JustMaths

Countdown to your final Maths exam ... part 1 (2019)

"Working Above"

Markscheme & Examiners Report

Q		Working/Answer	Marks	Notes
1		94 x 94 or 87 x 86 95 x 94 x 87 x 86 66 814 260	3	M1 for combinations of any two roles M1 for all combinations A1
2		2.55	3	B1 for max as 42.5̇ or 42.49̇ B1 for max X 60 or 2550 A1 (accept 2.549̇)
3	a	1/10	1	
	b	9	2	M1 for $(\sqrt[3]{27}^2)$ A1
	c	$\sqrt{75} = \sqrt{25}\sqrt{3}$ $\mathbf{5\sqrt{3}}$	2	M1 A1
4	a	64.5	1	B1
	b	65.5 or 65.4**9̇**	1	B1
5		-5 0.2 0.5 1 **-5 5^{-1} 0.5 1**	2	M1 for either 5^{-1} or 5^0 correctly evaluated A1 SC (B1 for list in reverse order_
6		59/330	3	M1 for 100x=17.8787... or 1000x=178.7878 and 10x = 1.7878... M1 (dep) for subtraction A1 leading to correct answer

7	a	300	2	B1 for correct use of index rules or sight of 10^2 B1 for 300 or 3 x 10^2 oe
	b	$\frac{25}{9}$	2	M1 for working out one step A1
8	i	200	1	B1 cao
	ii	5.6	1	B1 for 5.6(2...)
9	a	35.55	1	B1 cao
	b	$\sqrt{\frac{2 \times 35.55}{9.85}}$ 2.68668...	3	B1 fir 9.85 M1 for $\sqrt{\frac{2 \times "35.55"}{9.85}}$ A1 dep on M1
10	a	1	1	B1 cao
	b	$\frac{1}{16}$	2	M1 for two of cube root, square, reciprocal A1 cao
11		x = 0.28181 ... 100 x = 28.181 ... 99 x = 27.9 $\frac{31}{10}$	3	M1 for 100x=218.181... or 1000x=2181.81.. and 10x = 21.8181... M1 (dep) for subtraction A1 leading to correct answer oe
12	a	1	1	B1
	b	$\frac{1}{16}$	1	B1
	c	$2\sqrt{7}$	2	M1 for multiplying denominator and numerator by $\sqrt{7}$ A1 cao
13	a	4.25	1	B1
	b	7.20 – 7.21	3	B1 for 4.35 or 0.35 M1 for 4.35 + $\frac{1}{0.35}$ A1
14	a	3	1	B1 cao
	b	$\frac{1}{5}$	2	M1 for correct reciprocal or square root A1 cao oe
15	i	$\frac{1}{16}$	1	B1 for $\frac{1}{16}$ or 0.0625
	li	4		B1 cao

Q1. No Examiner's Report available for this question

Q2. Many students did not appreciate that this was a question about bounds. They simply multiplied 42 by 60 and could not be awarded any credit. Some students then rounded the result of this calculation (2.52kg). They were not being awarded any marks either. Most students successfully converted from grams to kilograms, usually towards the end of their calculations but some students used the incorrect conversion 100g = 1 kg.

Q3. Part (a) was well attempted but as many candidates scored B1 as scored B0. Common errors included rewriting the value in the question or writing 0.01.

Part (b) was well attempted but few gained M1A1. Those that gained M1 usually earned the mark for $\sqrt[3]{27}$ = 3. Other common errors included 27 ÷ 3 × 2 or writing $\frac{1}{\sqrt[3]{27}}$, $\frac{1}{\sqrt{27}}$ or $\frac{1}{\sqrt[3]{27^2}}$. Part (c) was well attempted by most candidates but few achieved full marks. Many split 75 correctly as 25×3 but did not write the square root sign or often wrote $25\sqrt{3}$ so achieved M0A0. A few candidates split 75 as 15 × 5.

