Extended Mathematics
Topic : Number
Year:May2013-May2024
Paper-2
Answers

Question 1

£ or pound[s] **Correct working must be shown**	**2**	**M1** for 425 ÷ 1.14 or 365 × 1.14

Question 2

$\frac{30}{300}$ oe www	**2**	**M1** for 30 seen or $\frac{k}{300}$ seen

Question 3

(a)	[±] **2.28** or 2.282 to 2.2822	**1**
(b)	**0.109** or 0.1094[3…]	**1**

Question 4

$\left(\frac{2}{3}\right)^{1.5}$ $\left(-\frac{2}{3}\right)^{\frac{2}{3}}$ $(1.5)^{\frac{2}{3}}$ $\left(\frac{2}{3}\right)^{-1.5}$	**2**	**M1** for at least 2 correct decimals seen 1.3[1..] 0.5[4..] 1.8[3..] or 1.84 0.7[6..]

Question 5

(a)	1.1×10^5	**2**
(b)	5×10^3	**2**

Question 6

$17 - 4n$	**2**	**B1** for $\pm 4n$ seen

Question 7

4.55×10^8	**2**	**B1** for figs 455 seen

Question 8

2.2[0...]	**2**	**M1** for 11.99 ÷ 0.626 soi by 19.2 or 19.15...

Question 9

(a)	5.17225...	**1**	
(b)	5.2	**1FT**	**FT** *their* (a)

Question 10

6.1 final answer	**2**	**M1** for [$\sqrt{37.8225}$=] 6.15

Question 11

with 2 correct steps seen $\frac{18k}{35k}$	**3**	**B1** for $\frac{5k}{3k}$ and **M1** for $\frac{6}{7} \times$ *their* $\frac{3}{5}$

Question 12

6632.55 cao final answer	**3**	**M2** for $6250 \times (1 + \frac{2}{100})^3$ oe **or M1** for $6250 \times (1 + \frac{2}{100})^2$ oe **SC2** for answer 382.55 final answer

Question 13

15	**4**	**M2** for $\frac{1}{2} \times 40 \times (26 + 19)$ oe or **M1** for one valid area calculation **Indep M1** for ÷ 60 **SC3** for answer 900

Question 14

11 or –11	**1**	

Question 15

(a)	1.32656...	**1**	
(b)	1.327	**1ft**	

Question 16

72	**2**	**M1** for 84 ÷ 7

Question 17

correct working; e.g. $\frac{3k}{2k} \times \frac{16n}{3n} = 8$	**2**	**M1** for $\frac{3k}{2k}$ and **A1** for $\frac{3k}{2k} \times \frac{16n}{3n} = 8$

Question 18

48.15, 48.45 cao	**2**	**B1 B1** If 0 then **M1** for 16.0 and 16.15 soi

Question 19

175 cao final answer	**3**	**B2** for 175.4 ... or **M1** for 200 ÷ 1.14

Question 20

454.27 cao final answer	**3**	**M1** for $420 \times (1+\frac{4}{100})^2$ oe and **A1** for 454 or 454.2 to 454.3 or **SC2** for answer 34.27 or **SC1** for answer 34.2 to 34.3

Question 21

(a)	2.8 oe	**1**	
(b)	700	**3**	**M2** for ½(20 + 30) × 28 oe or **M1** for a correct area statement

Question 22

39	**2**	**M1** for 52 × 45 ÷ 60 oe

Question 23

tan 100, cos 100, 1/100, $100^{-0.1}$	**2**	**B1** for decimals –0.1[[7..], –5.[67..], [0.01], 0.6[3..] or for three in the correct order

Question 24

(a) 600 000	**1**	
(b) 79.2	**2**	**M1** for 22 × 60 × 60 ÷ 1000 oe

Question 25

25[.00]	3	**M2** for $30 \times \frac{100}{120}$ oe or **M1** for 30 associated with 120% e.g. $1.2x = 30$

Question 26

(a) 7.5×10^{-2}	2	**M1** for 0.075 or $\frac{3}{40}$ or $\frac{6}{80}$ or 0.75×10^{-1} oe
(b) 9.3×10^{7}	2	**M1** for 93 000 000 or 93×10^{6} or 0.93×10^{8} oe

Question 27

19% 0.719^5 $\sqrt{0.038}$ sin 11.4 1/5	2	**B1** for decimals [0.19], [0.2], 0.194…, 0.197…, 0.192… seen Or for four in correct order

Question 28

(a) –447	1	
(b) 2	1	

Question 29

10.1[0]	3	**M1** for 1.3199 and 1.3401 seen and **M1** for 500×1.3199 or 500×1.3401 or for $500 \times$ (*their* highest – *their* lowest) oe

Question 30

10[.00]	3	**M2** for 1.90 and 2.90 and 5.20 only or **M1** for two of 1.90, 2.90, 5.20 in a list of three or two values from the table or **SC1** FOR 1.90, 2.90, 4.30 $\left[\text{from } \frac{3.40 + 5.20}{2}\right]$

Question 31

86.7 or 86.74 to 86.75	1	

Question 32

5.293 cao	2	**B1** for 5.29 or 5.292 to 5.2927

Question 33

7.7	2	**M1** for $44 \times \frac{17.5}{100}$ oe

Question 34

435, 445 cao	**2**	**B1** for one value in the correct place or **SC1** for both values correct but reversed

Question 35

134	**3**	**M2** for $\frac{20.1\times100}{3\times5}$ oe or **M1** for $\frac{x\times3\times5}{100}=20.1$ or 3% = 4.02 oe If 0 scored **SC1** for answer of figs 134

Question 36

(a) $\frac{n}{n+2}$ oe final answer	**1**	
(b) n^2-1 oe final answer	**2**	**B1** for any quadratic in final answer

Question 37

(a) $\frac{9}{12}-\frac{1}{12}$ oe	**M1**	Must be shown
$[=]\frac{8}{12}$ oe $[=]\frac{2}{3}$	**M1**	Both fractions must be shown
(b) $\frac{5}{2}\times\frac{4}{25}$ oe	**M1**	Must be shown
Cancelling shown or $\frac{20}{50}$ oe $[=]\frac{2}{5}$	**M1**	**Dependent** and cancelling shown or a fraction and then $\frac{2}{5}$ must be shown

Question 38

(a) 40	**2**	**M1** for $\frac{144\times1000}{60\times60}$ oe
(b) 3.5	**2FT**	FT 140 ÷ *their* **(a)** **M1** for dist ÷ *their* **(a)** or dist ÷ 40 or dist × $\frac{60\times60}{144\times1000}$ or **B1** for 140 seen

Question 39

-16	**1**	

Question 40

1030	**2**	**M1** for $1350 \div 1.313$

Question 41

0.059161...	**1**	
$5.9161... \times 10^{-2}$	**1FT**	ft *their* part (a)

Question 42

$\frac{5}{4}$ oe	**B1**	Do not allow decimals for the **B1**, **M1**, or **A1**
$\frac{5\times9}{4\times9}$ and $\frac{7\times4}{9\times4}$ oe or better	**M1**	e.g. $\frac{45}{36}$ and $\frac{28}{36}$
	FT	
$\frac{17}{36}$ **oe working must be shown**	**A1**	Follow through *their* $\frac{5}{4}$ for the **M1** mark.
		Alt method 1: **B1** for $\frac{1}{4}+\frac{2}{9}$
		M1 for $\frac{1\times9}{4\times9}$ and $\frac{2\times4}{4\times9}$ oe e.g. $\frac{9}{36}$ and $\frac{8}{36}$
		Alt method 2: **B1** for $\frac{1}{4}-\frac{7}{9}+1$
		M1 for oe e.g. $\frac{9}{36}$ and $\frac{8}{36}$
		ISW converting fraction answer to a decimal.

Question 43

427.8	**3**	**M2** for $2\times(127.35+86.55)$ or
427.4		$2\times(127.35+86.45)$
		or **B1** for two of these figures: 127.35, 86.55, 127.25, 86.45 seen
		If zero scored, **SC2** for upper bound 427.8 or lower bound 427.4 provided nfww

Question 44

	1.49 or 1.491…	**1**	

Question 45

(a)	570 000	**1**	
(b)	5.69×10^5	**1**	

Question 46

101.4, 102.6	**2**	**M1** for 8.45 and 8.55 seen If 0 scored, **SC1** for one correct value in correct position on answer line or for two correct reversed answers

Question 47

$2\frac{1}{2}\%$, 0.2, $\frac{43}{201}$, $\sqrt{0.1}$	**2**	**B1** for 0.3… , 0.21… and 0.025 seen or for three in correct order

Question 48

$\left[\frac{1}{2}\times1\frac{1}{2}=\right]\frac{3}{4}$ oe	**B1**	
$\frac{5\times2}{6\times2}$ and $\frac{3\times3}{4\times3}$ oe or better	**M1FT**	
$\frac{1}{12}$ oe **working must be shown**	**A1**	

Question 49

3.17 or 3.174 to 3.175	**3**	**M2** for $\frac{63-61}{63}\times100$ oe or $100-\frac{61}{63}\times100$ oe or **M1** for $\frac{63-61}{63}$ oe or $\frac{61}{63}\times100$

Question 50

460	**3**	**M2** for $\frac{391\times100}{(100-15)}$ oe or **M1** for recognising 391 as (100 – 15)% soi

Question 51

(a)	–3	**1**	
(b)	$39 - 7n$ oe	**2**	**M1** for $-7n$ [+ k]
(c)	53	**2**	**M1** for *their* (b) = –332 shown provided *their*(b) is linear and their answer for (c) is a positive integer

Question 52

1.37	**2**	**B1** for 0.866… or $\frac{\sqrt{3}}{2}$ or 0.5 or $\frac{1}{2}$ or **B1** for 1.366… as final answer

Question 53

0.5^3 0.5^2 0.5 $\sqrt[3]{0.5}$	**2**	**B1** for 0.25 , 0.125 and 0.793… seen or for three in correct order

Question 54

1.6[0]	**3**	**M1** for 800 × 1.5 and **M1** for *their* 1200 ÷ 750

Question 55

(a)	119	**3**	**M2** for 18 × 6 + 11 oe or **B1** for 18 or 11 or 108
(b)	[0] 1 [00] pm cao	**1**	

Question 56

(a)	2×10^{10}	**2**	**B1** for 20×10^9 or 20 000 000 000
(b)	1.25×10^{-1}	**2**	**B1** for 0.125 oe

Question 57

2870	**2**	**M1** for 350 × 8.2

Question 58

0.34 0.7^3 0.6^2 $\sqrt{0.6}$	**2**	**M1** for decimal conversion: 0.7 [7…] or 0.8 for $\sqrt{0.6}$ and 0.36 for 0.6^2 and 0.343 for 0.7^3 or **B1** for three in the correct order

Question 59

2.4×10^8	**2**	**B1** for 240 000 000 oe or **B1** for $k\times10^8$ or 2.4×10^k

Question 60

48	**2**	**M1** for $52 \div 65$ [$\times 60$] oe implied by 0.8

Question 61

13891.5[0]	**3**	**M2** for $12000\times\left(1+\frac{5}{100}\right)^3$ oe or **M1** for $12000\times\left(1+\frac{5}{100}\right)^n$ oe $n\geqslant 2$

Question 62

$6 + 5 \times (10 - 8) = 16$	**1**	One pair of brackets only

Question 63

20	**1**	

Question 64

95.5 96.5 in correct places cao	**2**	**B1** for 95.5 or 96.5 in correct place or for answers reversed

Question 65

(a)	700	**2**	**M1** for 2800×0.325
(b)	0.28	**1**	

Question 66

$\frac{7}{6}$ oe	**B1**	
their $\frac{7}{6}\times\frac{8}{7}$ oe	**M1**	Or **M1** for $\frac{56}{\cancel{48}} \div \frac{42}{\cancel{48}}$ or equivalent division with fractions with common denominator
$\frac{4}{3}$ or $1\frac{1}{3}$ cao	**A1**	
must see working		

Question 67

(a)	$2 \times 3 \times 3 \times 5$	**2**	**B1** for 2, 3, [3] and 5 identified as only prime factors or **M1** for partial prime factorisation $6 \times 3 \times 5$ or $2 \times 9 \times 5$ or $3 \times 3 \times 10$ or $2 \times 3 \times 15$
(b)	630	**2**	**M1** for $2 \times 3^2 \times 5 \times 7$ oe or for listing multiples of 90 and 105 at least up to 630

