	Juestic	n	Answer	Marks	Guidance	Question
1	(i)		1	1 [ <b>1</b> ]		
1	(ii)		$\frac{3}{5}$ or 0.6	3	allow <b>B3</b> for ±0.6 oe; <b>M1</b> for $\binom{25}{9}^{\frac{1}{2}} = \binom{9}{25}^{\frac{1}{2}}$ soi or $\frac{1}{\binom{25}{9}^{\frac{1}{2}}}$ and <b>M1</b> for at least one of 3 and 5 found	M1 for inversion even if they have done something else first, eg may be earned after $2^{nd}$ M1 for inversion of their $\frac{5}{3}$

Q	Questio	n	Answer	Marks	Guida	nce
2	(i)		1	2	isw conversion to decimal	
			9		M1 for 9 or for $3^{-2}$ or for $\frac{1}{3}$	ie M1 for evidence of $(\sqrt[3]{27})^2$ or $1/(\sqrt[3]{27})$ found correctly
					Except M0 for 9 from 27/3 or $\sqrt[3]{27}$	(\\\27) Tound concerny
				[2]		
2	(ii)		$2a^2c^{-4}$ or $\frac{2a^2}{c^4}$ as final answer	3	B1 for each element; must be multiplied	
					if B0, allow SC1 for $64a^6c^3$ obtained from numerator or for all elements correct but added	
				[3]		

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(	Questio	n	Answer	Marks	Guida	nce
3	(i)	$3n^2 + 6n^{-1}$	+5 isw	B2	M1 for a correct expansion of at least one of $(n + 1)^2$ and $(n + 2)^2$	
3	(ii)	odd numb	bers with valid explanation	[2] B2	marks dep on 9(i) correct or starting again for B2 must see at least odd × odd = odd [for $3n^2$ ] (or when <i>n</i> is odd, $[3]n^2$ is odd) and odd [+ even] + odd = even soi, condone lack of odd × even = even for 6 <i>n</i> ; condone no consideration of <i>n</i> being even or B2 for deductive argument such as: 6 <i>n</i> is always even [and 5 is odd] so $3n^2$ must be odd so <i>n</i> is odd B1 for odd numbers with a correct partial explanation or a partially correct explanation or B1 for an otherwise fully correct argument for odd numbers but with conclusion positive odd numbers	accept a full valid argument using odd and even from starting again Ignore numerical trials or examples in this part – only a generalised argument can gain credit
				[2]	B0 for just a few trials and conclusion	

4	(i)	25	2	M1 for $\left(\frac{10}{2}\right)^2$ or $\left(\frac{1}{0.2}\right)^2$ oe soi	ie M1 for one of the two powers used correctly
				or for $\frac{1}{0.04}$ oe	M0 for just $\frac{1}{0.4}$ with no other working
			[2]		
4	<b>(ii)</b>	8a <sup>9</sup>	3	<u>1</u>	ignore $\pm$
				B2 for 8 or M1 for $16^4 = 2$ soi	C
					eg M1 for 2 <sup>3</sup> ; M0 for just 2
				and B1 for $a^9$	
			[3]		

Q	uestio	n	Answer	Marks	Guidan	ce
5	(i)		$\frac{9}{25}$ or 0.36 isw	2	M1 for numerator or denominator correct or for squaring correctly or for inverting correctly	M1 for eg $\frac{1}{\begin{pmatrix} 25\\9 \end{pmatrix}}$ or $\begin{pmatrix} 25\\9 \end{pmatrix}^{-1}$ or $\frac{25}{9}$ or for $\begin{pmatrix} 3\\5 \end{pmatrix}^2$ or $\frac{3}{5}$ M0 for just $\frac{1}{\begin{pmatrix} 5\\3 \end{pmatrix}^2}$
				[2]		
5	(ii)		27	2 [2]	M1 for $81^{\frac{1}{4}} = 3$ soi	eg M1 for $3^3$ M0 for $81^3 = 531441$ (true but not helpful)

