Extended Mathematics
Topic : Geometry
Year :May 2013 -May 2022
Paper -2
Questions

Question 1

6	**3**	**M2** for $3\times\sqrt[3]{\frac{288\pi}{36\pi}}$ or **M1** for $3\times\sqrt[3]{\frac{288\pi}{36\pi}}$ or $3\times\sqrt[3]{\frac{36\pi}{288\pi}}$

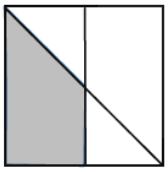
Question 2

(a)	95	**1**	
(b)	77	**2**	**B1** for [angle] $ACD = 58°$ or [angle] $BAC = 19°$ or [angle] $ANB = 103°$ or [angle] $CAE = 66°$

Question 3

40.3 or 40.31 to 40.32	**3**	**M2** for $4.4\times\sqrt[3]{\frac{0.05}{65}}$ soi **or M1** for $\sqrt[3]{\frac{0.05}{65}}$ soi or $\sqrt[3]{\frac{65}{0.05}}$ soi

Question 4

(a)	Equidistant from A and B (or C and D or AD and BC)	**1**	
(b)		**1**	

Question 5

105	**2**	**M1** for 180 – 55 – 50 or **B1** for 55 or 75 seen in the correct angle inside the triangle

Question 6

(a) 24	**2**	**M1** for $MOC = 48$
(b) 24	**2**	**M1** for $ACM = 66$ or **B1** for 48 – *their* **(a)**

Question 7

52	3	**B2** for $AOB = 104$ or **B1** for OAB or $OBA = 38$

Question 8

decagon	3	**M1** for $360 \div 36$ oe **A1** for 10

Question 9

(a) 110	1	
(b) 79	2	**B1** for $DAC = 42$ or $ACB = 79$ or $ACD = 28$

Question 10

125	2	**B1** for 55 or 125 in any other correct position on diagram or **M1** for 180–55

Question 11

48	2	**M1** for 15^2 or $\left(\frac{1}{15}\right)^2$ or $\frac{1}{15^2}$ or $\sqrt{10800}$ or $\frac{1}{\sqrt{10800}}$

Question 12

(a)	74	1	
(b)	8.69	1	

Question 13

576	4	**M1** for $\frac{1458}{3456}$ or $\frac{3456}{1458}$ **M1 dep** for $\sqrt[3]{\textit{their}\ \text{fraction}}$ **M1** for (*their* cube root)^2

Question 14

(a)	correct working	2	**B2** for $\sqrt[3]{\frac{1}{8}} = \frac{1}{2}$ or $\sqrt[3]{8} = 2$ AND $\frac{10}{2} = 5$ oe and $\frac{4}{2} = 2$ oe or **B1** for $\sqrt[3]{\frac{1}{8}}$ or $\sqrt[3]{8}$ or $8 = 2^3$ or $\frac{1}{8} = (\frac{1}{2})^3$

(b)	147 or 146.5 to 146.6…	**4**	**M3** for $\frac{7}{8}\times\frac{1}{3}\times\pi\times4^2\times10$ or **M1** for $\frac{1}{3}\times\pi\times4^2\times10$ and **M1** for $\frac{1}{3}\times\pi\times2^2\times5$ and **M1** for subtracting *their* volumes

Question 15

(a)	32	**2**	**B1** for $AOC = 116$
(b)	35	**2**	**B1** for $CDA = 122$

Questio 16

160	**3**	**M2** for $180-\frac{360}{18}$ or $\frac{180\times(18-2)}{18}$ oe or **M1** for $180\times(18-2)$ or $\frac{360}{18}$

Question 17

108	**1**	
Angle at **centre** is **twice** angle at **circumference** oe	**1**	

Question 18

9.13 or 9.127 to 9.1271	**3**	**M2** for $\sqrt[3]{\frac{1000}{440}}$ [1.31] oe or $\sqrt[3]{\frac{440}{1000}}$ [0.761] oe Or **M1** for $\frac{1000}{440}$ [2.27] oe or $\frac{440}{1000}$ [0.44] oe or $\sqrt[3]{\frac{figs440}{figs1000}}$ or $\sqrt[3]{\frac{figs1000}{figs440}}$