Question 68

[0.]08	**4**	**M3** for $200 \times \left(1+\frac{2}{100}\right)^2 - 200 - \frac{200 \times 2 \times 2}{100}$ oe or **M1** for $200 \times \left(1+\frac{2}{100}\right)^2$ **and M1** for $\frac{200 \times 2 \times 2}{100}$ [+200]

Question 69

96	**2**	**B1** for $96k$ or $2^5 \times 3$ or for listing multiples of each up to 96

Question 70

$18 - 5n$ oe	**2**	**M1** for $5n$ or $-5n$

Question 71

400 350 250	**3**	**M1** for $\frac{1000}{8+7+5}$ implied by 50 **A1** for one clearly assigned correct answer or **SC2** for 3 correct answers in wrong order

Question 72

44 300 cao	**3**	**M1** for $50\,000 \times (0.97)^4$ oe and **B1** for 44260 or better or **SC1** for correct method for 3% increase with final answer of 56300

Question 73

$\frac{25}{9}$	**B1**	(Alt) $\frac{25}{9}$
$\frac{a}{b} \times \frac{6}{5}$ where $a > b$	**M1**	$\frac{their 25 \times 2}{9 \times 2} \div \frac{5 \times 3}{6 \times 3}$ oe
Their $\frac{150}{45}$ or *their* correct full cancelling	**M1FT dep**	$\frac{their 25 \times 2}{5 \times 3}$ oe or $\frac{50}{18} \div \frac{15}{18}$ oe with 18's cancelled
$\frac{10}{3}$ or $3\frac{1}{3}$ nfww	**A1**	

Question 74

95	**4**	**B1** for 2.3 or $2\frac{18}{60}$ **M1** for $75 \div 30$ (= 2.5) **M1** for $\frac{381 + 75}{their\ 2.3 + their\ 2.5}$

Question 75

168	**2**	**M1** for $240 \div (7 + 3)$ or better

Question 76

18.45 18.75	**1** **1**	If 0 scored, **SC1** for 6.15 **and** 6.25 seen or for correct answers reversed

Question 77

1.60 cao	**3**	**B2** for 1.597…. or 1.6 or **M1** for $2 \div 1.252$

Question 78

$\frac{15}{8}$	**B1**	or $\frac{135}{72}$
their $\frac{15}{8}\times\frac{9}{5}$ oe	**M1**	or $\frac{135}{72}\div\frac{40}{72}$ or equivalent division with fractions with common denominators
$\frac{27}{8}$ or $3\frac{3}{8}$ cao	**A1**	

Question 79

20.6 or 20.58 to 20.59	**3**	**M2** for $\frac{85-67.5}{85}\times100$ or $\left(1-\frac{67.5}{85}\right)\times100$ or **M1** for $\frac{85-67.5}{85}$ or $\frac{67.5}{85}\times100$ If zero scored **SC1** for $\frac{67.5-85}{85}\times100$

Question 80

(a)	5	**3**	**M2** for $\frac{u\times10}{2}+2u\times10=125$ oe or **M1** for evidence that area represents distance e.g. $\frac{u\times10}{2}$, $2u\times10$ or $3u\times10$
(b)	2	**1FT**	**FT** $10\div$ *their* u correctly evaluated

Question 81

5.34×10^7	**1**

Question 82

9 [h] 30 [min] cao	**1**

Question 83

(a)	7	**1**
(b)	Any number except 3, 7 or 20	**1**

Question 84

$2n^2 + 3$ oe final answer	**2**	**M1** for a quadratic expression as final answer or $2n^2 + 3$ oe in working

Question 85

$\frac{23}{90}$ oe, must be fraction	**2**	**M1** for $25.\dot{5} - 2.\dot{5}$ oe e.g. $2.55^r - 0.25^r$ or **B1** for $\frac{k}{90}$

Question 86

7	**2**	**B1** for 120.5 or 113.5 seen

Question 87

$\frac{8}{3}$	**B1**	or $\frac{40}{15}$ accept $\frac{3}{8}$ or $\frac{15}{40}$
$\frac{4}{5} \times \textit{their}\frac{3}{8}$ oe	**M1**	or $\frac{12}{15} \div \textit{their}\frac{40}{15}$ or equivalent division with fractions with common denominators
$\frac{3}{10}$ cao	**A1**	

Question 88

(a) (i)	0.5 or – 0.5 or $\frac{1}{2}$ or $-\frac{1}{2}$	**1**
(ii)	4	**1**
(b)	1.37 or 1.37[4…]	**1**

Question 89

(a)	0.4 or $\frac{2}{5}$	**1**	
(b)	1430	**3**	**M2** for correct, complete, area statement e.g. $120 \times 10 + \frac{1}{2} \times 20 \times 8 + \frac{1}{2} \times 30 \times 10$ oe or **M1** for one area calculation e.g. 10×120 or $\frac{1}{2} \times 20 \times 8$ or $\frac{1}{2} \times 30 \times 10$
(c)	11.9 or 11.91 to 11.92	**1FT**	*their* **(b)** ÷ 120

Question 90

9.5	**1**	

Question 91

7.37 or 7.371...	**1**	

Question 92

2.7×10^5	**1**	

Question 93

44	**2**	**B1** for 75.5 or 119.5 seen

Question 94

$\frac{9}{5}$	**B1**	or $\frac{63}{35}$
their $\frac{9}{5} \times \frac{7}{3}$ or $\frac{9 \times 7}{5 \times 3}$	**M1**	or *their* $\frac{63}{35} \div \frac{15}{35}$ or equivalent division with fractions with common denominators
$\frac{21}{5}$ or $4\frac{1}{5}$ cao	**A1**	

Question 95

2520	**3**	**M2** for $12 \times (1 + 6) \div 2$ oe or **M1** for 1 area correct If zero scored **B1** for top speed = 720 m per min or total time = 360 sec

Question 96

(a)	$4n$ oe final answer	**1**	
(b)	$3n^2 + 8$ oe final answer	**2**	**M1** for a quadratic expression as final answer or $3n^2 + 8$ oe in working

Question 97

72	**3**	**M2** for $\frac{1280}{64} \times \frac{60 \times 60}{1000}$ **M1** for working out distance ÷ speed e.g. figs 1280 ÷ 64 or figs $\frac{1280}{\textit{their speed}}$ or for working out km/h to m/s conversion e.g. $64 \times \frac{1000}{60 \times 60}$ oe or *their* $\left(\frac{1280}{64}\right) \times \frac{60 \times 60}{1000}$ oe

Question 98

1597 cao	**4**	**B3** for 1597.39.. or 1597.3[9...] or 1597.4 or 6597 or **B2** for 6597.3[9...] or 6597.4 or **B1** for $5000\left(1 + \frac{2}{100}\right)^{14}$ If **B1** scored or **B0** scored and an attempt at compound interest is shown **SC1** for *their* 6597[...] – 5000 evaluated correctly provided answer positive and **SC1** for *their* final answer rounded correctly to nearest $ from their more accurate answer

Question 99

(a)	$2 \times 3 \times 5$	**2**	**B1** for 2, 3, 5 as prime factors
(b)	90	**2**	**B1** for $90k$ or for listing multiples of each up to 90 or $2 \times 3^2 \times 5$

Question 100

170 cao	**1**	

Question 101

[0].101 or [0].1005 to [0].1006	**1**	

Question 102

[0].00017	**1**	

Question 103

(a)	12, 15	**1**	
(b)	11, 13	**1**	

Question 104

(a)	625	**1**	
(b)	9	**1**	

Question 105

Any two of $\frac{8}{12}, \frac{2}{12}$ or $\frac{3}{12}$ oe	**M1**	**M1** for any 2 correct over a common denominator e.g. $\frac{4}{6}$ and $\frac{1}{6}$
$\frac{8}{12}+\frac{2}{12}-\frac{3}{12}$ oe	**M1**	or **SC2** for final answer $\frac{13}{12}$ or $1\frac{1}{12}$ with full working
$\frac{7}{12}$	**A1**	

Question 106

18 cao nfww	**3**	**M2** for $\frac{877.5}{7.5\times 6.5}$ or **B1** for any two of 877.5, 7.5 and 6.5 seen

Question 107

(a)	12.5 oe	**2**	**M1** for $45 \times 1000 \div 60 \div 60$ oe
(b)	1.25 oe	**1FT**	**FT** *their* **(a)** ÷ 10
(c)	312.5 oe	**3FT**	**FT** for $25 \times$ *their* **(a)** **M2** for $20 \times$ *their* $12.5 + 0.5 \times 10 \times$ *their* 12.5 oe or **M1** for one correct relevant area calculation or **SC2** for final answer 1125

Question 108

17	**1**	

Question 109

694 or 694.4[4...]	**2**	**M1** for $950 \div 1.368$

Question 110

3826 or 3826.38	**2**	**M1** for $8000 \times \left(1-\frac{10}{100}\right)^7$ oe

Question 111

54	**3**	**M2** for $14.4 \times \frac{15}{4}$ oe or **M1** for $14.4 \div 4$ or $\frac{4}{15}$ associated with 14.4 If zero scored **SC1** for final answer 19.6[4]

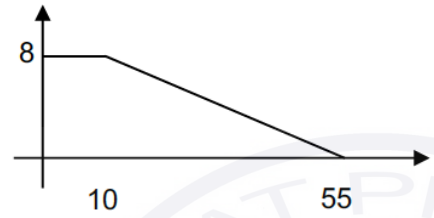
Question 112

$2\frac{3}{12}$ or $1\frac{15}{12}$ or $\frac{27}{12}$ or $\frac{9\times3}{4\times3}$	**M1**	Accept any correct conversion with common denominator $12k$
their $(\frac{27}{12} - \frac{11}{12} = \frac{16}{12})$ oe	**M1**	Correct resolving of *their* subtraction with denominator $12k$ showing full working
$1\frac{1}{3}$ or $\frac{4}{3}$ cao	**A1**	Working and then simplified answer must both be seen

Question 113

16.2 16.6 nfww	**3**	**M1** for two of 2.35, 5.75, 2.45, 5.85 seen or $2 \times (5.8 - 0.05 + 2.4 \quad 0.05)$ or $2 \times (5.8 + 0.05 + 2.4 + 0.05)$ **A1** 16.2 or 16.6 in either answer space If zero scored **SC2** for both correct reversed answers provided 16.6 nfww

Question 114

(a)		**B1** **B1**	line from (0, 8) to (10, 8) line from *their* (10, 8) to (55, 0)
(b)	260	**3FT**	**M2FT** for $8 \times 10 + 0.5 \times 8 \times 45$ oe or for a fully correct area calculation for *their* graph or **M1FT** for 8×10 or $0.5 \times 8 \times 45$ or for one correct area calculation for *their* graph

Question 115

[+]17	**1**	

Question 116

628	**2**	**M1** for $\frac{785}{1+4}[\times 4]$

Question 117

$\frac{\sqrt{4} \times 30}{9-3}$ 10 nfww	**M1** **A1**	Allow one error and 2 for $\sqrt{4}$ and 6 for $9 - 3$

Question 118

18	**2**	**M1** for $36 = 2 \times 2 \times 3 \times 3$ soi or $90 = 2 \times 3 \times 3 \times 5$ soi or listing the correct factors of 36 and 90 showing a minimum of 2, 3, 6, 9 and 18

Question 119

$\frac{14}{90}$ oe must be fraction	**2**	**M1** for $15.\dot{5}-1.\dot{5}$ oe or **B1** for $\frac{k}{90}$

Question 120

19 nfww	**4**	**B3** 19.3 or 19.28 to 19.29 or **M2** for $\frac{300\times60^2}{56\times1000}$ oe or **M1** for distance divided by speed e.g. *their* 300 ÷ *their* 56 or $\frac{56\times1000}{60^2}$ If **B0** then **B1** for seeing their answer in decimal form correctly written to the nearest integer

Question 121

198	**4**	**B3** for 197.7…. or answer 198.00 or **M2** for $1800\times\left(1+\frac{1.5}{100}\right)^7-1800$ or **B2** for answer 1998 or **M1** for $1800\times\left(1+\frac{1.5}{100}\right)^7$ If **B0** then **B1** for seeing their answer in decimal form correctly written to the nearest integer

