Topical Worksheets for Cambridge OLEVEL

Mathematics D (4024)

Geometry

Mark Scheme

1st edition, for examination until 2025

Question	Answer	Marks	AO Element	Notes	Guidance
1	Acute	**1**			
2(a)	Chord	**1**			
2(b)	16	**1**			
3	7	**3**		**M2** for $166 + 2x = 180$ or better or **M1** for $97 - 3x + 69 + 5x = 180$ oe	
4	109	**3**		**M1** for $(180 - 38) \div 2$ oe **M1** for $180 -$ *their ACB*	
5	Three correct lines on first shape AND One correct line on second shape	**3**		**B2** for three correct lines on first shape or **B1** for one or more correct lines and no wrong lines **B1** for one correct line on second shape	
6	2	**1**			

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7	**M1** for angle $ACB = 65°$ or angle $RPQ = 37°$ **A1** for 2 pairs of equal angles oe	**2**			
8(a)	$2x - 3$	**2**		**B1** for $kx - 3$ or $2x + k$ $k \neq -3$	
8(b)	Ruled line perpendicular to L	**1**			
9	140	**2**		**M1** for $360 \div 9$	
10	Correct shape drawn	**1**			
11	Correct shape drawn	**2**		**M1** for 3 sides correctly reflected or 4 correct vertices	
12	Kite or isosceles trapezium	**1**			
13	2	**1**			
14	Circle with 3.8 cm radius drawn	**2**		**M1** for $11.4 \div 1.5$ or $5.7 \div 1.5$	
15(a)	72 Corresponding angles	**2**		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
15(b)	65 Angles [at a point] sum [to] 360 oe	**2**		**B1** for each	
16	116	**2**		**M1** for angle $ACB = 32$ soi	
17	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	

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18	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 $\sqrt{28^2 + 18^2}$ $[\div 2]$ or $\sqrt{(their\ AC)^2 + 18^2}$ $[\div 2]$ or **M1** for $AD^2 = 28^2 + 18^2$ or $AD^2 = (their\ AC)^2 + 18^2$ OR alternative trigonometry method e.g. **M1** for $\tan E = \frac{21}{13.5}$ and **M1** for $AD = \frac{18}{\cos\ their\ 57.3}$	

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19	[x =] 55 [y =] 24	**2**		**B1** for each	
20(a)	49	**1**			
20(b)	98	**1**		**FT** 2 × *their* **(a)**	
20(c)	20	**1**			
20(d)	70	**1**		**FT** 90 – *their* **(c)**	
21	25	**2**		**B1** for 130 seen or **M1** for 50 ÷ 2	
22	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	
23(a)	Equilateral	**1**			
23(b)(i)	4.1 to 4.5	**1**			
23(b)(ii)	10.25 to 11.25	**2**		**M1** for 0.5 × 5 × *their* **(b)(i)**	

Question	Answer	Marks	AO Element	Notes	Guidance
23(b)(iii)	61.5 to 67.5	**2**		**FT** *their* **(b)(ii)** **B1** for 6 seen	
24(a)	Correct position of town *B*	**2**		**B1** for correct bearing **B1** for correct distance	
24(b)(i)	Correct triangle drawn	**3**		**B2** for correct triangle with no or wrong arcs or correct position of *C* with arcs (no triangle) or **B1** for one line correct length drawn or 7 and 5 seen	
24(b)(ii)	38 to 42	**1**		**FT** *their* measured angle at *C*	
25(a)	Tangent	**1**			
25(b)(i)	22π final answer	**2**		**M1** for $2 \times 11 \times \pi$	
25(b)(ii)	40	**2**		**B1** for angle $OBC = 40°$ or angle $BOG = 140°$	
25(b)(iii)	7.68 or 7.679 to 7.680....	**2**		**FT** *their* **(b)(ii)** and **(b)(i)** **M1** for $\frac{\textit{their (b)(ii)}}{360} \times \textit{their (b)(i)}$	

