SUBSTITUTION

Pearson Edexcel - Thursday 2 November 2017 - Paper 1 (Non-Calculator) Higher Tier

1.

20		$1+\sqrt{2}$	B1	for a value for a known trigonometric ratio stated
			P1	for process to form 2 equations in a and b **or** one correct value stated
			P1	for complete process to solve to reach $a = 2$ and $b = 1$
			A1	for $1+\sqrt{2}$ oe

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier

2.

21		$\frac{2}{5}$	P1	for process to find $\overrightarrow{AB}$ (= **b** – **a**) or $\overrightarrow{BA}$ (= **a** – **b**)
			P1	for process to find $\overrightarrow{MN}$ $(=-\frac{1}{2}\mathbf{b}+\mathbf{a}+2\mathbf{a})$ or $\overrightarrow{PN}$ (= –k(**b** – **a**) + 2**a**) or $\overrightarrow{MP}$ $(=-\frac{1}{2}\mathbf{b}+\mathbf{a}+k(\mathbf{b}-\mathbf{a})$ or $\frac{1}{2}\mathbf{b}+(1-k)(\mathbf{a}-\mathbf{b}))$
			P1	for process to find two of $\overrightarrow{MN}$, $\overrightarrow{PN}$ and $\overrightarrow{MP}$
			P1	for process to find k, using $\overrightarrow{MN}$ as a multiple of $\overrightarrow{PN}$ or using $\overrightarrow{MN}$ as a multiple of $\overrightarrow{MP}$ or using $\overrightarrow{PN}$ as a multiple of $\overrightarrow{MP}$
			A1	for $\frac{2}{5}$ oe

Pearson Edexcel - Wednesday 13 June 2012 - Paper 2 (Calculator) Higher Tier

3.

19		$\sqrt{\frac{8.5\times10^9-4\times10^8}{8.5\times10^9\times4\times10^8}}$ $=\sqrt{\frac{8.1\times10^9}{3.4\times10^{18}}}$ $=\sqrt{2.3823529...\times10^{-9}}$ **OR** $\sqrt{\frac{1}{4\times10^8}-\frac{1}{8.5\times10^9}}$ $=\sqrt{2.5\times10^{-9}-1.17647\times10^{-10}}$ $=\sqrt{2.3823529...\times10^{-9}}$	4.9×10^{-5}	3	B3 for 4.88×10^{-5} to 4.9×10^{-5} (B2 for digits 238(23529) or 24 or 488(09353) or 49) (B1 for digits 81 or 34) **OR** B3 for 4.88×10^{-5} to 4.9×10^{-5} (B2 for digits 238(23529) or 24 or 488(09353) or 49) (B1 for digits 25 or 117(647))

Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier

4.

3	(a)	$3\times2+5\times-4$	-14	2	M1 for $3\times2+5\times-4$ oe or 6 and −20 seen A1 cao for −14
	(b)		$3(m-2)$	1	B1 cao

OCR GSCE – Tuesday 5 November 2019 – Paper 6 (Calculator) Higher Tier

5.

10	**(a)**		165 000	**1**		
	(b)		3	**1**		
	(c)		$165\,000 \times 1.03^7$ 202 929.1878 truncated or rounded to at least 3sf	**1** **1**		

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

6.

22	**a**		17 150	**1**		
	b		16 807 ÷ 17 150 = 0.98	**1**	Condone: 17150 × [0].98 = 16807 16807 ÷ [0].98 = 17150	
	c		15 818 to 15 819	**2**	**M1** for 17150×0.98^4 or *their* (a) $\times 0.98^4$ or for 16807×0.98^3 and **A1FT** from *their* (a) $\times 0.98^4$ correctly evaluated <u>Alternative methods using division</u> **M1** for $16000 \div 0.98^4$ **A1** for 17300 to 17350 is greater than 17150 **OR** **M1** for $16000 \div 0.98^3$ **A1** for 16900 to 17000 is greater than 16807	**FT** from *their* (a), and only if method shown Accept "[population in] 2018" for 17150 Accept "[population in] 2019" for 16807
	d		17 500 nfww	**2**	**M1** for 17150×0.98^{-1} oe or *their* (a) $\times 0.98^{-1}$ oe or 16807×0.98^{-2} oe	NB: **M1** for $0.98^{-1} = 1.02[04\ldots]$ **and** 17150 x 1.02[04…] but **M0** for 17150 × 1.02 = 17493

OCR GSCE – Thursday 24 May 2018 – Paper 4 (Calculator) Higher Tier

7.

12	**(a)**		16 500	**1**		
	(b)		18	**1**		
	(c)		7460 and 8250 oe or [0].452… and [0] .5 oe	**2**	**M1** for [16 500 ×] $.82^4$ or 7460 or [0].452	accept 7460.01 or 7460.009… accept any correct argument for 2 marks e.g. 7460×2 and 16 500 or better

OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier

8.