Question 122

$\frac{4}{9}$ oe, must be fraction	**2**	**M1** for $10\times0.\dot{4}-0.\dot{4}$ oe

Question 123

$\frac{35(or\ 95)}{60}+\frac{39}{60}$	**M1**	accept $\frac{35k(or\ 95k)}{60k}+\frac{39k}{60k}$
$2\frac{7}{30}$	**A2**	or **A1** for $\frac{67}{30}$ or $\frac{134k}{60k}$ or $1\frac{74k}{60k}$ or $2\frac{14k}{60k}$

Question 124

87 cao nfww	**3**	**B2** for 87.04…. or 87.0 nfww or **M1** for 500.5 or 5.75 seen or for (500 + 0.5) ÷ (5.8 – 0.05) and **B1** for **truncating** their decimal answer to an integer

Question 125

(a)	$2^5 \times 3^2 \times 7$ oe final answer	**3**	**B2** for product of two of 2^5 , 3^2 , 7 or **B1** for 2, 3 and 7 seen or **M1** for 2×1008 or 3×672 or 7×288 soi
(b)	2.016×10^3	**1**	

Question 126

(a)	$9a + 3b$	**1**	
(b)	$36a + 6b = 96$ or $9a + 3b = 21$	**B1**	
	for correct method to eliminate one variable	**M1**	
	$a = 3$ $b = -2$	**A1** **A1**	If **M0 A0 A0** scored **SC1** for 2 values satisfying $36a+6b=96$ or $9a+3b=21$ or if no working shown, but 2 correct answers given

Question 127

17	**1**	

Question 128

71000 cao	**1**	

Question 129

$\frac{1}{12} \times \frac{6}{5}$ oe	**M1**	Must be shown
$\frac{1}{10}$ final answer cao	**A1**	

Question 130

$\frac{29}{90}$ oe, must be a fraction	**2**	**M1** for $32.\dot{2}-3.\dot{2}$ or **B1** for $\frac{k}{90}$

Question 131

14	**2**	**M1** for $56 = 2\times2\times2\times7$ soi or $70 = 2\times5\times7$ soi or 2×7 as final answer

Question 132

(a)	10.4675 cao nfww	**2**	**B1** for 3.95 **or** 2.65 seen or **M1** for $(4.0 - 0.05) \times (2.7 - 0.05)$
(b)	34 nfww	**2**	**B1** for 7.65 **or** 0.225 seen or **M1** for $(7.6 + 0.05) \div (0.23 - 0.005)$

Question 133

(a)	57 122	**2**	**M1** for $20\,000 \times (1+\frac{30}{100})^4$ oe
(b)	15	**2**	**M1** for two substitutions greater than 4 e.g. $20\,000 \times (1+\frac{30}{100})^k$ where $k > 4$

Question 134

5.74×10^{-5}	**1**

Question 135

5.89 or 5.885 to 5.886	**1**

Question 136

3.590 cao	**1**

Question 137

(a)	9 and 16	**1**
(b)	11	**1**

Question 138

$\frac{11}{30}$ cao	**3**	**B2** for $\frac{33}{90}$ oe as final answer or **M1** for $36.\dot{6}-3.\dot{6}$ or $36.6^{r} - 3.6^{r}$ oe or **B1** for $\frac{k}{90}$

Question 139

10 cao nfww	**3**	**M2** for $42.5 \times 2 \div 8.5$ allowing one error in the UB or LB provided it is still UB × 2 ÷ LB or **M1** for one of 42.5 or 8.5 seen as bounds

Question 140

$\frac{21}{8} \times \frac{3}{7}$ oe	**M1**	Must be shown
$1\frac{1}{8}$ cao final answer	**A2**	**A1** for $\frac{9}{8}$ oe e.g. $\frac{63}{56}$

Question 141

(a)	$3n + 13$ oe final answer	**2**	**M1** for $3n + c$ or $kn + 13$
(b)	3^{n-1} oe final answer	**2**	**M1** for recognition of terms being powers of 3

Question 142

(a)	7.74 or 7.738 to 7.739 [billion]	**2**	**M1** for $7.23 \times \left(1+\frac{1.14}{100}\right)^6$
(b)	2042	**2**	**B1** for 28 or 28.6…or 29 or answer 2043

Question 143

8(h) 52 (min)	**1**	

Question 144

3.75 or 3¾	**1**	

Question 145

[0].00127	**1**	

Question 146

157 900 cao	**2**	**B1** for 158000 or 157860 or 157862 to 157863 If zero scored, **SC1** for *their* answer to more than 4 figs correctly rounded to 4 sf

Question 147

393	**2**	**B1** for 393.1 to 393.2 or **M1** for $2000 \div 5.087$

Question 148

144	**2**	**M1** for finding a correct product of prime factors or correctly listing a minimum of 3 multiples of 36 **and** 48 or for answer $2^4 \times 3^2$ oe or $144k$

Question 149

28.35 cao	**2**	**B1** for 9.45 seen or **M1** for $(9.4 + 0.05) \times 3$

Question 150

(a)	-3	**1**	
(b)	$9 - 2n$ oe	**2**	**B1** for $-2n + k$ or $dn + 9$ where $d \neq 0$

Question 151

$\frac{6}{7} \times \frac{3}{5}$ or $\frac{18}{21} \div \frac{35}{21}$ oe	**M2**	**B1** for $\frac{5}{3}$ oe or **M1** for $\frac{6}{7} \times$ *their* $\frac{3}{5}$
$\frac{18}{35}$ cao	**A1**	

Question 152

1.38 or 1.381 to 1.382	**3**	**M2** for $(36 + 4.3) \div (105 \times \frac{1000}{60 \times 60})$ oe or **M1** for $105 \times \frac{1000}{60 \times 60}$ or for a distance ÷ a speed or **SC2** for answer 1.23(4...)

Question 153

(a)	2.47×10^6	**1**
(b)	7.9×10^{-3}	**1**

Question 154

$\frac{18}{30}$ and $\frac{5}{30}$ oe must be shown	**M1**	$\frac{18k}{30k}$ and $\frac{5k}{30k}$
$\frac{23}{30}$ cao	**A1**	

Question 155

0.4^2 0.6^3 0.22 $\sqrt{0.09}$	**2**	**M1** for decimal conversion 0.216 and 0.3 and 0.16

Question 156

4.25 4.15	**2**	**B1** for each or both answers reversed

Question 157

(a)	*A*	**1**
(b)	A ruled line joining (65, 23) to (80, 28)	**1**

Question 158

(a)	2.9[0] or 2.900 to 2.901	**1**
(b)	3.17 or 3.172 to 3.173	**1**

Question 159

18 360	**2**	**M1** for $34\,000 \times \left(1-\frac{40}{100}\right)\times\left(1-\frac{10}{100}\right)$ oe

Question 160

$\frac{2}{9}$ oe, must be a fraction	**2**	**M1** for $2.\dot{2} - 0.\dot{2}$ oe or **B1** for $\frac{k}{9}$

Question 161

(a)	15000 cao	**1**	
(b)	1.5×10^4	**1FT**	**FT** *their* **(a)**

Question 162

72.25 cao	**2**	**M1** for 8 + 0.5 or better seen

Question 163

(a)	38	**2**	**M1** for 57 ÷ (2 + 1) or better
(b)	12 : 7	**2**	**M1FT** for *their* 38 – 2 **and** *their* 19 + 2 seen dep on sum = 57 If M0 **SC1** for answer 7 : 12

Question 164

Common denominator 24	**B1**	accept $k \times 24$
Two correct from $\frac{18}{24}$, $\frac{16}{24}$ and $\frac{3}{24}$ oe	**M1**	accept $\frac{18k}{24k}$, $\frac{16k}{24k}$ and $\frac{3k}{24k}$
$1\frac{7}{24}$ cao	**A2**	**A1** for $\frac{31}{24}$ or $\frac{31k}{24k}$ or $1\frac{7k}{24k}$

Question 165

–7	**1**	

Question 166

(a)	[0].0402	**1**
(b)	[0].040	**1**

Question 167

[0].67	**2**	**M1** for 14×0.905 [–12] or 12.67 If zero scored, **SC1** for answer [0].74[0]

Question 168

$\frac{8}{12}$ and $\frac{3}{12}$ oe	**M1**	Correct fractions with common denominator
$\frac{5}{12}$ cao	**A1**	

Question 169

(a)	$\frac{1}{125}$	**1**
(b)	4.56×10^{-3}	**1**

Question 170

(a)	$\frac{1}{8}$ cao	**1**	
(b)	$\frac{2}{11}$	**2**	**M1** for $18.\dot{1}\dot{8}-0.\dot{1}\dot{8}$ oe or **B1** for $\frac{2k}{11k}$ (k not 0 or 1)

Question 171

(a)	$6n+1$ oe final answer	**2**	**B1** for $6n+c$ or for $kn+1$ ($k \neq 0$)
(b)	$(n+2)^2$ final answer	**2**	**M1** for any quadratic expression or reaching second difference of 2

Question 172

(a)	$\frac{3mx}{50}$ or $0.06mx$	**2**	**M1** for $m \times x \times 60 \div 1000$ oe
(b)	35	**2**	**M1** for $5 \times x \times 60 \div 1000 = 10.5$ oe or for substituting $m = 5$ in *their* **(a)** and equating to 10.5 oe

Question 173

$\frac{10\times 20}{90-40}$	**M1**
4 nfww	**A1**

Question 174

4 nfww	**2**	**M1** for $[7.31 =]\ 7\left(1+\frac{1.1}{100}\right)^k$ oe

Question 175

$10^k \times 0.1\dot{7} - [10] \times 0.1\dot{7}$ $k \geqslant 1$ oe	**M1**
$\frac{16}{90}$ or $\frac{8}{45}$ oe nfww	**A1**

Question 176

70.7625 cao and 72.4625 cao	**3**	**B2** for 70.7625 or 72.4625 or **M2** for 9.25×7.65 **and** 9.35×7.75 or **B1** for two of 9.25, 9.35, 7.65, 7.75 seen

Question 177

$\frac{10}{3}$ or $\frac{5}{2}$	**B1**	oe improper fractions
their $\frac{10}{3} \times$ *their* $\frac{2}{5}$	**M1**	accept $\frac{20}{6} \div \frac{15}{6}$
$1\frac{1}{3}$ cao	**A1**	

Question 178

1050	**3**	**M2** for $924 \div \frac{(100-12)}{100}$ oe or **M1** for 88[%] associated with 924 oe

Question 179

(a)	0.25 or $\frac{1}{4}$	**1**	
(b)	0.45	**3**	**B2** for 450 or **M2** for $\frac{1}{2} \times 60 \times 15 \div 1000$ or **M1** for $\frac{1}{2} \times 60 \times 15$ If 0 scored **SC1** for correct conversion of their distance in metres to kilometres

Question 180

0.407 or 0.4067...	**1**	

Question 181

120	**2**	**M1** for finding a correct product of prime factors or correctly listing a minimum of 3 multiples of 20 **and** 24 or for answer $2^3 \times 3 \times 5$ oe or $120k$ where k is an integer > 1

Question 182

$10^{k+2} \times [0].\dot{6}\dot{3} - 10^{k} \times [0].\dot{6}\dot{3}$ oe where $k > 1$	**M1**	
$\frac{63}{99}$ or equivalent fraction	**A1**	e.g. $\frac{6300}{9900}$ but not $\frac{7}{11}$
$\frac{7}{11}$	**B1**	

Question 183

3000	**3**	**M2** for $12.5 \times \frac{1}{2}(200 + 280)$ oe or **M1** for part area

Question 184

common denominator 12	**B1**	accept $k \times 12$ throughout
one correct from $\frac{9}{12}$ or $\frac{8}{12}$ oe	**M1**	accept $\frac{9k}{12k}$ or $\frac{8k}{12k}$
$\frac{5}{6}$ cao	**A2**	**A1** for $\frac{10}{12}$ or $\frac{10k}{12k}$