Question	Answer	Marks	AO Element	Notes	Guidance
25(c)(i)	Angle [between] tangent [and] radius	**1**			
25(c)(ii)	**B1** for 180 – 140 or 90 – *their* **(b)(ii)** **M1** for $\tan(180 - 140) = \frac{11}{BC}$ oe **A1** for [BC =] 13.109[...]	**3**			
25(c)(iii)	6.11 or 6.112 to 6.114	**3**		**M1** for [OB^2 =] $13.11^2 + 11^2$ **A1** for 17.1 or 17.11 or 17.112 to 17.114 OR **M1** for $\frac{11}{\sin 40}$ oe **A1** for 17.1 or 17.11... or 17.112 to 17.113	
26(a)	Kite	**1**			
26(b)(i)	Translation $\begin{pmatrix} 4 \\ 9 \end{pmatrix}$	**2**		**B1** for each	

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26(b)(ii)	Reflection $x = 0.5$ oe	**2**		**B1** for each	
26(b)(iii)	Rotation 90° clockwise oe [centre] (0, 0) oe	**3**		**B1** for each	
26(c)(i)	(−5, −6)	**1**			
26(c)(ii)	Image at (−5, 0), (−2, 3), (7, 0),(−2, −3)	**2**		**B1** for correct size, wrong position or correct shape with incorrect scale factor	
27	55	**2**		**M1** for 180 – 70	
28(a)	Cuboid	**1**			
28(b)	10	**2**		**M1** for 5 × 2 [× 1]	
29(a)	(−1, −2)	**1**			
29(b)	$\begin{pmatrix} 6 \\ 0 \end{pmatrix}$	**1**			
29(c)	C marked at (3, 3)	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
29(d)(i)	$\begin{pmatrix} 4 \\ 5 \end{pmatrix}$	**1**		**FT** *their* **(b)** + $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$	
29(d)(ii)	$\overrightarrow{AC}$	**1**			
29(e)(i)	Correct parallelogram drawn	**1**		**FT** *their* **(c)** provided *ABCD* forms a parallelogram	
29(e)(ii)	30 cm^2	**2**		**FT** the area of *their ABCD* provided it is a parallelogram. **B1** for each	
30	[a =] 32 [b =] 98 [c =] 82	**3**		**B1** for each	
31	Correct ruled net of cuboid	**3**		**B2** for 3 or 4 further correct faces drawn in the correct places or **B1** for 1 or 2 further correct faces drawn in the correct places	
32(a)	Hexagon	**1**			
32(b)	6	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
33(a)	24	**3**		**M2** for $\frac{180}{2+13} \times k$ where $k = 1$, 2 or 13 or **B1** for $e + i = 180$ soi	
33(b)	15	**1**		**FT** if $\frac{360}{their\ (\mathbf{b})(\mathbf{i})}$ is an integer	
34	Correct ruled triangle with arcs	**2**		**M1** for correct triangle without arcs or for correct arcs and no lines	
35	85	**2**		**B1** for either angle in alt segment = 58	
36	72	**2**		**B1** for either angle at J or $H = 108$ or angle at $F = 72$	
37(a)	36	**2**		**M1** for $\left(\frac{8}{12}\right)^2$ or $\left(\frac{12}{8}\right)^2$ oe	

Question	Answer	Marks	AO Element	Notes	Guidance
37(b)	30	**3**		**M2** for $320 \div 16 \times \frac{12}{8}$ oe or **M1** for $320 \div 16$	
38	12	**2**		**M1** for $150 = \frac{(n-2) \times 180}{n}$ or $\frac{360}{180 - 150}$ oe	
39	**B1** for $OA = OB = OC = OD$ Radii **B1** for $AB = CD$ chords equidistant from centre are equal **B1** for SSS implies congruent	**3**			
40	45	**2**		**B1** for angles at M or K = 45 or angle at L = 90	
					[Total: 132]