Question 19

(a)	35	**2**	**M1** for [Z =] 180 – 88 – 57 or $VWX = 57$ or $YZX = 35$
(b)	10.8	**2**	**M1** for $\frac{AC}{7.2} = \frac{12.6}{8.4}$ oe

Question 20

(a)	68	**1**	
(b)	15	**2**	**M1** for $\frac{360}{n} = 24$ or $(n-2)180 = 156n$

Question 21

37	**2**	**M1** for 180 – 90 – 53 oe or **B1** for 53 or the right angle, either marked in correct place on diagram

Question 22

Parallel	**1**	
Same length	**1**	

Question 23

(a)	7.5	**2**	**M1** for [10] $\times \frac{6}{8}$ oe
(b)	12 cao	**2**	**M1** for $9 \times \frac{8}{6}$ oe or $9 \times \frac{10}{\textit{their}\ \textbf{(a)}}$

Question 24

6	**3**	**M2** for $4.5 \times \sqrt[3]{\frac{128}{54}}$ oe or better **M1** for $\sqrt[3]{\frac{128}{54}}$ or $\sqrt[3]{\frac{54}{128}}$ oe or $\frac{54}{128} = \left(\frac{4.5}{x}\right)^3$ oe

Question 25

4140	**2**	**M1** for $(25-2) \times 180$ or $25 \times \left(180 - \frac{360}{25}\right)$

Question 26

(a)	12	**2**	**M1** for $\frac{7.2}{x}=\frac{15}{25}$ oe or better eg $7.2\times\frac{25}{15}$
(b)	12.8	**3**	**M2** for $16\times\sqrt[3]{\frac{192}{375}}$ oe or **M1** for $\sqrt[3]{\frac{192}{375}}$ or $\sqrt[3]{\frac{375}{192}}$ oe or $\left(\frac{16}{y}\right)^3=\frac{375}{192}$ oe

Question 27

6.24 or 6.244 to 6.245	**3**	**M2** for $\sqrt{8^2-5^2}$ or **M1** for $8^2=5^2+x^2$ or better

Question 28

0.3	**2**	**M1** for $\frac{k\times50000\times50000}{100000\times100000}$ oe If zero scored **SC1** for figs 3

Question 29

Parallelogram	**1**	

Question 30

(a)	47	**1**	
(b)	117	**2**	**M1** for $360-(115+85+97)$
(c)	244	**2**	**B1** for 116 seen at centre or 122 seen at circumference

Question 31

64000	**3**	**M2** for $\frac{1.6\times20000^2}{100^2}$ oe or **M1** for figs 64 in answer or $1\,\text{cm}^2=40\,000\,\text{m}^2$

Question 32

9.1 oe	**2**	**M1** for $\frac{5.2}{PQ}=\frac{12.4}{21.7}$ oe

Question 33

(a)	5	**2**	**M1** for $\frac{9}{k}=\frac{6+4.8}{6}$ oe
(b)	24	**3**	**M2** for $\sqrt[3]{\frac{2592}{1500}} \times 20$ oe or **M1** for $\sqrt[3]{\frac{2592}{1500}}$ or $\sqrt[3]{\frac{1500}{2592}}$

Question 34

(a)	72	**1**	
(b)	123	**2FT**	FT dep. on answer being obtuse **M1** for $(360 - \textit{their}(a) - 42)$ [÷2]

Question 35

110	**3**	**B2** for $ADC = 25$ or **B1** for $AEC = 135$ or $CAE = 25$

Question 36

62 on answer line or clearly identified as $<ACB$ **and** two correct supporting reasons	**4**	**B1** for $<AOB = 124$ or for *their* $<AOB \div 2$ or other appropriate correct angle one step from $<ACB$ **B1** for any correct reason e.g. isosceles triangle **or** angles in triangle = 180 **B1** for a different correct reason leading directly to $<ACB$ e.g. angle at circumference is ½ angle at centre oe **B1** for 62

Question 37

45	**3**	**M2** for $360 \div (180 - 172)$ or **M1** for $180 - 172$ or $\frac{180(n-2)}{n}=172$ oe