Question 185

1.96 cao	**5**	**M4** for $\left(\left(\left(\sqrt[3]{\frac{\frac{2500\times1.6\times3}{100}+2000}{2000}}\right)-1\right)-1\right)$ [× 100] oe or 1.96…or [0].0196... or 101.96… or 1.0196… or **M3** for $\sqrt[3]{\frac{\frac{2500\times1.6\times3}{100}+2000}{2000}}$ or **B2** for [SI =] 120 or [CI total=] 2120 or **M1** for $\frac{2500\times3\times1.6}{100}$ and **M1** for $2000\times(k)^3$

Question 186

[0].072	**1**	

Question 187

[0].62	**1**	

Question 188

[0].394 or [0].3944 to [0].3945	**1**	

Question 189

41.9 or 41.87	**1**	

Question 190

$\frac{5}{6}-\frac{3}{6}$ oe	**M1**	oe for $\frac{5k}{6k}-\frac{3k}{6k}$
$\frac{1}{3}$ cao final answer	**A1**	

Question 191

(a)	6.05×10^{-2}	**1**	
(b)	5.1×10^{3}	**1**	

Question 192

(a)	25	**1**	
(b)	9	**1**	

Question 193

2859.75 2968.75 cao final answer	**3**	**B2** for one correct seen or **B1** for 62.5 or 61.5 or 46.5 or 47.5 seen or **M1** for $(62 + 0.5) \times (47 + 0.5)$ or $(62 - 0.5) \times (47 - 0.5)$

Question 194

2	**1**

Question 195

(a)	23.46 cao	**1**
(b)	20 cao	**1**

Question 196

(a)	Chicago	**1**	
(b)	−3	**1**	

Question 197

$\frac{14(\text{or}\,35)}{21} + \frac{15}{21}$	**M1**	accept $\frac{14k(\text{or}\,35k)}{21k} + \frac{15k}{21k}$
$2\frac{8}{21}$ cao	**A2**	or **A1** for $\frac{50}{21}$ or $1\frac{8}{21}$ or $\frac{29}{21}$ or $1\frac{29}{21}$

Question 198

(a)	0.8 or $\frac{4}{5}$	**1**	
(b)	1180	**3**	**M2** for $(0.5 \times 16 \times 20) + (0.5 \times 4 \times 30) + (80 \times 12)$ oe or **M1** for part area

Question 199

− 3	**1**

Question 200

[0].00517	**1**

Question 201

(a)	2, 3, 4, 6	**1**	
(b)	27, 36 cao	**1**	

Question 202

2.5	**2**	**B1** for 2200 or 0.055 seen or **SC1** for answer figs 25

Question 203

16.5	**2**	**M1** for $\frac{55}{60}$ or speed × time (numerical)

Question 204

1.32×10^{41}	**2**	**M1** for 0.12×10^{41} or 12×10^{40} or **SC1** for figs 132

Question 205

20.75 final answer cao	**2**	**B1** for one of 5.15, 6.25 or 9.35 seen or **M1** for $(5.2 - 0.05) + (6.3 - 0.05) + (9.4 - 0.05)$

Question 206

$48.\dot{4}\dot{8} - 0.\dot{4}\dot{8}$ oe	**M1**	**SC1** for $\frac{48}{99}$ or $\frac{16}{33}$ or equivalent fraction with no/insufficient working
$\frac{48}{99}$ or $\frac{16}{33}$ or equivalent fraction	**A1**	

Question 207

(a)	$3\frac{2}{3}$ cao	**1**	
(b)	$\frac{3}{12}$[and $\frac{5}{12}$] oe	**M1**	For correct method to find common denominator e.g. $\frac{12}{48}$ and $\frac{20}{48}$
	$\frac{2}{3}$ cao	**A1**	

Question 208

5(a)	–1	**1**	
5(b)	$-6n + 29$ oe	**2**	**M1** for $-6n + k$ (any k) or $-kn + 29$ $(k \neq 0)$

Question 209

132	**3**	**M2** for $\frac{1}{2}(7 + 15) \times 12$ or **M1** for any correct area

Question 210

2	**1**	

Question 211

(a)	1.49220….	**1**	
(b)	1.5	**1FT**	**FT** *their* answer to **(a)** rounded correctly to 2 significant figures

Question 212

Diagonal line from (0, 0) to (30, 12)	**1**	
and Horizontal line from (30, 12) to (70, 12)	**1FT**	**FT** for horizontal line from (30, k) to (70, k) where k is *their* 12

Question 213

19.65 cao	**2**	**B1** for 6.55 seen (must be evaluated, not 6.5 + 0.05) or **M1** for 3 × (6.5 + 0.05)

Question 214

7615.15	**2**	**M1** for $12\,400 \times \left(1-\frac{15}{100}\right)^3$ oe

Question 215

$\frac{5}{3}$	$\frac{2}{3}+\frac{4}{15}$	**B1**	Allow $\frac{5k}{3k}$
$\frac{25}{15}$ [and $\frac{11}{15}$]	$\frac{10}{15}$ [and $\frac{4}{15}$]	**M1**	Correct method to find common denominator e.g. $\frac{75}{45}$ and $\frac{33}{45}$ Follow through *their* $\frac{5}{3}$ for the **M1** mark
$\frac{14}{15}$ cao	$\frac{14}{15}$ cao	**A1**	

Question 216

(a)	343	**1**	
(b)	–11	**1**	
(c)	343	**1**	

Question 217

Positive	**1**	

Question 218

5.23×10^{-5}	**1**	

Question 219

2.29 or 2.292…	**1**	

Question 220

$\frac{8}{9}$ oe, must be fraction	**1**	

Question 221

21400 or 21430 or 21434.[…]	**2**	**M1** for $23000 \times \left(1-\frac{1.4}{100}\right)^5$ oe

Question 222

92	**3**	**M2** for $[600-](0.18\times 600+\frac{2}{3}\times 600)$ or **M1** for 108 or 400 seen

Question 223

common denominator 24	**B1**	accept $24k$
$\frac{21}{24}$ and $\frac{4}{24}$ oe	**M1**	
$1\frac{1}{24}$	**A1**	

Question 224

– 5	**1**	

Question 225

6.15 or 6.153 to 6.154 or $6\frac{2}{13}$	**1**	

Question 226

3, 4, 6, 9, 12, 18	**2**	**B1** for list with one or two errors or omissions or for a complete list of products

Question 227

25.3[0]	**2**	**M1** for $22 \times \frac{15}{100}$ oe or better

Question 228

(a)	[0].004 82 cao	**1**	
(b)	5.2×10^7	**1**	

Question 229

$\frac{6}{5}$	**B1**	accept equivalent fractions e.g. $\frac{18}{15}$
$\frac{2}{3} \times$ *their* $\frac{5}{6}$	**M1**	or $\frac{10}{15} \div \frac{18}{15}$ oe
$\frac{5}{9}$ cao	**A1**	

Question 230

5(a)	50 cao nfww	**2**	**B1** 12.5 seen or **M1** for 12 + 0.5 or better
5(b)	12.3	**1**	

Question 231

2 [h] 55 [min]	**1**	

Question 232

[a =] 15 [b =] –27	**2**	**B1** for each or **SC1** for reversed answers

Question 233

24	**2**	**B1** for 17 or 41 identified

Question 234

$\frac{8}{12}$ and $\frac{1}{12}$ oe	**M1**	For correct fractions with a common denominator $12k$
$\frac{7}{12}$ cao	**A1**	

Question 235

5(a)	1.36×10^6 oe	**1**	
(b)	5.21×10^{-3} oe	**1**	

Question 236

7 cao nfww	2	**B1** for 31 + 0.5 or 5 – 0.5 or 31.5 or 4.5 seen

Question 237

30	3	**M2** for ½ (8 + 2) × *v* [= 150] oe or **M1** for ½ × 6 × *v* or 2 × *v* oe

Question 238

23 or 29	**1**

Question 239

3.87×10^{-5}	**1**

Question 240

$\frac{7}{11}$ oe	**1**

Question 241

)(a)	6.58331…	1	
)(b)	6.5833	1	**FT** *their* **(a)** correctly rounded to 4 dp

Question 242

$\frac{4}{7}$ oe exact answer	2	**B1** for 4 or $\frac{1}{7}$

Question 243

$\frac{3}{10}$

Question 244

'(a)	2200	3	**M2** for $\frac{1}{2}(90+130)\times20$ or $\frac{1}{2}(10\times20)+(90\times20)+\frac{1}{2}(30\times20)$ or **M1** for one area
'(b)	16.9 or 16.92…	1	**FT** *their* **(a)** ÷ 130

Question 245

126	**1**

Question 246

2	**1**

Question 247

6.59 or 6.594 to 6.595	**1**	

Question 248

$\frac{9}{25}$ oe	**1**	

Question 249

(a)	5000207	**1**	
(b)	8.13×10^{-3}	**1**	

Question 250

(a)	0.076 cao	**1**	
(b)	10000 cao	**1**	

Question 251

$\frac{3}{8}$

Question 252

6.5[0] nfww final answer	**2**	**M1** for 42.5 – 0.25 implied by 42.25

Question 253

1.88… – 0.188.. oe	**M1**	e.g. 18.88… – 1.88… or 18.88… – 0.188…
$\frac{17}{90}$ or equivalent fraction	**B1**	

Question 254

600	**3**	**M2** for $\frac{108\times1000\times20}{60\times60}$ oe or **M1** for $\frac{108\times1000}{60\times60}$ oe or for figs108 × time oe

Question 255

(a)	1.2	**1**	
(b)	45	**3**	**M2** for $\frac{1}{2}\times10\times12+12(T-10)[=480]$ oe or **M1** for one relevant area OR **M1** for $480-\frac{1}{2}\times10\times12$ implied by 420 **M1** for $\frac{420}{12}[+10]$

Question 256

2.3×10^4	**1**	

Question 257

4	**1**	

Question 258

$\left[\frac{1}{15}+\right]\frac{2\times3}{5\times3}$	**M1**	or better e.g. $\left[\frac{1}{15}+\right]\frac{6}{15}$ Allow any correct common denominator $15k$
$\frac{7}{15}$ cao	**A1**	

Question 259

26 600 cao	**2**	**M1** for $30000\times\left(1-\frac{2}{100}\right)^6$ oe

Question 260

34.5 and 37.5 final answers	**2**	**B1** for 11.5 or 12.5 seen or **M1** for $(12-0.5)\times3$ or $(12+0.5)\times3$

Question 261

8[h] 55[min]	**1**	

Question 262

7.36×10^7	**2**	**B1** for figs 736

Question 263

121 nfww	**2**	**M1** for $(6000+50)\div50$ or **B1** for 6050 seen

Question 264

896	3	**M2** for $800 + \frac{800 \times 4 \times 3}{100}$ oe or **M1** for $\frac{800 \times 4 \times 3}{100}$ oe

Question 265

−14	1	

Question 266

330	1	

Question 267

$\frac{23}{99}$	1	

Question 268

(a)	0.047	1	
(b)	2.76×10^6	1	

Question 269

467.42 or 467	2	**M1** for $500 \div 1.0697$

Question 270

$22\frac{2}{9}$ or 22.2 or 22.22...	3	**M2** for $\frac{77-63}{63}[\times 100]$ oe or $\frac{77}{63} \times 100\,[-100]$ oe or **M1** for $\frac{77}{63}$ oe

Question 271

6290[.0…]	3	**M2** for $\frac{6999.31}{\left(1+\frac{2.16}{100}\right)^5}$ or **M1** for $[A]\left(1+\frac{2.16}{100}\right)^5$

Question 272

(a)	$1\frac{2}{3}$ or 1.67 or 1.666 to 1.667	**1**	
(b)	1062.5	**3**	**M2** for $\frac{25}{2}(50+35)$ oe or **M1** for one area

Question 273

$\frac{25}{8}$	**B1**	or $\frac{75}{24}$
their $\frac{25}{8}\times\frac{12}{5}$ or *their* $\frac{75}{24}\div\frac{10}{24}$ oe	**M1**	$\frac{75}{24}\times\frac{24}{10}$
their $\frac{300}{40}$ oe	**M1**	oe e.g. $\frac{1800}{240}, \frac{75}{10}, \frac{60}{8}, \frac{30}{4}, \frac{15}{2}$
$7\frac{1}{2}$ cao	**A1**	