6	(i)	25	2	M1 for $\frac{1}{\frac{1}{25}}$ or $\left(\frac{1}{25}\right)^{-1}$ or $5^2$ or $\frac{25}{1}$	
			[2]		
6	(ii)	$\frac{4}{9}$	2	M1 for 4 or 9 or $\frac{1}{9}$ or $\frac{2}{3}$ or $\left(\frac{2}{3}\right)^2$ or $\sqrt[3]{\frac{64}{729}}$	0 for just $\left(\frac{64}{729}\right)^{\frac{1}{3}}$
			[2]	seen	

Q	uestic	on	er	Marks	Guidan	се
7	(i)		30	3	M1 for $\left(\sqrt{6}\right)^3 = 6\sqrt{6}$ soi and	M0 for $6000\sqrt{6}$ ie cubing 10 as well
					M1 for $\sqrt{24} = 2\sqrt{6}$ soi	for those using indices: M1 for both $10 \times 6^{3/2}$ and $2 \times 6^{1/2}$ oe then M1 for $5 \times 6$ oe
				[3]	or allow SC2 for final answer of $5(\sqrt{6})^2$ or $5\sqrt{36}$ or $10\sqrt{9}$ etc	award SC2 for similar correct answer with no denominator
7	(ii)		<u>8</u> 11	2	M1 for common denominator $(4+\sqrt{5})(4-\sqrt{5})$ soi - may be in separate fractions or for a final answer with denominator 11, even if worked with only one fraction	condone lack of brackets
				[2]		

8	(i)	$\frac{1}{3}$ as final answer	2 [2]	allow $\pm \frac{1}{3}$ M1 for $\frac{1}{9^{\frac{1}{2}}}$ or for $9^{\frac{1}{2}} = \sqrt{9}$ or 3 soi	eg M1 for 3 <sup>-1</sup>
8	(ii)	$32x^{10}y^{-3}$ or $\frac{32x^{10}}{y^3}$ oe as final answer	3 [ <b>3</b> ]	B1 for each element if B0, allow M1 for $(4x^4)^3 = 64x^{12}$	allow 2 <sup>5</sup> instead of 32

[3]	9	$6n^{2} + 12n + 8 \text{ or } 2(3n^{2} + 6n + 4) \text{ oe}$ as final answer	3	B2 for 2 terms correct in final answer or for $(n + 2)^3 = n^3 + 6n^2 + 12n + 8$ or B1 for 1, 3, 3, 1 soi or SC2 for final answer of $3n^2 + 6n + 4$	B1 for $n^3 + 4n^2 + 4n + 2n^2 + 8n + 8[-n^3]$ , condoning one error
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10	(i) /3 isw	2	condone $\pm 4/3$ ;	<b>M1</b> for just –4/3;
			M1 for numerator or denominator correct or for $\frac{3}{4}$ or $\frac{1}{\left(\frac{3}{4}\right)}$ oe or for $\left(\frac{16}{9}\right)^{\frac{1}{2}}$ soi	allow <b>M1</b> for $\sqrt{16} = 4$ and $\sqrt{9} = 3$ soi; condone missing brackets
10	(ii) $\frac{2a}{c^5}$ or $2ac^{-5}$	3	<b>B1</b> for each 'term' correct; mark final answer; if B0, then <b>SC1</b> for $(2ac^2)^3 = 8a^3c^6$ or $72a^5c^7$ seen	condone $a^1$ ; condone multiplication signs but <b>0</b> for addition signs

11	(i)(A) 1/16	1	isw attempted conversion of 1/16 to decimals	accept 0.0625
11	(i)( <i>B</i> ) 1	1		set image 'fit to height' so that in marking this question you also check that there is no working on the back page attached to the image
11	(ii) 256/625	2	M1 for num or denom correct or for 4/5 or 0.8	accept 0.4096