Question 38

460	**2**	**B1** for 1 cm^2 : 100 km^2 oe or **M1** for $4.6 \times 1\,000\,000^2 \div 100\,000^2$ oe seen

Question 39

145	**3**	**M2** for $(6 - 2) \times 180 - 5 \times 115$ or **M1** for $(6 - 2) \times 180$ Alt method **M2** for $180 - (360 - 5 \times (180 - 115))$ or **M1** for $360 - 5 \times (180 - 115)$

Question 40

(a)	112	**1**	
(b)	56	**1**	

Question 41

[a =] 70 [b =] 40	**2**	**B1** for each

Question 42

(a)	68	**1**	
(b)	9	**2**	**M1** for 360 ÷ 40 oe or $\frac{180(n-2)}{n} = 140$ oe

Question 43

B	**1**	

Question 44

46.3 or 46.29 to 46.30	**3**	**M2** for $53 \times \sqrt[3]{\frac{20}{30}}$ oe or **M1** for $\sqrt[3]{\frac{20}{30}}$ or $\sqrt[3]{\frac{30}{20}}$ or $\left(\frac{53}{x}\right)^3 = \frac{30}{20}$ or better

Question 45

25	**2**	**B1** for 67 or 113 seen once in correct position or **M1** for $a + 42 = 67$ or $a + 42 + 113 = 180$ or better

Question 46

6.35 or 6.349 to 6.350	**3**	**M2** for $\frac{8}{h} = \sqrt[3]{\frac{0.5}{0.25}}$ oe or **M1** for $\left(\frac{8}{h}\right)^3 = \frac{0.5}{0.25}$ oe or for $\sqrt[3]{\frac{0.5}{0.25}}$ or $\sqrt[3]{\frac{0.25}{0.5}}$ oe

Question 47

[x =] 55	**1**	
[y =] 125	**1FT**	correct or **FT** (180 – their x)

Question 48

42	**2**	**M1** for $Q = 90$ or $WPQ = 90 - 42$ or $WPQ = 48$

Question 49

150	**3**	**M2** for $\left(\frac{1}{0.512}\right)^{\frac{2}{3}}$ oe or $\left(\frac{0.512}{1}\right)^{\frac{2}{3}}$ oe or **M1** for scale factor $\left(\frac{1}{0.512}\right)^{\frac{1}{3}}$ oe or $\left(\frac{0.512}{[1]}\right)^{\frac{1}{3}}$ oe

Question 50

(a)	10	**2**	**M1** for $5x + 6x + 7x = 180$ oe or $\frac{180}{5+6+7}$ or **B1** for angles 50, 60 and 70
(b)	70	**1FT**	**FT** 7 × *their* ***(a)*** provided 0 < *their answer* < 180

Question 51

[w =] 40	**1**	
[x =] 95	**2**	**B1** for angle ABC = 85 or *their* w + *their* CBD = 85
[y =] 45	**2**	**B1** for angle CBD = 45 or angle ACD = 40 or angle ACD = *their* w or y = *their* CBD

Question 52

(a)	Similar	**1**	
(b)	5.6	**2**	**M1** for $\frac{4}{8} = \frac{2.8}{AX}$ oe
(c)	$\frac{y}{4}$ oe	**1**	

Question 53

110	**1**	
70	**1**	

Question 54

(a)	[u =] 35	**1**	
	[v =] 110	**2**	**B1** for ACB or ADB = 35
(b)	75	**2**	**B1** for 150 or **M1** for $\frac{360-210}{2}$

Question 55

165	**3**	**M2** for $\frac{360}{8}+\frac{360}{3}$ oe or **M1** for **[**exterior angle of octagon =] $\frac{360}{8}$ or [exterior angle of triangle =] $\frac{360}{3}$ oe

Question 56

76.9 or 76.94 to 76.95	**3**	**M2** for $90 \div \sqrt[3]{\frac{160}{100}}$ or $90 \times \sqrt[3]{\frac{100}{160}}$ or **M1** for $\sqrt[3]{\frac{160}{100}}$ soi or $\sqrt[3]{\frac{100}{160}}$ soi or $\left(\frac{h}{90}\right)^3=\frac{100}{160}$ oe