Question 274

1.90 cao	**1**	

Question 275

$\frac{5}{24}$ or 0.208 or 0.2083…	**1**	

Question 276

(a)	6	**1**	
(b)	2.15 or 2.154…	**1**	

Question 277

(a)	31 or $\sqrt{121}$	**1**	
(b)	$\sqrt{13}$	**1**	

Question 278

$\frac{84}{315}$ or $\frac{4}{35}\times\frac{7}{3}$ or $\frac{12}{5}\times\frac{1}{9}$ or $\frac{4}{5}\times\frac{1}{3}$	**M1**	Accept any correct cancelling
$\frac{4}{15}$ cao	**A1**	

Question 279

53 or 59	**1**	

Question 280

0.839 or 0.8386 to 0.8387	**1**	

Question 281

$\frac{7}{9}$	**1**	

Question 282

56.4 or 56.44…	**2**	**M1** for $\frac{254}{\textit{their}\ 4.5}$ or $\frac{254}{\textit{their}\ 270}[\times 60]$

Question 283

(a)	0.048 cao	**1**	
(b)	5.27×10^{-3}	**1**	

Question 284

6	**2**	**M1** for $2 \times 3^2 \times 5$ or $2^4 \times 3$ or for 2×3 as final answer or **B1** for 2 or 3 as final answer

Question 285

$\frac{9}{4}\times\frac{7}{3}$ or $\frac{63}{28}\div\frac{12}{28}$ oe with common denominator	**M2**	**B1** for $\frac{9}{4}$ oe seen or **M1** for $\textit{their}\frac{9}{4}\times\frac{7}{3}$
$5\frac{1}{4}$ cao	**A1**	

Question 286

495	**3**	**M2** for $435.6 \div \frac{100-12}{100}$ oe or **B1** for recognising 435.6 as 88[%]

Question 287

7.5 oe	**1**	

Question 288

4.01 or 4.007 to 4.008	**1**	

Question 289

46.5	**1**	

Question 290

47.77…– 4.77… oe	**M1**	
$\frac{43}{90}$	**A1**	Allow equivalent fractions If **M0** then **SC1** for $\frac{43}{90}$ or equivalent fraction with no/insufficient working

Question 291

(a)	28	**1**	
(b)	27	**1**	
(c)	29 or 31	**1**	

Question 292

$\frac{5}{6} + \frac{4}{6}$ oe		**M1**	2 correct fractions with a suitable common denominator $6k$
$1\frac{1}{2}$ cao		**A2**	**A1** for $\frac{9}{6}$ oe

Question 293

(a)(i)	17	**1**	
(a)(ii)	$3n + 2$ oe final answer	**2**	**B1** for $3n + k$ or $cn + 2$, $c \neq 0$
2(b)	$\frac{31}{12}$ oe	**1**	

Question 294

(a)	2	**1**	
(b)	1300	**3**	**M2** for $\frac{20}{2} \times (60 + 70)$ oe or **M1** for any relevant area

Question 295

–10	**1**

Question 296

6	**1**

Question 297

(a)	27	**1**	
(b)	47	**1**	

Question 298

21	**2**	**M1** for [84 =] 2 × 2 × 3 × 7 or [105 =] 3 × 5 × 7 or 3 × 7 as final answer or **B1** for 3 or 7 as final answer

Question 299

(a)	7.2×10^4	**1**	
(b)	1.8×10^{-3}	**1**	

Question 300

(a)	$\frac{1}{2n}$ oe final answer	**1**	
(b)	5^{n-1} oe final answer	**2**	**M1** for recognition of terms being powers of 5

Question 301

$\frac{2}{12}$ oe or $\frac{1}{2}\times\frac{1}{3}$	$\frac{2}{3}\left(1+\frac{1}{4}\right)$	**M1**	**M1** for correct first step to deal with multiplication
$\frac{8}{12}[+]\frac{2}{12}$ oe	$\frac{2}{3}\times\frac{5}{4}$	**M1**	**M1** for correct working for common denominator with *their* $\frac{2}{12}$ oe or correct evaluation of bracket
$\frac{5}{6}$ cao		**A2**	**A1** for $\frac{10}{12}$ oe

Question 302

(a)	0.3 or $\frac{3}{10}$	**1**	
(b)	760	**3**	**M2** for correct complete area statement e.g. $70 \times 10 + \frac{1}{2} \times 20 \times 6$ oe or **M1** for one of these area calculations 70×10, $\frac{1}{2} \times 20 \times 6$, 50×10 or $\frac{1}{2} \times (16 + 10) \times 20$

Question 303

6.8	**1**	

Question 304

7.6[0] or 7.604 to 7.605	**1**	

Question 305

440 or 440.2 to 440.3	**2**	**M1** for $30000 \div 68.14$

Question 306

$67.\dot{7} - 6.\dot{7}$ oe	**M1**	
$\frac{61}{90}$	**A1**	If 0 scored, **SC1** for $\frac{k}{90}$

Question 307

$\frac{29}{8}$ or $\frac{5}{3}$	$2\frac{5}{8} - \frac{2}{3}$	**M1**	Allow $\frac{29k}{8k}$ or $\frac{5k}{3k}$ Correct step for dealing with mixed numbers
$\frac{87}{24}$ and $\frac{40}{24}$	[2]$\frac{15}{24}$ and $\frac{16}{24}$	**M1**	Correct method to find common denominator e.g. $3\frac{15}{24}$ and $1\frac{16}{24}$
$1\frac{23}{24}$ cao		**A1**	

Question 308

1.25	**1**	

Question 309

4.6 cao nfww	**2**	**B1** for 4.57 or 4.58 or 4.579 to 4.580 If 0 scored, **SC1** for their calculation rounded to 2 sf if more than 2sf seen

Question 310

(a)	Fifteen thousand [and] sixty	**1**	
(b)	$1.506[0] \times 10^4$	**1**	

Question 311

$\frac{5}{16} \times \frac{8}{7}$	**M1**	
$\frac{5}{14}$ cao	**A1**	

Question 312

1.5	**2**	**M1** for $\frac{600 \times r \times 10}{100} = 90$ oe or better

Question 313

229.5225 final answer cao	**2**	**M1** for $(15.1 + 0.05)^2$ or **B1** for 15.15 seen

Question 314

380	**5**	**B2** for time = 8, implied by 23 on t-axis or **M1** for $\frac{20}{t} = 2.5$ or $\frac{20}{t-15} = 2.5$ or $\frac{0-20}{t-15} = -2.5$ oe **M2** for $\frac{1}{2}$(*their* 23 + 15) × 20 or $20 \times 15 + \frac{1}{2} \times$ *their* 8×20 oe or **M1** for any relevant area found

Question 315

(a)	12	**1**	
(b)	8	**1**	
(c)	5	**1**	
(d)	$\sqrt{7}$	**1**	

Question 316

$\frac{15}{28}\times\frac{7}{4}$ or $\frac{15}{28}\div\frac{16}{28}$ oe	**M1**	
$\frac{15}{16}$ cao	**A2**	**A1** for $\frac{105}{112}$ oe

Question 317

229 500 cao	**3**	**B2** for 229 460… OR **M1** for $250\,000\times\left(1-\frac{1.7}{100}\right)^5$ oe **B1** for *their* more accurate answer correctly rounded to the nearest 100

Question 318

2.98×10^{-3}	**1**	

Question 319

$2.\dot{6}-0.2\dot{6}$ oe	**M1**	
$\frac{4}{15}$ oe fraction nfww	**A1**	If **M0** scored **SC1** for $\frac{k}{90}$

Question 320

22.5 nfww	**3**	**M2** for $\frac{146.2+0.05}{7-0.5}$ or **M1** for 146.2 + 0.05 or 7 – 0.5 or better seen

Question 321

(a)	32	**1**	
(b)	36	**1**	
(c)	37	**1**	

Question 322

(a)	1509	**1**	Accept 3 09 pm
(b)	472	**2**	**M1** for 80 × *their* time oe or **B1** for time = 5.9

Question 323

Correct common denominator	**M1**	
Correct method	**M1**	e.g. $1\frac{3-8}{12}$ or $\frac{12+3-8}{12}$ or $\frac{((3\times4)+1)\times3-\left((2\times3)+2\right)\times4}{12}$ or $\frac{39-32}{12}$
$\frac{7}{12}$ cao	**A1**	

Question 324

(a)	0.3 oe	**1**	
(b)	3060	**3**	**M2** for $\frac{1}{2}(300+210)\times12$ oe or **M1** for one correct part area

Question 325

1.22 or 1.219 to 1.22	**5**	**M1** for SI = $\frac{2000\times5\times1.25}{100}$ **M3** for $\sqrt[5]{\frac{2000+their125}{2000}}$ or **M2** for $2000k^5 = 2000 + their$ SI or **M1** for CI = $2000k^5$

Question 326

–5	**1**	

Question 327

(a)	Any square number greater than 10	**1**	
(b)	Any irrational number	**1**	

Question 328

0.0625	**1**	

Question 329

$\frac{7}{4}$	$\frac{9}{12}$	**B1**	
$\frac{21}{12}$	$1-\frac{2}{12}$	**M1**	
$\frac{5}{6}$	$\frac{5}{6}$	**A1**	

Question 330

8	**2**	**M1** for $\frac{5-4.60}{5}[\times 100]$ or $\frac{4.60}{5}\times 100$

Question 331

177.5	**1**

Question 332

2.7×10^{-8}	**1**

Question 333

108	**3**	**M1** for $(105 + 225) \div 11$ **M1** for *their* speed $\times \frac{60\times 60}{1000}$

Question 334

15	**1**

Question 335

(a)	52	**1**	
(b)	$7n + 5$ oe final answer	**2**	**B1** for $7n + a$ or $bn + 5$ $b \neq 0$

Question 336

$\frac{56}{24}-\frac{21}{24}$	**M2**	**M2** for correct method for common denominator or **B1** for $\frac{7}{3}$
their $\frac{35}{24}\times\frac{6}{25}$	**M1**	
$\frac{7}{20}$	**A1**	

Question 337

990	**3**	**M2** for correct complete area statement e.g. $\frac{1}{2} \times 30 \times (6 + 12) + 60 \times 12$ oe or **M1** for one area calculation

Question 338

34	**2**	**M1** for 12 + 0.5 or 4 + 0.5 or better seen

Question 339

$2^5 \times 3^4 \times 13^2$	**1**	

Question 340

492.2[0]	**3**	**B2** for 32.2[0] OR **M1** for $x \times \left(1 - \frac{7}{100}\right) = 427.8[0]$ oe or better **M1** for *their* $460 \times \left(1 + \frac{7}{100}\right)$ oe or *their* $460 \times \frac{7}{100}$ correctly evaluated

Question 341

21	**2**	**B1** for 3×7 soi or $2^4 \times 3^2 \times 7^6$ oe or answer of $21 \times k^2$

Question 342

$\frac{8}{7}$ and $\frac{21}{10}$ oe improper fractions	**M1**	
$\frac{168}{70}$ oe improper fractions	**A1**	
$2\frac{2}{5}$ cao final answer	**A1**	**Dep**. on first **A1** If M0 scored **SC1** for $\frac{8}{7}$ or $\frac{21}{10}$ oe improper fractions

Question 343

18.25, 18.35	**2**	**B1** for each or **SC1** for both values correct but reversed

Question 344

45.7	**1**	

Question 345

396	**1**	

Question 346

80	**1**	

Question 347

64	**1**	

Question 348

27.15 cao	**3**	**M2** for $(9.4 + 0.05) \times 2 + 8.2 + 0.05$ or better or **M1** for $8.2 + 0.05$ or $9.4 + 0.05$ or better seen OR **SC2** for answer 25.95 or **SC1** for answer 26.85

Question 349

25	**2**	**M1** for $x \times \left(1 + \frac{6}{100}\right) = 26.50$ oe or better

Question 350

2.03×10^{201}	**2**	**B1** for figs 203 or $[0].03 \times 10^{201}$ or 200×10^{199}

Question 351

15	**2**	**M1** for 4 [parts] = 20 soi or a correct equation e.g. $\frac{x+20}{7} = \frac{x}{3}$ oe