Q4. Part (a) was generally well answered with most candidates opting for 64.5. They were less successful with part (b) where answers of 64.4, 65.4, 65.49 and 65.9 were commonly seen.

Q5. Many candidates showed some understanding of the relative size of the powers of 5 in this question and were able to score at least one mark for ordering three or more of the numbers correctly or for evaluating 5^{-1} or 5^0 correctly. Unfortunately, a significant proportion of candidates evaluated either 5^{-1} or 5^0 incorrectly as −5 or 0.5 and 0 respectively and so could not be awarded full marks. A surprising number of candidates did not show that −5 was the smallest of the four numbers listed.

Q6. Some students could recall the need to consider multiplying the recurring decimal by powers of ten but not many could use a correct combination to eliminate the recurring nature of the decimal. A small number of students gave a clear, accurate and complete solution to score full marks.

Q7. No Examiner's Report available for this question

Q8. No Examiner's Report available for this question

Q9. Part (a) was generally answered quite well by those who attempted it.
Part (b) was not answered very well at all. Some candidates ignored their answer from part (a) and used something completely different. A common error was for candidates to use 9.75, the lower bound of *g*, as the denominator. Some did not work with bounds and substituted 35.6 and 9.8 into the formula. Those who chose the correct values almost always got a correct final answer with only a few forgetting to square root.

Q10. Part (a) allowed most candidates to demonstrate their knowledge of power zero.

Part (b) proved much more of a challenge. Firstly candidates had to interpret what the power $-\frac{2}{3}$ meant in terms of the operations required and secondly, once interpreted correctly, candidates were faced with the problem of the actual evaluation. This became very apparent for those candidates who wrote (correctly) $\frac{1}{\sqrt[3]{64^2}}$ but then could not cope with the arithmetic of the large numbers.

Q11. Candidates who were able to recognise that the given recurring decimal was 0.28181... rather than 0.281281... gained a generous first method mark. In order to gain the second method mark a full correct method had to be seen. Unfortunately, many attempted the subtraction of 281.8181... and 0.28181... which is an incorrect method. Some got as far as $^{27.9}/_{99}$ or $^{279}/_{99}$ but were then unable to finish their solution correctly to arrive at the correct answer of $^{31}/_{110}$. There were many incorrect guesses of $^{281}/_{10000}$ and $^{281}/_{999}$ seen.

Q12.This question was not well answered as students often wrote 7 or 0 instead of 1 for part (a), 16 or −8 or

$\frac{1}{2^4}$ instead of $\frac{1}{16}$ for (b) with $\frac{14\sqrt{7}}{7}$ being the most common answer for (c) which only scored one mark as it was not written in its simplest form.

Q13. Most students did not understand the concept of a bound, so scored no marks for either part of this question. Those that did get the mark for part (a), often did have some strategy for dealing with the formula. However, very few appreciated that the upper bound of $\frac{1}{q}$ is found from using the lower bound of q. These students generally scored 1 mark for the 4.35. As often is the case, students also thought that bounds had to be applied to an exact answer, so worked out $4.3 + \frac{1}{0.4}$ and then added 0.5 to their answer

Q14. One third of candidates knew that raising a number to power ^{1} ⁄$_3$ is equivalent to taking the cube root and so successfully evaluated $27^{1/3}$ in part (a) of this question.

Part (b) discriminated well between those candidates who understood negative indices, those who understood fractional indices and those who could combine both concepts. Over 40% of candidates made some progress in finding the value of $25^{-½}$ with just over 25% of candidates completing the question successfully. Most of the candidates who presented a partially correct solution were able to evaluate $25^{½}$. Fewer candidates were able to interpret a negative index as a reciprocal. Commonly seen incorrect answers include 5, – 5, – 12.5 and 12.5 .

Q15. In part (a) predictably some candidates wrote -16, 16 or ⅛ , amongst other incorrect answers. But the majority answered this correctly.

In part (b) candidates found more success, though 8 featured strongly as the most common incorrect answer.