Question 57

[w =] 54 [x =] 126 [y =] 60	**3**	**B1** for [w =] 54 **B1** for [x =] 126 If **B0 B0** for first two B marks then **B1** for *their w* + *their x* = 180 **B1** for [y =] 60 or for *their w* + *their x* + *their y* = 240

Question 58

60	**3**	**B2** for x = 6 or **M1** for $29x + x = 180$ oe and **M1** for 360 ÷ 6 or 360 ÷ *their x* or $180(n-2)$ = *their x* × $29n$

Question 59

[x =] 60 [y =] 40	**2**	**B1** for each or for two numbers that add to 100

Question 60

(a)	1480	**1**	
(b)	30	**3**	**M2** for $10 \times \sqrt{\frac{3960}{440}}$ or $10 \div \sqrt{\frac{440}{3960}}$ or **M1** for $\sqrt{\frac{3960}{440}}$ or $\sqrt{\frac{440}{3960}}$ or $\left(\frac{h}{10}\right)^2 = \frac{3960}{440}$ oe

Question 61

54	**3**	**M2** for $\frac{180\times(5-2)}{5}$ or $180 - \frac{360}{5}$ or **M1** for $180 \times (5 - 2)$ or $\frac{360}{5}$

Question 62

101	**1**	

Question 63

63 corresponding [angles] 59 angles [in a] triangle [add up to] 180 oe	**4**	**B1** for [a =] 63 **B1** for corresponding angles **B1FT** for [b =] 59 or *their a* + *their b* = 122 **B1** for angles [in a] triangle [add up to] 180 oe

Question 64

(a)	similar	**1**	
(b)	11.61	**3**	**M2** for $8.6 \times \sqrt{\frac{65.61}{36}}$ or **M1** for $\sqrt{\frac{65.61}{36}}$ or $\sqrt{\frac{36}{65.61}}$ or $\left(\frac{8.6}{BX}\right)^2 = \frac{36}{65.61}$ oe

Question 65

(a)	5	**1**	
(b)	1	**1**	

Question 66

(a)	1.8	**2**	**M1** for $\frac{10}{8}=\frac{9}{AP}$ oe
(b)	10.3 or 10.31 to 10.32	**3**	**M2** for $13\times\sqrt[3]{\frac{0.25}{0.5}}$ oe or **M1** for $\sqrt[3]{\frac{0.5}{0.25}}$ oe or $\sqrt[3]{\frac{0.25}{0.5}}$ oe or $\frac{0.5}{0.25}=\left(\frac{13}{h}\right)^3$ oe

Question 67

[w =] 95 [x =] 85 [y =] 48	**3**	**B1** for each If **B0** scored for x and for y, **SC1** for *their* x + *their* y = 133

Question 68

7.5 nfww	**3**	**M2** for $[OB^2=]\left(\frac{12}{2}\right)^2+4.5^2$ oe or **B1** for recognition of right angle

Question 69

80	**2**	**M1** for $\left(\frac{12}{3}\right)^2$ or $\left(\frac{3}{12}\right)^2$ oe or $\frac{3^2}{5}=\frac{12^2}{A}$ oe

Question 70

94	**2**	**B1** for ACB or PAB or ABC = 43 or **M1** for $180-2\times43$ or $\frac{1}{2}x=90-43$

Question 71

5	**1**

Question 72

[x =] 62	**2**	**B1** for 56 identified as angle A or **M1** for $\frac{(180-56)}{2}$
[y =] 118	**2**	**FT** for 2 marks *their* acute x + *their* y =180 or 56 + *their* acute x = *their* y or **B1** for any of ACB, BCM or LCN = 62 or *their* acute x or **M1** for 180 – 62 or 180 – *their* acute x or 56 + 62 or 56 + *their* acute x

Question 73

Congruent	**1**	

Question 74

73	**3**	**B1** for angle $PBC = 52$ **B1** for APO or $BPC = 55$ or APC or $OPB = 125$