Question 352

$\frac{5}{6} \times \frac{3}{4}$ or $\frac{5}{6} \div \frac{8}{6}$ oe	**M2**	**M1** for $\frac{4}{3}$ seen or for $\frac{5}{6} \times \textit{their}\frac{3}{4}$ or for $\frac{5}{6} \div \frac{\textit{their}8}{6}$
$\frac{5}{8}$ cao	**A1**	dep on M2

Question 353

48.72	**2**	**M1** for $\frac{16}{100} \times 42$ oe or better

Question 354

$7 - (5 - 3) + 4$	**1**	

Question 355

200 017	**1**	

Question 356

$17.77\ldots - 1.77\ldots$ oe	**M1**	**M1** for correct working shown
$\frac{8}{45}$ cao	**A2**	**B1** for $\frac{16}{90}$ oe seen

Question 357

48 700 cao	**3**	**M1** for $45\,000 \times \left(1 + \frac{1.6}{100}\right)^5$ oe **A1** for 48 710 to 48 720 If A0 scored **B1** for *their* more accurate value correctly rounded to the nearest 100

Question 358

40×4	**1**	

Question 359

(a)	0	**1**	
(b)	$2^2 \times 3 \times 7$ or $2 \times 2 \times 3 \times 7$	**2**	**B1** for 2, 2, 3, 7

Question 360

$\frac{8}{3}$ and $\frac{11}{4}$ oe improper fractions	**M1**	
$\frac{88}{12}$ oe improper fraction	**A1**	
$7\frac{1}{3}$ cao final answer	**A1**	dep on 1st A1 If M0 scored **SC1** for $\frac{8}{3}$ or $\frac{11}{4}$ oe improper fraction

Question 361

$\frac{50-10}{4\times2}$	**M1**	Allow **M1** for 3 out of 4 values correctly rounded or for all correct but with any trailing zeros
5	**A1**	dep on $\frac{50-10}{4\times2}$

Question 362

1.75	**3**	**M2** for $(13.72 - 2.8 \times 2.65) \div 3.6$ oe or **M1** for 2.8×2.65

Question 363

(a)	245	**1**	
(b)	69 cao nfww	**3**	**M2** for $\frac{200+0.5}{3-0.1}$ oe or **M1** for 200 ± 0.5 oe or 3 ± 0.1 oe seen

Question 364

(a)	1 −6	**2**	**B1** for each If 0 scored, **SC1** for two terms with a difference of –7
(b)	n^2+3 oe	**2**	**M1** for any quadratic or second differences = 2

Question 365

15.8 or 15.76 to 15.77	**2**	**M1** for $125.9\times\left(1-\frac{34}{100}\right)^5$ oe

Question 366

12	**2**	**M1** for $2^2 \times 3^2$ and $2^2\times3\times7$ or for $2\times2\times3$ final answer or **B1** for 2, 3, 4 or 6 as final answer

Question 367

4.18×10^7 cao	**1**	

Question 368

$\frac{37}{99}$ oe fraction	**1**	

Question 369

$\frac{9}{4}$ and $\frac{11}{3}$ oe improper fractions	**M1**	
$\frac{99}{12}$ oe improper fraction	**A1**	
$8\frac{1}{4}$ cao final answer	**A1**	dep on 1st A1 If M0 scored **SC1** for $\frac{9}{4}$ or $\frac{11}{3}$ oe improper fraction

Question 370

271.2[0]	**2**	**M1** for $56.50 \div 5$ or 56.50×24 oe or better

Question 371

3, 80, 30 and 10 seen and answer 12	**2**	**M1** for 3 out of 4 correct elements or for all correct but with any trailing zeros If 0 scored **SC1** for answer 12

Question 372

30 48	**2**	**M1** for $\frac{78}{5+8} \times k$ oe where $k = 1$, 5 or 8

Question 373

70.5 or 70.52 to 70.53	**4**	**B3** for 59(.0) or 58.99… or 50.5 or 50.47 to 50.48 OR **M2** for $\frac{10^2+9^2-11^2}{2\times10\times9}$ oe or equivalent expression for smaller angle or **M1** for $11^2 = 10^2+9^2-2\times10\times9\cos(...)$ oe or equivalent expression for smaller angle **A1** for $\frac{1}{3}$ oe

Question 374

2.31×10^{p}	**2**	**B1** for $21\times10^{p-1}$ or 0.21×10^{p} or answer with figs 231

Question 375

72	**2**	**M1** for $\frac{360}{180-175}$ oe or $\frac{180(n-2)}{n}=175$ oe

Question 376

477	**2**	**M1** for $80 - 0.5$ oe or better seen

Question 377

$\frac{5}{3}\times\frac{2}{15}$ oe or $\frac{10}{6}\div\frac{45}{6}$ oe with common denominator	**M2**	**B1** for $\frac{5}{3}$ oe or $\frac{15}{2}$ oe or **M1** for *their* $\frac{5}{3}\times$ *their* $\frac{2}{15}$
$\frac{2}{9}$ cao	**A1**	

Question 378

162.07 cao	**2**	**M1** for $190 \div 1.1723$

Question 379

(a)	125	**1**
(b)	29	**1**

Question 380

$100y - np$	**2**	**B1** for $100y$ seen or for answer $[10^k]\, y - np$

Question 381

Question 382

(a)	$\frac{18}{25}$ cao	**1**
(b)	$\frac{1}{250}$ cao	**1**

Question 383

-24.6	**1**	

Question 384

$\frac{4}{99}$ cao	**1**	

Question 385

(a)	6.54×10^{-3}	**1**	
(b)	99	**1**	

Question 386

$\frac{2}{3} \times \frac{7}{10}$ or $\frac{14}{21} \div \frac{30}{21}$ oe with common denominator	**M2**	**B1** for $\frac{10}{7}$ oe or **M1** for $\frac{2}{3} \times$ *their* $\frac{7}{10}$
$\frac{7}{15}$ cao	**A1**	

Question 387

(a)	5 97	**2**	**B1** for each
(b)	$\sqrt{7}$	**1**	

Question 388

$k-1$	**1**	

Question 389

0.4 or $\frac{2}{5}$	**1**	

Question 390

68 nfww		**3**	**M2** for $\frac{600-5}{8\text{h}40 \text{ to} 8\text{h}50}$ or $\frac{590 \textit{to} 600}{8\text{h}40 + 5[\text{m}]}$ oe or **M1** for $600 - 5$ oe or $8\text{h}\,40 + 5[\text{m}]$ oe or $520 + 5$ oe[m] seen

Question 391

1.8432		**2**	**M1** for $\frac{32\times24000\times24000}{100000\times100000}$ oe If 0 scored, **SC1** for figs 184[32]... as answer

Question 392

9080 or 9080.13		**2**	**M1** for $9500\times\left(1-\frac{0.9}{100}\right)^5$

Question 393

$\frac{11}{8}\ [-\frac{5}{6}]$ $\frac{3}{8}+\frac{1}{6}$		**B1**	Correct step for dealing with mixed number Allow $\frac{11k}{8k}$
$\frac{33}{24}$ and $\frac{20}{24}$ $\frac{9}{24}$ and $\frac{4}{24}$		**M1**	Correct method to find common denominator e.g. 1 $\frac{9}{24}$ and $\frac{20}{24}$
$\frac{13}{24}$ cao		**A1**	

Question 394

(a)	4 10 18	**2**	**B1** for 2 correct
(b)	$32 - 7n$ oe final answer	**2**	**B1** for $32 - kn$ oe $k \neq 0$ *or* $j - 7n$ oe or $32 - 7n$ seen then spoilt

Question 395

(a)	$\begin{pmatrix}14\\-6\end{pmatrix}$	**1**	
(b)	$\begin{pmatrix}-12\\21\end{pmatrix}$	**1**	

Question 396

31 : 21	**3**	**B2** for equivalents e.g. 15.5 oe and 10.5 oe or for an equivalent ratio e.g. 3.1 : 2.1 or **M1** for e.g. $x + 5 + x = 26$ oe or $x - 5 + x = 26$ oe

Question 397

145	**2**	**M1** for $x\left(1+\frac{6}{100}\right) = 153.7$ oe or better

Question 398

$1[.0] \times 10^{-2}$ cao	**2**	**B1** for 0.01 oe

Question 399

$\frac{11}{12}+\frac{9}{12}$ oe	**M1**	Allow any correct common denominator $12k$
$1\frac{2}{3}$ cao	**A2**	**A1** for $\frac{20}{12}$ or equivalent improper fraction or mixed number

Question 400

(a)	–13	**1**	
(b)	$-4n + 7$ oe final answer	**2**	**B1** for $-4n + k$ or $jn + 7$ ($j \neq 0$) or for a correct answer spoilt

Question 401

$\frac{3}{11}$ oe fraction	**1**	

Question 402

4.32	**3**	**B1** for $\frac{1}{4}$ oe or $\frac{2}{4.5}$ oe seen **M1 dep** on **B1** for $\frac{1+2}{their\frac{1}{4}+their\frac{2}{4.5}}$ oe

Question 403

357	**2**	**M1** for $\left(1-\frac{15}{100}\right)\times 420$ oe or **B1** for 63

Question 404

170	**1**	

Question 405

(a)	$\neq$ and $>$ indicated	**1**	
(b)	$7 - (3 - 1) + 2 = 7$ cao	**1**	

Question 406

13	**1**	

Question 407

12.5	**1**	

Question 408

$13 - 5n$ oe final answer $\frac{n+1}{n}$ oe final answer 2^{n-2} oe final answer	**5**	**B2** for $13 - 5n$ oe final answer or **B1** for $-5n + c$ or $13 - kn$ $k \neq 0$ or $13 - 5n$ seen then spoilt **B1** for $\frac{n+1}{n}$ oe final answer **B2** for 2^{n-2} oe final answer or **B1** for 2^{n-k} oe k can be 0

Question 409

15	**2**	**M1** for $360 \div (180 - 156)$ or $\frac{180(n-2)}{n} = 156$ oe

Question 410

$\frac{24}{1000} < 2.1 \times 10^{-1} < 22\% < 0.\dot{2} < \sqrt{0.2}$	**2**	**M1** for four values in the correct order or for conversion to consistent comparable form e.g. 0.21, 0.22…, 0.22, 0.4.., 0.024

Question 411

2.5 oe	**1**	

Question 412

$\frac{1}{3} \times \frac{6}{7}$ oe or $\frac{2}{6} \div \frac{7}{6}$ oe	**M1**	
$\frac{2}{7}$ oe	**A1**	
their $\frac{2}{7} + \frac{1}{5}$ with a correct method to find fractions with a common denominator	**M1**	e.g. $\frac{10}{35} + \frac{7}{35}$ oe
$\frac{17}{35}$ cao	**A1**	If order of operations not correct **SC2** for answer $\frac{10}{41}$ with correct working for $\frac{1}{3} \div \left(\frac{7}{6} + \frac{1}{5}\right)$ or **SC1** for $\frac{35}{30} + \frac{6}{30}$ oe

Question 413

12	**3**	**M2** for (95.25 – 15.5) ÷ 7.25 oe or (95.25 – (15.5 – 7.25)) ÷ 7.25 oe or **M1** for 95.25 – 15.5 or **B1** for 79.75

Question 414

129	**1**	

Question 415

7.5	**1**	

Question 416

(a)	$n^3 + 7$ oe final answer	**2**	**B1** for any cubic or for 3rd differences of 6
(b)	$\frac{n+1}{4^{n-1}}$ oe final answer	**3**	**B1** for $n + 1$ **B2** for 4^{n-1} oe or **B1** for 4^{n-k} oe k can be 0 Maximum 2 marks if not correctly combined as a fraction

Question 417

3 : 5 nfww	**4**	**M3** for $5^2 - 1$ oe and $8^2 - 5^2 + 1$ oe or **M2** for $5^2 - 1$ oe or $8^2 - 5^2 + 1$ oe or **M1** for 5^2 oe or 8^2 oe seen

Question 418

[–] 9	**3**	**M2** for $[k \times]\left(1-\frac{35}{100}\right) \times \left(1+\frac{40}{100}\right)$ oe or better or for $[k \times]\left(\frac{35}{100}-\left(1-\frac{35}{100}\right)\times\frac{40}{100}\right)$ or **M1** for $[k \times]\left(1-\frac{35}{100}\right)$ oe or $[k \times]\left(1+\frac{40}{100}\right)$ or better