20	**(a)**	**(i)**	8	**2**	**M1** for $\left[\left(\sqrt{2}\right)^7 =\right]\ 2^3\times\sqrt{2}$	For M1 accept $2\times2\times2$ for 2^3 Final answer $8\sqrt{2}$ scores M1
		(ii)	13	**2**	**B1** for 2 correct trials with $n > 3$ correctly evaluated or **M1** for $\left(\sqrt{2}\right)^{12}=2^6$ **oe** or for $\frac{n-1}{2}=6$ **oe**	e.g. $\left(\sqrt{2}\right)^6=8$ and $\left(\sqrt{2}\right)^9=16\sqrt{2}$

	(b)		$\frac{14}{3-\sqrt{2}}\times\frac{3+\sqrt{2}}{3+\sqrt{2}}$ **or better** $\frac{14\left(3+\sqrt{2}\right)}{7}$ $2\left(3+\sqrt{2}\right)$ or $6+2\sqrt{2}$	**M1** **B3** **A1**	or **M2** for $\frac{14\left(3+\sqrt{2}\right)}{9+3\sqrt{2}-3\sqrt{2}-\left(\sqrt{2}\right)^2}$ **or better** or **M1** for numerator or denominator correct Dep on M1B3 earned	If written in a single fraction, must have brackets For B marks or method marks, allow numerator brackets expanded For M1, allow denominator unsimplified but not 9 – 2 or 7 if from wrong working Allow M1 for either numerator or denominator even if not in fraction

OCR GSCE – Tuesday 6 November 2017 – Paper 5 (Non - Calculator) Higher Tier

9.

11	**(a)**	**(i)**	16 000	**1**		
		(ii)	25	**1**		
		(iii)	$16\,000\times0.75^2$ **oe** with no subsequent error	**M2**	**M1** for $16\,000\times0.75^2$ with subsequent error or $16\,000\times0.75$ **oe** or for *their* $12\,000\times0.75$	M1 implied by 12000
	(b)		Equation does not give a straight line **oe isw**	**1**		Accept 'There is not a constant decrease' oe isw See AG

	(c)		If you calculate a value for a 20 year-old car it is greater than 0 **oe**	**1**		Accept 'the graph will never reach the *x*-axis' oe, It will have scrap value The answer is always positive etc Condone additional 'opinion based' information

OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

10.

1	**(a)**		200	**2**	**B1** for 50 or 150 soi	Eg. answer 500 or 275 with (5×10) + … seen
	(b)		$a=\frac{2(s-ut)}{t^2}$ oe	**2**	**M1** for $s - ut = ½ at^2$	

OCR GSCE – Wednesday 8 November 2017 – Paper 6 (Calculator) Higher Tier

11.

14	**(a)**		$(34 \times 36) - (25 \times 45) = 99$	**2**	**M1** for either 34×36 or 25×45 soi by 1224 or 1125	
	(b)		Eg. If $M = n$ $L = (n - 1)(n + 1) = n^2 - 1$ $T = (n - 10)(n + 10) = n^2 - 100$ $L - T = (n^2 - 1) - (n^2 - 100) = 99$	**5**	**B2** for defining relative positions algebraically Eg. $n - 1$, $n + 1$, $n - 10$, $n + 10$ or **B1** for at least two relative positions defined algebraically AND **M2** for $[L =] (n - 1)(n + 1) = n^2 - 1$ **and** $[T =] (n - 10)(n + 10) = n^2 - 100$ or **M1** for $[L =] (n - 1)(n + 1) = n^2 - 1$ **or** $[T =] (n - 10)(n + 10) = n^2 - 100$ **or** $L - T = (\textit{their}\ (n - 1)(n + 1) - (\textit{their}\ (n - 10)(n + 10))$ If **0** scored, allow **SC1** for one further numerical example	Or equivalent algebraic representation of relative positions. Condone poor notation for B marks eg **B2** for n – 1 × n + 1 – n – 10 × n + 10 For **M** marks, follow through allowed for working with *their* relative positions described algebraically as linear expressions: ie. • L = Multiplication of their left and right expressions • T = Multiplication of their top and bottom expressions **M1** could be awarded by expressing *their* L – *their* T, even if incorrectly expanded **M2** may be embedded

OCR GSCE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

12.

4			128	**2**	**M1** for $12(4) + \frac{1}{2}(10)(4)^2$ or **B1** for 48 or 80	

OCR GSCE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

13.

10	**(a)**		4200	**1**		
	(b)		$3948 = 4200r$ oe $3948 \div 4200 = 0.94$	**B1** **B1**		Can be implied by e.g. second statement
	(c)		[0].4[0] × 4200 or 1680 $4200 \times ([0].94)^{15}$ or 1660[. …] 1660[. …] and1680 oe	**M1** **M1** **A1**	accept any correct method e.g. **M1** for 4200×0.94^{15} or 1660[. …] **M1** for 1660[. …] ÷ 4200 [×100] implied by .395[…] or 39.5 to 39.6 **A1** for 60.4 to 60.5[…] or 39.5 to 39.6 with a suitable comment	Alternatives: **M2** for $0.94^{15} = .395$[…] **A1** for 60.4 to 60.5[…]

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

14.

