise by one mark the use of $n0.6$ for $0.6n$ eg $C = n0.6 + 2.5$ $n0.6 + 2.5$ $n0.6$	B2 B1 B0	
Penalise by one mark the use of different letters eg $y = 0.6x + 2.5$ $0.6x + 2.5$ $2p + 2.5$	B2 B1 B0	
Transposing 0.6 and 2.5 scores zero eg $C = 2.5n + 0.6$	B0	
Ignore £ signs eg $£C = £0.6n + £2.5$ or $C = £0.60n + £2.5$	B3	
$C = 1.2n + 2.5$	B2	
$1.2n + 2.5$	B1	
$C = 0.6n + 2.5$ in working with $0.6n + 2.5$ on answer line	B3	
Equivalent formula but C not the subject scores B2 eg $100C = 60n + 250$	B2	

14

8.

18	$x \times x \times 2x$ or $2x^3$	M1	oe
	$\dfrac{x}{2}$ used as radius	M1	eg $\pi \times \dfrac{x}{2} \times \dfrac{x}{2}$ seen
	$\dfrac{1}{2} \times \pi \times \dfrac{x}{2} \times \dfrac{x}{2} \times x$ or $\dfrac{1}{8}\pi x^3$	M1	oe
	$2x^3 + \dfrac{1}{8}\pi x^3$	A1	Accept $a = 2$ and $b = 8$ Condone if subsequently factorised to $(2 + \dfrac{1}{8}\pi)x^3$