Question 419

60	**2**	**M1** for $360 \div (180 - 174)$ or for $\frac{180(n-2)}{n}=174$ oe

Question 420

$\frac{25 \text{ or } 55}{30}$ and $\frac{12}{30}$	**M1**	Accept $\frac{25k \text{ or } 55k}{30k}$ and $\frac{12k}{30k}$
$2\frac{7}{30}$ cao	**A2**	**A1** for $\frac{67k}{30k}$ or $1\frac{37k}{30k}$

Question 421

3.1	**1**	

Question 422

(a)	Sunday 24 [July] 02 15	**3**	**B1** for Sunday 24th [July] as final answer **B2** for 02 15 oe as final answer or **B1** for sight of any of these 12 40 oe, 11 15 oe, 28h 35min, 50 15, 35 15 or 0215 oe spoilt or **M1** for departure time + 13h35min + 15h evaluated as a time with one interval correctly added
(b)	6320.4[0]	**1**	

Question 423

79	**2**	**B1** for 64 or 81 seen or for answer 61, 62, 67, 71 or 73

Question 424

$\frac{7}{3}$ oe improper fraction	**M1**	or $\frac{k}{3}\times\frac{11}{14}$ where $k>3$
$1\frac{5}{6}$ cao	**A2**	**A1** for $\frac{77}{42}$ or $\frac{11}{6}$ or $1\frac{35}{42}$

Question 425

(a)	805	**3**	**B2** for 105 or **M2** for $\frac{700\times2.5\times6}{100}+700$ oe or **M1** for $\frac{700\times2.5[\times6]}{100}$ oe
(b)	2.3[0…]	**3**	**M2** for $\sqrt[17]{\frac{1030.35}{700}}$ oe or **M1** for $1030.35=700(k)^{17}$ oe for any k

Question 426

(a)	8 11 16	**2**	**B1** for two correct
(b)	$23 - 8n$ oe final answer	**2**	**B1** for $j - 8n$ or $23 - kn$ $k \neq 0$ or $23 - 8n$ seen then spoilt

Question 427

7 [h] 18 [min]	**1**	

Question 428

80.50 cao	**2**	**B1** for 80.498… or 80.5 or correctly rounding their more accurate decimal to 2 dp

Question 429

13.75 14.85	**3**	**B2** for one correct answer or both correct answers seen in working then rounded to 3sf or both correct but reversed or **M1** for 2 correct seen from 23 + 0.5, 23 – 0.5, 8.7 + 0.05 or 8.7 – 0.05 or better

Question 430

$3n^2 + 5$ oe final answer	**2**	**M1** for correctly finding second differences or an answer that is a quadratic sequence

Question 431

0.14 oe nfww	**4**	**M3** for $\frac{14}{50 \times 2}$ with at least 2 out of 3 values correct and for the **one** incorrect value: f must be 1, 2 or 7 m must be a multiple of 50 p must be prime OR **B1** for $f = 14$ **B1** for $m = 50$ **B1** for $p = 2$ If **0** scored **SC1** for a correct multiple for m, factor for f or prime for p

Question 432

18		**2**	**M1** for $\frac{300\times60}{1000}$ oe or **B1** for figs 18 in *their* answer

Question 433

$\frac{2}{9}\times\frac{6}{5}$ or $\frac{4}{18}\div\frac{15}{18}$ oe	**M1**	
$\frac{4}{15}$ cao	**A1**	

Question 434

0, 3, 8		**2**	**B1** for 2 correct terms in correct position or **SC1** for −1, 0, 3

Question 435

$4a^2b$ final answer	**2**	**M1** for two correct parts out of three from 4, a^2 and b in final answer

Question 436

2.6[0] or 2.600…	**3**	**M2** for $\sqrt[10]{\frac{1328.54+4540}{4540}}$ or **M1** for $4540\times k^{10} = 1328.54 + 4540$ for any k If 0 scored **SC1** for answer –11.6 or –11.56…

Question 437

$\frac{33}{8}$ or $\frac{17}{6}$ $\quad 2\frac{1}{8}-\frac{5}{6}$		**B1**	Correct step for dealing with mixed numbers Allow $\frac{33k}{8k}$ or $\frac{17k}{6k}$
$\frac{99}{24}$ and $\frac{68}{24}$ $\quad [2]\frac{3}{24}-\frac{20}{24}$		**M1**	Correct method to find common denominator e.g. $4\frac{3}{24}$ and $2\frac{20}{24}$
$1\frac{7}{24}$ cao and correct working		**A1**	

Question 438

13 16 21	**2**	**B1** for 2 correct terms in correct position or **SC1** for 12, 13, 16

Question 439

103.32 cao	**2**	**M1** for $126\times\left(1-\frac{18}{100}\right)$ oe or **B1** for 22.68

Question 440

102	**1**	

Question 441

11 27	**3**	**M1** for $500 \div 43$ oe **M1** for $500 - \textit{their}\,11\times 43$ oe *their* 11 must be an integer from 2 to 11

Question 442

13 or –13	**1**	

Question 443

90	**3**	**B2** for 210 or 0.09 km OR **M1** for speed × time seen **M1** for correct conversion of both km to m and between h and s

Question 444

1.98×10^{100}	**2**	**B1** for 200×10^{98} or 0.02×10^{100} or answer with figs 198

Question 445

(a)	–3	**1**	
(b)	$27 - 5n$ oe final answer	**2**	**B1** for $j - 5n$ or $27 - kn$, $k \neq 0$ or for $27 - 5n$ seen then spoilt

Question 446

$\frac{9}{21}$ and $\frac{2}{21}$ oe	**M1**	Allow any correct denominator 21k
$\frac{1}{3}$ cao and correct working	**A1**	

Question 447

$2 \times 2 \times 3 \times 3 \times 5$ oe	**2**	**B1** for 2, 2, 3, 3, 5 or **M1** for correct factor tree/diagram/table.

Question 448

320	**2**	**M1** for $380.8 \div 1.19$ oe

Question 449

399	**1**	
4.286 cao	**2**	**B1** for 4.285[7...] or 4.29 or $\frac{30}{7}$ or $4\frac{2}{7}$ or for correctly rounding their more accurate decimal to 4sf

Question 450

2h 57 min	**1**	

Question 451

399	**1**	

Question 452

31 or 37	**1**	

Question 453

49.6	**2**	**M1** for answer figs 496

Question 454

$2.\dot{4} - 0.2\dot{4}$ oe	**M1**	
$\frac{11}{45}$ cao	**B1**	If **0** scored **SC1** for $\frac{k}{90}$.

Question 455

320.18	**3**	**B2** for 4320.18 or **M1** for $4000 \times \left(1+\frac{2.6}{100}\right)^3 [-4000]$ oe

Question 456

180	**2**	**M1** for answer $2 \times 2 \times 3 \times 3 \times 5$ or better or for answer $180k$ or two correct factor trees, tables or Venn diagram or better or a list of multiples of both 36 and 60 with at least 3 correct of each

Question 457

$\frac{15}{21}$ and $\frac{14}{21}$ oe	**M1**	Allow any correct common denominator $21k$
$\frac{1}{21}$ cao	**A1**	

Question 458

93 95 101 101	**3**	**M1** for 4×97.5 implied by 390 or for four numbers which add to 390 **B1** for four numbers with a range of 8 **B1** for four numbers with mode of 101 to a maximum of 2 marks

Question 459

6.05 or 6.054 to 6.055	**1**	

Question 460

(a)	121	**1**	
(b)	216	**1**	

Question 461

5[h] 23[min]	**1**	

Question 462

$419.\dot{1}\dot{9} - 4.\dot{1}\dot{9}$ oe	**M1**	
$\frac{83}{198}$ cao	**A2**	**Al** for $\frac{415}{990}$ oe If M0 scored **SC1** for $\frac{k}{990}$ or correct answer with insufficient working

Question 463

5×199^{57}	**2**	**M1** for [315 =] $3^2 \times 5 \times 7$ oe or $3^2 \times 5^2 \times 7 \div 315 = 5$

Question 464

(a)	3456	**1**	
(b)	0.75 or $\frac{3}{4}$ oe	**1**	
(c)	0.25 or $\frac{1}{4}$	**1**	

Question 465

$\frac{10}{18}$ and $\frac{3}{18}$	**M1**	Allow any correct common denominator $18k$
$\frac{7}{18}$ cao	**A1**	

Question 466

(a)	2 –9	**2**	**B1** for one correct
(b)	Sequence A $7n - 4$ oe final answer	**2**	**B1** for $7n + c$ or $kn - 4$ $k \neq 0$ or for correct answer seen then spoilt
	Sequence B $3n^2 - 1$ oe final answer	**2**	**M1** for finding second differences of 6 or has an answer that is a quadratic sequence or for correct answer seen then spoilt

Question 467

6.55	**3**	**M2** for $(33.48 - 2.4 \times 0.85)$ oe or **M1** for 2.4×0.85

Question 468

0	**1**	

Question 469

4 nfww	**2**	**M1** for $39 + 0.5$ or $36 - 0.5$ or better seen $39 - 0.5$ or $36 + 0.5$

Question 470

$\frac{2}{6}+\frac{5}{6}$ oe	**M1**	i.e. correct fractions with common denominator $6k$
$1\frac{1}{6}$ cao	**A1**	

Question 471

(a)	243	**1**	
(b)	$4n + 9$ oe final answer	**2**	**B1** for $4n + k$ or $jn + 9, j \neq 0$ or for correct answer seen then spoilt

Question 472

442	**2**	**M1** for $\frac{100-15}{100} \times 520$ oe or **B1** for 78

Question 473

140, 60	**2**	**M1** for $\frac{200}{(7+3)} \times k$ where $k = 1$, 7 or 3

Question 474

$\frac{4}{25}$ cao	**2**	**M1** for $\frac{32}{200}$ oe

Question 475

7 h 10 min	**1**	

Question 476

Any multiple of 72	**1**	

Question 477

1.08	**3**	**M2** for $\frac{13 \text{ to } 14}{12+0.5}$ oe or $\frac{14-0.5}{12 \text{ to } 13}$ oe or **M1** for 14 + 0.5 oe or 14 – 0.5 oe or 12 + 0.5 oe or 12 – 0.5 oe

Question 478

(a)	$(n-1)^3-1$ oe	**2**	**M1** for any cubic or third differences = 6
(b)	$24\times\left(\frac{1}{2}\right)^{n-1}$ oe	**2**	**M1** for $c\times\left(\frac{1}{2}\right)^{an+b}$ oe where a, b and c are constants and $a > 0$

Question 479

$4x^{12}$ final answer	**2**	**B1** for $4x^k$ or kx^{12} or for $4x^{12}$ seen then spoiled

Question 480

9×10^{-2}	**2**	**B1** for 0.09 oe or **M1** for *their* decimal correctly converted to standard form if negative power

Question 481

$\frac{4}{7}\times\frac{1}{8}$ oe or $\frac{4}{7}\div\frac{56}{7}$ oe	**M1**	
$\frac{1}{14}$ cao	**A1**	

Question 482

(a)	–1	**1**	
(b)	29 – 6n oe final answer	**2**	**B1** for k – 6n or 29 – kn or 29 – 6n seen then spoiled

Question 483

(a)	27	**1**	
(b)	29	**1**	

Question 485

1h 48 min nfww	**4**	**B3** for 1.8 [hrs], $1\frac{4}{5}$ [hrs], $\frac{9}{5}$ [hrs] or 108 [mins] nfww or **M2** for $\frac{220\text{ to }221}{125-2.5}$ or $\frac{220+0.5}{120\text{ to }125}$ or **M1** for 220 + 0.5 or 220 – 0.5 or 125 + 2.5 or 125 – 2.5

Question 486

807	**2**	**M1** for $980\times\left(1-\frac{1.75}{100}\right)^{11}$ oe or better

Question 487

581.81...– 5.81...oe	**M1**	
$\frac{32}{55}$ cao	**A2**	**A1** for $\frac{576}{990}$ oe If **M0** scored **SC1** for $\frac{k}{990}$ or for answer $\frac{32}{55}$ with insufficient working.