3	**(a)**		£20 000	**1** 1 AO1.3a		
	(b)		£14 580 or £14 600	**2** 2 AO1.3a	**M1** for $20\,000 \times 0.9^3$	
	(c)		7 years	**2** 1 AO1.3a 1 AO3.1c	**M1** for 2 trials shown	

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

15.

17			$-\frac{1}{6}$ with working shown including explanation for discounting $w = -3$	**6** 1 AO1.3b 1 AO2.4a 4 AO3.1b	**B1** for $x^2 = (w + 1)$ **M1** for $y = 6(\text{their } x^2)^2 + 7(\text{their } x^2)$ **M1** for *their* $y = 10$ and make = 0 **M1** for solving a three term quad with $a \neq 1$ **B1** for discounting a value of w less than -1	$w = -\frac{1}{6}$ and -3 **OR** $w = -3$ implies 5 marks

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

16.

24	–1	B1	

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

17.

1	(–1, 6)	B1	
	Additional Guidance		

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

18.

27	**Alternative method 1**		
	$y + 1 = \frac{2x}{5}$ or $5y = 2x - 5$	M1	x and y may be transposed oe 1st step eg $\frac{y}{2} = \frac{x}{5} - \frac{1}{2}$
	$5(y + 1) = 2x$ or $5y + 5 = 2x$	M1dep	x and y may be transposed oe 2nd step eg $\frac{y}{2} + \frac{1}{2} = \frac{x}{5}$ implies M2
	$\frac{5(y+1)}{2}$ or $\frac{5y+5}{2}$ or $\frac{5(3+1)}{2}$ or 10	A1	may use x instead of y oe expression or calculation eg $\frac{5y}{2} + \frac{5}{2}$ or $\frac{3+1}{\frac{2}{5}}$
	$\frac{2\times-0.5}{5} - 1$ or -1.2 or $-\frac{6}{5}$ or $-1\frac{1}{5}$	M1	oe
	8.8 or $\frac{44}{5}$ or $8\frac{4}{5}$	A1	

Mark scheme and Additional Guidance continue on the next page

27 cont	**Alternative method 2**		
	$\frac{2x}{5} = 3 + 1$ or $\frac{2x}{5} = 4$	M1	oe
	$2x$ = their 4×5	M1dep	oe implies M2
	10	A1	
	$\frac{2 \times -0.5}{5} - 1$ or -1.2 or $-\frac{6}{5}$ or $-1\frac{1}{5}$	M1	oe
	8.8 or $\frac{44}{5}$ or $8\frac{4}{5}$	A1	
	Additional Guidance		
	The 4th mark may be seen first and may be the only mark awarded		
	f may be used for y		
	Missing brackets must be recovered		
	Answer 8.8		M2A1M1A1
	First three marks in Alt 1 Can be gained using a reverse function machine for a full calculation (applied to 3) which may be seen in stages eg $3 + 1 = 4$ and $4 \times 5 = 20$ and $20 \div 2$ Part marks are not possible for this approach		M1M1A1

26	$16 - x^3$	M1	
	$x^3 = 16 - 24$ or $x^3 = -8$ or $x = \sqrt[3]{-8}$ or $-x^3 = 24 - 16$ or $-x^3 = 8$ or $-x = -\sqrt[3]{-8}$	M1dep	
	-2	A1	
	Additional Guidance		
	$16 - x^3 = 24$ $x^3 = 24 - 16$		M1M0A0

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

20.

26	$\frac{x^2 - 2}{x^2 - 2 + 2}$ or $\frac{x^2 - 2}{x^2}$	M1	
	$\frac{x^2}{x^2} - \frac{2}{x^2}$ or $1 - \frac{2}{x^2}$	A1	implied by correct final answer must be two terms oe eg $x^2x^{-2} - 2x^{-2}$
	$1 - 2x^{-2}$ or $a = 1$ and $b = -2$ and $n = -2$	A1	
	Additional Guidance		

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

21.

27	$\frac{1}{64} = k^3$ or $\sqrt[3]{\frac{1}{64}}$	M1	oe equation in k
	$(k =) \frac{1}{4}$ or $(k =) 0.25$	A1	must see working for M1 implied by $y = \left(\frac{1}{4}\right)^x$ $\left(\frac{1}{4}\right)^3 = \frac{1}{64}$ is M1A1
	$\left(\frac{1}{4}\right)^{\frac{1}{2}} = \frac{1}{2}$ or $0.25^{\frac{1}{2}} = 0.5$	A1	must see working for M1A1 allow $\sqrt{\frac{1}{4}} = \frac{1}{2}$ or $\sqrt{0.25} = 0.5$
	Additional Guidance		

AQA GSCE – Thursday 6 November 2017 – Paper 2 (Calculator) Higher Tier

22.

3	$\left(\frac{1}{3}, \frac{1}{9}\right)$	B1	
	Additional Guidance		

AQA GSCE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

23.

16	36	B1	
	Additional Guidance		

AQA GSCE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

24.

30	$\frac{6x^2+3}{3}$ or $2x^2 + 1$ or $\frac{6x^2+3}{3} + 4$ or $2x^2 + 1 + 4$	M1	oe
	$2x^2 + 5$	A1	
	Additional Guidance		