Question 75

(a)	126	**4**	**M3** for $\frac{360-\left[180-\left(360\div 5\right)\right]}{2}$ or $\frac{360-180\times\left(5-2\right)\div 5}{2}$ or **M2** for $\frac{180\times\left(5-2\right)}{5}$ or $180-\frac{360}{5}$ or **M1** for $180\times(5-2)$ or $\frac{360}{5}$
(b)	7 : 2	**2**	**M1** for $\sqrt{\frac{73.5}{6}}$ or $\sqrt{\frac{6}{73.5}}$

Question 76

36	**4**	**B1** for angle KNL or $MNJ = 76$ **B2** for angle LJM or $LKM = 68$ or **B1** for angle $LMJ = 90$ or $LKJ = 90$ or $LCM = 136$ (C = centre)

Question 77

4	**1**	

Question 78

2.1	**2**	**M1** for $\frac{33.6\times 25000^2}{100000^2}$ oe or answer figs 21

Question 79

(a)	Trapezium	**1**	
(b)	Obtuse	**1**	

Question 80

1500	**3**	**M2** for $12 \div \left(\frac{20}{100}\right)^3$ oe or **M1** for $\left(\frac{20}{100}\right)^3$ or $\left(\frac{100}{20}\right)^3$ oe OR **M1** for $\div 20^3$ oe **M1** for $\times 100^3$ oe

Question 81

100	**2**	**M1** for reflex angle = 2 × 130 or opposite angle of a cyclic quadrilateral shown = 50

Question 82

(a)	$180 - 4x$	**1**	
(b)	$90 - 2x$	**1**	**FT** *their* **(a)** ÷ 2 in its simplest form dep on expression in x in **(a)**
(c)	$90 + x$	**2**	**FT** 180 – *their* **(b)** – x oe dep on expression in x in **(b)** then fully simplified **M1** for $180 - (90 - 2x + x)$ oe or 180 – *their* **(b)** – x oe dep on expression in x in **(b)**

Question 83

352	**3**	**B2** for figs 352 or **M1** for $\left(\frac{75}{30}\right)^3$ oe or $\left(\frac{30}{75}\right)^3$ oe OR **M2** for $5.5 \times \left(\frac{30}{75}\right)^3 \times 1000$

Question 84

90	**3**	**M2** for $360 \div (180 - 176)$ oe or **M1** for $180(n - 2) = 176n$ oe or $180 - 176$

Question 85

49 000	**3**	**M1** for $4.9 \times (10\,000\,000)^2$ **M1** for $\div (100\,000)^2$ OR **M1** for 1 cm : 100 km **M1** for $4.9 \times (\textit{their}\ 100)^2$ OR **M2** for $(\sqrt{4.9} \times 10\,000\,000 \div 100\,000)^2$ or **M1** for $\sqrt{4.9} \times 10\,000\,000 \div 100\,000$

Question 86

116°	**B1**	
alternate segment theorem	**B1**	
angles in opposite segments are supplementary or cyclic quadrilateral or angles at a point on a straight line	**B1**	

Question 87

165	**2**	**M1** for $\frac{(24-2)\times 180}{24}$ or $180 - \frac{360}{24}$

Question 88

5	**3**	**M2** for $8 \times \sqrt{\frac{52.5}{134.4}}$ oe or **M1** for $\sqrt{\frac{52.5}{134.4}}$ or $\sqrt{\frac{134.4}{52.5}}$ oe

Question 89

116	**2**	**M1** for angle $ACB = 32$ soi

Question 90

(a)	49	**1**	
(b)	98	**1**	**FT** $2 \times$ *their* **(a)**
(c)	20	**1**	
(d)	70	**1**	**FT** $90 -$ *their* **(c)**

Question 91

25	**2**	**B1** for 130 seen or **M1** for 50 ÷ 2

Question 92

2	**1**	

Question 93

Complete explanation with geometrical reasons	**3**	**B1** for $RQP = x°$ QR bisects angle PQB **B1** for $RPQ = x°$ alternate segment theorem **B1** for triangle PQR has two equal angles both less than 60 (so can't be equilateral) so must be isosceles