Question 488

8.03 or 8.032 to 8.033	**1**	

Question 489

$\frac{k}{12}+\frac{27}{12}$ or $\frac{71}{12}+\frac{c}{12}$ oe	[5] $\frac{11}{12}$ and [2] $\frac{3}{12}$ oe	**M1**	Accept with other correct common denominators e.g. 24, 36, 48 such as $\frac{71f}{12f}$ and $\frac{27f}{12f}$
$8\frac{1}{6}$ cao		**A2**	**A1** for fraction equivalent to $8\frac{1}{6}$ e.g. $\frac{49k}{6k}$ or $8\frac{1k}{6k}$ or $7\frac{7}{6}$

Question 490

52	**2**	**M1** for $12 = x \times \frac{3}{13}$ oe or better e.g. $12 \div \frac{3}{13}$ oe

Question 491

20 15 or [0]8.15pm	**1**	

Question 492

$621.21\ldots - 6.21\ldots$ oe	**M1**	
$\frac{41}{66}$ cao	**A2**	**A1** for $\frac{615}{990}$ oe If M0 scored **SC1** for $\frac{k}{990}$ or for answer $\frac{41}{66}$ with insufficient working

Question 493

$\frac{4}{7} \times \frac{21}{26}$ oe or $\frac{12}{21} \div \frac{26}{21}$ oe with common denominator	**M2**	**B1** for $\frac{26}{21}$ or $\frac{21}{26}$ oe or **M1** for $\frac{4}{7} \times \frac{21}{\textit{their}\,26}$ oe
$\frac{6}{13}$ cao	**A1**	

Question 494

8.75	**2**	**M1** for $\frac{3.5 \times 250000}{100 \times 1000}$ oe or **B1** for figs 875 or 1 cm : 2.5 km

Question 495

108	**2**	**B1** for 47 or 61 identified

Question 496

–13	**1**	

Question 497

1.24[0…]	**3**	**M2** $\sqrt[8]{\frac{6000 + 621.70}{6000}}$ oe or **M1** for $6000 + 621.70 = 6000(k)^8$ oe

Question 498

$\frac{15}{7}\times\frac{9}{5}$ oe or $\frac{135}{63}\div\frac{35}{63}$ oe with common denominator		**M2**	**B1** for $\frac{15}{7}$ oe or **M1** for $\frac{their 15}{7}\times\frac{9}{5}$ oe
$3\frac{6}{7}$ cao		**A1**	

Question 499

(a)	9 6 1	**2**	**B1** for 2 correct
(b)	$3n + 4$ oe final answer	**2**	**B1** for $3n + j$ or $kn + 4$ $k \neq 0$, or $3n + 4$ seen then spoilt

Question 500

11.75		**2**	**M1** for $\frac{9.4\times125000}{100\times1000}$ oe or **B1** for figs 1175 or 1 cm : 1.25 km

Question 501

$\frac{7\times2}{20-6}$	**M1**	
1 nfww	**A1**	If 0 scored **SC1** for 3 correct roundings or for all correct but with any trailing zeros

Question 502

06 15 or 6:15 am	**1**	

Question 503

19	**3**	**M2** for $\left(1+\frac{40}{100}\right)\left(1-\frac{15}{100}\right)$ $[ma]$ oe or **M1** for $F = kma$ or better or $\left(1+\frac{40}{100}\right)$ **and** $\left(1-\frac{15}{100}\right)$ oe seen

Question 504

55	**3**	**B2** for 250 or **M2** for $(305 \div 122) \times 22$ oe or better or **M1** for $\left(1+\frac{22}{100}\right)m = 305$ oe or better

Question 505

16	**2**	**B1** for answer 2 or 4 or 8 or **M1** for $2 \times 2 \times 2 \times 2$ oe as final answer or [48 =] $2 \times 2 \times 2 \times 2 \times 3$ and [80 =] $2 \times 2 \times 2 \times 2 \times 5$ or for 2 correct factor trees or tables

Question 506

$\frac{11}{6} \times \frac{15}{11}$ or $\frac{55k}{30k} \div \frac{22k}{30k}$ oe with common denominator	**M2**	**B1** for $\frac{11}{6}$ oe or **M1** for *their* $\frac{\text{their}11}{6} \times \frac{15}{11}$
$2\frac{1}{2}$ cao	**A1**	

Question 507

67.5[0]	**2**	**M1** for $\frac{750 \times 1.8[\times 5]}{100}$ oe

Question 508

1923 or 723 pm	**1**	

Question 509

(a)	64	**1**	
(b)	61	**1**	

Question 510

6.5 nfww	**3**	**M2** for $\frac{55.2+0.05}{8 \text{ to} 9}$ or $\frac{55.2 \text{ to } 55.3}{9-0.5}$ or **M1** for 9 + 0.5 or 9 – 0.5 or 55.2 + 0.05 or 55.2 – 0.05

Question 511

(a)	$14 - 3n$ oe final answer	**2**	**B1** for $14 - kn$ or $c - 3n$ or $14 - 3n$ seen then spoiled
(b)	5^{n-1} oe	**2**	**B1** for 5^{an+b} where $a > 0$ or 5^k for any integer $k > 1$

Question 512

$24x^{12}$ final answer	**2**	**B1** for $24x^k$ or kx^{12} in final answer

Question 513

$2 \times 3 \times 3 \times 5$ or $2 \times 3^2 \times 5$	**2**	**B1** for 2, 3, 3, 5 or **M1** for correct factor tree/diagram/list/table.

Question 514

$\frac{25}{8}$ or $\frac{7}{4}$ $\quad 2\frac{1}{8} - \frac{3}{4}$	**B1**	Correct step for dealing with mixed numbers Allow $\frac{25k}{8k}$ or $\frac{7k}{4k}$
$\frac{25}{8}$ and $\frac{14}{8}$ $\quad 2\frac{1}{8}$ and $\frac{6}{8}$ oe	**M1**	Correct method to find common denominator e.g. $3\frac{1}{8} - 1\frac{6}{8}$, $\frac{100-56}{32}$
$1\frac{3}{8}$ cao	**A1**	

Question 515

(a)	Multiple of 3 or multiple of 37	**1**
(b)	113	**1**

Question 516

0.062	**1**	

Question 517

–14	**1**	

Question 518

(a)	24.08 cao	**1**	
(b)	20 cao	**1**	

Question 519

[Lower bound =] 39.9 nfww [Upper bound =] 42.1 nfww	**3**	**B2** for one correct or **M1** for 11 + 0.5 or 9.5 + 0.05 or 11 – 0.5 or 9.5 – 0.05

Question 520

23 903 cao	**3**	**B2** for answer 23900, 23902, 23902.9… or 23 903 seen then rounded OR **M1** for $27\,000 \times \left(1-\frac{3}{100}\right)^4$ oe **B1** for *their* more accurate value seen and correctly rounded to the nearest whole number

Question 521

42.22… – 4.22… oe	**M1**	**M1** for correct working shown
$\frac{19}{45}$ cao	**A2**	**A1** for $\frac{38}{90}$ oe seen If **M0** scored **SC1** for $\frac{k}{90}$ or for answer $\frac{19}{45}$ with insufficient working.

Question 522

14	**2**	**B1** for answer 2 or 7 or **M1** for 2 × 7 as final answer or [140 =] 2 × 2 × 5 × 7 and [126 =] 2 × 3 × 3 × 7 or 2 correct factor trees or tables

Question 523

24 cao	**1**	

Question 524

260	**1**	

Question 525

Fruit	Cost per kg	Cost
Oranges		\$7.52
Bananas	\$2.15	\$6.02

3	**B1** for 7.52 **B1** for 6.02 or **B1FT** for 13.54 – *their* 7.52 correctly evaluated provided *their* 7.52 < 13.54 **B1FT** for *their* 6.02 ÷ 2.8 correctly evaluated

Question 526

$14x^3$	**2**	**B1** for $14x^k$ or $7x^3$ or $2x^3$

Question 527

146 cao	**3**	**M2** for $\frac{1750 + 480}{55 \times 1000} \times 60 \times 60$ oe or **M1** for distance = 1750 + 480 oe or $\frac{55 \times 1000}{60 \times 60}$ oe soi or correctly writing *their* whole number of seconds from a more accurate answer seen

Question 528

$\frac{5}{4}$ or $\frac{1}{4} + \frac{1}{6}$	**B1**	Correct method for dealing with mixed number Allow $\frac{5k}{4k}$
$\frac{15}{12}$ and $\frac{10}{12}$	**M1**	Correct method to find common denominator e.g. $[1]\frac{3}{12}$ and $\frac{10}{12}$
$\frac{5}{12}$ cao	**A1**	

Question 529

(a)	–2 1 6	**2**	**B1** for any 2 correct in correct position If 0 scored **SC1** for –3 –2 1
(b)	3^{n-1}	**2**	**B1** for 3^{an+k} , $a \neq 0$ or 3^c for any integer c>1

Question 530

24.352	**1**	

Question 531

7h 28min	**1**	

Question 532

41.11... – 4.11... oe	**M1**	
$\frac{37}{90}$ cao	**A1**	If **M0** scored **SC1** for answer $\frac{37}{90}$ with insufficient working.

Question 533

(a)	1.68×10^{203}	**2**	**B1** for 16.8×10^{202}
(b)	2.31×10^{101}	**2**	**B1** for figs 231

Question 534

$\frac{6}{14}$ and $\frac{1}{14}$ oe	**M1**	Allow any correct denominator $14k$
$\frac{5}{14}$ cao	**A1**	

Question 535

14.8	**2**	**M1** for 1 cm represents 0.4 km soi or **B1** for figs 148 as answer

Question 536

$5-(4\times3-9)-2$	**1**	

Question 537

2 002 002	**1**	

Question 538

$\frac{9}{4}\times\frac{8}{15}$ oe or $\frac{18}{8}\div\frac{15}{8}$ oe with common denominator	**M2**	**B1** for $\frac{9}{4}$ oe or $\frac{15}{8}$ oe or **M1** for $\frac{their\,9}{4}\times\frac{8}{their\,15}$ oe
$1\frac{1}{5}$ cao	**A1**	dep on M2

Question 539

1.74×10^{5}	**1**	

Question 540

1.75	**3**	**M2** for $\frac{(5700-5000)[\times100]}{5000\times8}$ oe or $\frac{(5700-5000)\times100}{5000[\times8]}$ oe or **M1** for $[5700-5000]=\frac{5000\times8\times r}{100}$ oe or **B1** for 87.5 or 0.14 or 1.14 If 0 scored **SC1** for answer 14.25

Question 541

0.046 cao	**1**	

Question 542

13 05 or 1 05pm	**2**	**M1** for 47 [minutes]

Question 543

$\frac{1}{6}$ or equivalent fraction	**3**	**B2** for $\frac{625}{750}$ oe or **M2** for $750-\frac{750}{4}-437.5$ oe or **M1** for $750-\frac{750}{4}$ oe or $\frac{750}{4}+437.5$ oe or $\frac{437.5}{750}$ oe

Question 544

41.7[0]	**2**	**M1** for $6.55 \times 4 + 15.5$

Question 545

29	**1**	

Question 546

$146.\dot{4}\dot{6}-1.\dot{4}\dot{6}$ oe	**M1**	
$\frac{29}{198}$ cao	**A2**	**A1** for $\frac{145}{990}$ oe If M0 scored **SC1** for $\frac{k}{990}$ with insufficient working.

Question 547

1.25 or 1.250…	**3**	**M2** for $\sqrt[8]{\frac{1656.73}{1500}}$ oe or **M1** for $1656.73 = 1500(k)^8$ oe for any k

Question 548

3375	**2**	**M1** for $8000\times\left(1-\frac{25}{100}\right)^3$ oe

Question 549

$7n + 4$ oe final answer	**2**	**B1** for $7n + j$ or $kn + 4$ $k \neq 0$, or $7n + 4$ seen then spoilt

Question 550

(a)	0.6 or $\frac{3}{5}$	**1**	
(b)	1024	**1**	

Question 551

35	**2**	**B1** for answer 5, 7 or 70 or **M1** for $2 \times 2 \times 5 \times 7$ and $2 \times 3 \times 5 \times 7$ or two correct factor trees or tables or $5 \times 7 \times k$ seen

Question 552

(a)	40 –275	**2**	**B1** for each
(b)	24	**2**	**B1** for 324 or 289 or $\sqrt{300}$ or 17.3…