Question 94

16.6 or 16.64…	**5**	**M2** for $21 \times \frac{18}{13.5} = [AC]$ oe or **M1** for scale factor $\frac{13.5}{18}$ or $\frac{18}{13.5}$ oe soi Then Pythagoras method: and **M2** for $\sqrt{28^2 + 18^2}$ [÷ 2] or $\sqrt{(theirAC)^2 + 18^2}$ [÷ 2] or **M1** for $AD^2 = 28^2 + 18^2$ or $AD^2 = (theirAC)^2 + 18^2$

Question 95

[x =] 55 [y =] 24	**2**	**B1** for each

Question 96

7	**3**	**M2** for $166 + 2x = 180$ or better or **M1** for $97 - 3x + 69 + 5x = 180$ oe

Question 97

(a)	Kite	**1**	
(b)	80	**2**	**M1** for (180 – 82 – 58) or better

Question 98

Accurate triangle with correct construction arcs	2	**B1** for accurate triangle with no/incorrect arcs or **SC1** for accurate triangle with arcs with sides interchanged

Question 99

171	2	**M1** for $180 - (360 \div 40)$ oe or $\frac{(40-2)\times 180}{40}$ oe

Question 100

107	4	**B2** for $x = 40$ or **M1** for $2x + x + 60 = 180$ oe **M1** for correctly substituting *their* x into $4x - 87 + y = 180$ oe or $4x - 87 + x + 60 + y + 2x = 360$ oe

Question 101

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

Question 102

107	4	**B2** for $x = 40$ or **M1** for $2x + x + 60 = 180$ oe **M1** for correctly substituting *their* x into $4x - 87 + y = 180$ oe or $4x - 87 + x + 60 + y + 2x = 360$ oe

Question 103

Correct triangle constructed with $AC = 5$ cm and $BC = 6.5$ cm and intersecting arcs	3	**B2** for correct triangle with no/incorrect arcs or **SC2** for accurate triangle with arcs but sides interchanged or **B1** for 6.5 [cm] or 5 [cm] soi

Question 104

(a)	1.84	**2**	**M1** for $\frac{1.61}{x}=\frac{2.8}{3.2}$ oe
(b)	9.20 or 9.204 to 9.205	**3**	**M2** for $11.5\times\sqrt[3]{\frac{4}{7.8}}$ oe or **M1** for $\sqrt[3]{\frac{4}{7.8}}$ or $\sqrt[3]{\frac{7.8}{4}}$ oe seen or for $\frac{11.5^3}{x^3}=\frac{7.8}{4}$ oe

Question 105

36	**2**	**M1** for angle $EHG = 72$ or for angle $EHF = 47$ **and** $GHF = 25$

Question 106

(a)	80	**2**	**B1** for angle $PQT = 50$
(b)	$[w =]$ 68 $[x =]$ 36	**3**	**B1** for 68 **B2** for 36 or **M1** for $3x + 2x + 68 + 112 = 360$ or better

Question 107

(a)	Similar	**1**	
(b)	4	**2**	**M1** for $\frac{12}{6}=\frac{8}{BX}$ oe or better If **0** scored **SC1** for answer 3.5
(c)(i)	6.7265 or 6.73 or 6.726 to 6.727	**2**	**M1** for scale factor 2^2 or $\left(\frac{1}{2}\right)^2$ oe soi
(c)(ii)	13.453 or 13.5 or 13.45 to 13.46	**1**	**FT** *their* **(c)(i)** × 2

Question 108

130	**2**	**M1** for 360 – 100 or better

Question 109

Corresponding	**1**	

Question 110

(a)	77.3 or 77.32 to 77.33…	**3**	**M2** for $\frac{360-60}{360}\times\pi\times12.4\times2$ oe $[\pm n\times12.4]$ or **M1** for angle 60° or 300° soi or for $\frac{k}{360}\times\pi\times12.4\times2$ oe $[\pm n\times12.4]$
(b)	5.17 or 5.172 to 5.173…	**3**	**M2** for $\frac{74.5}{\pi}\times\frac{360}{360-41}=r^2$ oe or better or **M1** for $74.5=\frac{360-41}{360}\times\pi r^2$ oe or for $\sqrt{\frac{74.5}{\pi}\times\frac{360}{k}}$ oe

Question 111

Congruent Congruent Not congruent	SAS SSS None	**3**	**B1** for each correct row

Question 112

456 or 456.4…	**4**	**M2** for $\frac{18.2}{\tan62}$ oe or **M1** for $\tan62=\frac{18.2}{x}$ oe **M1** for $\frac{1}{2}\left(\left(\textit{their trapezium base}\right)+15.4\right)\times18.2$ oe

Question 113

68	**3**	**M1** for correctly identifying 90° angle soi or *DAC* / *DCA* = 68 **M1** for [obtuse angle] *AOC* identified as $2x$ soi or x = *their DAC* / *DCA*

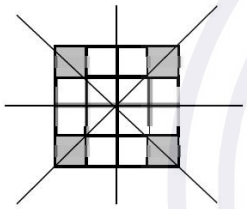
Question 114

Accurate construction of rhombus with sides 6.5 cm and correct construction arcs.	**2**	**B1** for accurate diagram with no/wrong arcs or for one triangle (6.5 cm, 6.5 cm, 8 cm) correctly constructed with correct arcs or for four correct arcs

Question 115

[a =] 59 [b =] 37 [c =] 84	**3**	**B1** for each If 0 scored **SC1** for *their* $(a + b + c) = 180$ if $a, b, c > 0$

Question 116

(a)	4	**1**	
(b)		**2**	**B1** for 2 or 3 correct lines drawn or for 4 correct lines and one wrong extra line

Question 117

40 000	**3**	**B2** for 1 cm to 0.4 km or 2.5 cm to 1 km or 1 600 000 000 or **M2** for $\sqrt{\frac{3\times10^{k}}{18.75}}$ oe where $k > 5$ or **M1** for 1 cm^2 to 0.16 km^2 or 6.25 cm^2 to 1 km^2 or for 3×10^{10} oe or 1.875×10^{-9} oe or 3×10^{6} oe **and** 1.875×10^{-3} oe

Question 118

240	**2**	**M1** for $360 \div (180 - 178.5)$ oe or for $\frac{180(n-2)}{n} = 178.5$ oe

Question 119

48	**2**	**B1** for 132 or 48 in the correct position on the diagram or **M1** for $180 - 132$

Question 120

(a)	55 Alternate segment theorem	**2**	**B1** for 55
(b)	Tangents from an external point are equal in length	**1**	

Question 121

79 nfww	**3**	**M2** for $x + x + 58 + 58 + 86 = 360$ oe or $86 - (180 - 2 \times 58)$ implied by $CAB = 22$ or **B1** for $DCA = 58$ or $BCA = x$ or $DAC = 64$

Question 122

correct triangle with arcs	**2**	**B1** for correct triangle with incorrect or no arcs or for two correct arcs. or a triangle with arcs but one side not in range

Question 123

40°	**1**

Question 124

ADC and *ADB* and 90 *AD* RHS	**3**	**B1** for each correct line

Question 125

DE	**1**

Question 126

97	**2**	**M1** for $360 - (73 + 129 + 75)$

Question 127

PQX and alternate *PXQ* and [vertically] opposite oe *ASA* *XB*	**4**	**B2** for lines 1 and 2 correct or **B1** for line 1 or 2 correct, or both angles correct **B1** for line 3 correct **B1** for line 4 correct

Question 128

$[x =]$ 38 $[y =]$ 22	**3**	**B1** for $[x =]$ 38 and **B2** for $[y =]$ 22 or **M1** for angle *ACB* = *their x* or angle *BAD* = 60 or angle *CBA* = 120

Question 129

162	**3**	**M2** for $\left(\frac{(5-2)\times 180}{4+5+5+7+9}\right) \times k$ where $k = 1, 4, 5, 7, 9$ or **M1** for $180n \div (4 + 5 + 5 + 7 + 9)$ where $n \geqslant 2$ or for $(5 - 2) \times 180$ oe

Question 130

(a)	4.5 oe	**2**	**M1** for $\frac{8}{6} = \frac{6}{QR}$ oe or better
(b)	135	**2**	**M1** for $\left(\frac{6}{8}\right)^3$ or $\left(\frac{8}{6}\right)^3$ or $\left(\frac{\textit{their}4.5}{6}\right)^3$ oe