Topical Worksheets for Cambridge O LEVEL Mathematics D (4024)

Mensuration

Mark Scheme

1st edition, for examination until 2025

Question	Answer	Marks	AO Element	Notes	Guidance
1	70.2π	**2**		**M1** for $\frac{1}{3}[\pi] \times 4.5^2 \times 10.4$	
2	86	**2**		**M1** for correct method to find the perimeter e.g. $(8+3) \times 2 \times 5 - 3 \times 8$ If 0 scored, **SC1** for answer 98	
3	45	**2**		**M1** for $\frac{11+7}{2} \times 5$ oe	
4	5300	**1**			
5	141 or 141.3 to 141.4	**4**		**M1** for $[2\times]\pi \times 3^2$ **M2** for $2 \times \pi \times 3 \times 4.5$ or **M1** for $2 \times \pi \times 3\,[\times 4.5]$	
6	3.7[0] or 3.689 to 3.699…	**3**		**M2** for $\frac{19.02}{2+\pi}$ or **M1** for $2r + \pi r\ [= 19.02]$ oe	

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7	25.6 or 25.59 to 25.60…	**4**		**M3** for $\frac{6.4}{2 \times \pi \times 8} \times \pi \times 8^2$ or **M2** for $\frac{x}{360} = \frac{6.4}{2 \times \pi \times 8}$ oe or **M1** for $\frac{x}{360} \times 2 \times \pi \times 8 = 6.4$ oe	
8	208	**1**			
9	15.5 or 15.48 to 15.49	**3**		**B2** for 1550 or 1548 to 1549 or **M2** for $\frac{42}{360} \times \pi \times 6.5^2$ or **M1** for $\frac{42}{360} \times \pi \times 65^2$	
10(a)	Equilateral	**1**			
10(b)(i)	4.1 to 4.5	**1**			
10(b)(ii)	10.25 to 11.25	**2**		**M1** for $0.5 \times 5 \times$ *their* **(b)(i)**	

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10(b)(iii)	61.5 to 67.5	**2**		**FT** *their* **(b)(ii)** **B1** for 6 seen	
11(a)	Tangent	**1**			
11(b)(i)	22π final answer	**2**		**M1** for $2 \times 11 \times \pi$	
11(b)(ii)	40	**2**		**B1** for angle $OBC = 40°$ or angle $BOG = 140°$	
11(b)(iii)	7.68 or 7.679 to 7.680....	**2**		**FT** *their* **(b)(ii)** and **(b)(i)** **M1** for $\frac{\textit{their}\ (\mathbf{b})(\mathbf{ii})}{360} \times \textit{their}\ (\mathbf{b})(\mathbf{i})$	
11(c)(i)	Angle [between] tangent [and] radius	**1**			
11(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**			

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11(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	
12	8	**3**		**M1** for 384 ÷ 6 **M1dep** for $\sqrt{their\ 64}$	
13	168	**3**		**M2** for (7 × 4 ÷ 2) × 12 oe or **M1** for (7 × 4 ÷ 2) or *their* area × 12	
14(a)	28	**1**			
14(b)	192	**2**		**M1** for $\frac{8}{0.5} \times \frac{16}{0.5}$ oe or **B1** for 16 and 12 or 4 tiles = 1 m^2 soi	
15(a)	Cuboid	**1**			

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15(b)	10	**2**		**M1** for 5×2 [$\times 1$]	
16(a)	$(-1, -2)$	**1**			
16(b)	$\begin{pmatrix} 6 \\ 0 \end{pmatrix}$	**1**			
16(c)	C marked at (3, 3)	**1**			
16(d)(i)	$\begin{pmatrix} 4 \\ 5 \end{pmatrix}$	**1**		**FT** *their* **(b)** + $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$	
16(d)(ii)	$\overrightarrow{AC}$	**1**			
16(e)(i)	Correct parallelogram drawn	**1**		**FT** *their* **(c)** provided *ABCD* forms a parallelogram	
16(e)(ii)	30 cm^2	**2**		**FT** the area of *their ABCD* provided it is a parallelogram. **B1** for each	

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17	41.1 or 41.09 to 41.112	**5**		**M1** for $\pi \times 6^2$ **M2** for $\frac{1}{2} \times 6 \times 6 \times 4$ or **M1** for $\frac{1}{2} \times 6 \times 6$ **M1** for $\pi \times 6^2 - \frac{1}{2} \times 6 \times 6 \times 4$	
18	25	**3**		**B1** for height is 5 [cm] **M1** for $\frac{1}{2} \times 10 \times 5$ oe	
19	$9x^2$	**3**		**M2** for $\left(\frac{12x}{4}\right)^2$ oe or **M1** for $\frac{12x}{4}$ oe If 0 scored, **SC1** for final answer kx^2	
20(a)	39[.0] or 39.03 to 39.04…	**3**		**M2** for $\frac{165}{360} \times 2 \times \pi \times 8 + 16$ or **M1** for $\frac{165}{360} \times 2 \times \pi \times 8$	

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20(b)	2.71 or 2.708…	**4**		**M3** for $\sqrt{\dfrac{\frac{165}{360}[\times\pi]\times 8^2}{4[\times\pi]}}$ oe or **M2** for $r^2 = \dfrac{\frac{165}{360}[\times\pi]\times 8^2}{4[\times\pi]}$ oe or **M1** for $\dfrac{165}{360}\times\pi\times 8^2$ oe seen	
20(c)(i)	3.67 or 3.666 to 3.667	**2**		**M1** for $\dfrac{165}{360}\times 2[\times\pi]\times 8 = 2[\times\pi]\times r$ or better or for $\dfrac{165}{360}[\times\pi]\times 8^2 = [\pi\times]\times r\times 8$ or better	

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20(c)(ii)	100 or 100.0 to 100.1… final answer	**4**		**M3** for $\frac{1}{3}\pi \times (their\ (c)\ (i))^2 \times \sqrt{8^2 - their\ radius^2}$ or **M2** for $\sqrt{8^2 - their\ radius^2}$ or **M1** for $(their\ (c)\ (i))^2 + h^2 = 8^2$	
21	3.375 cao	**3**		**M2** for $\frac{\frac{4}{3}\pi \times 4.5^3}{\pi \times 6^2}$ or better or **M1** for $\pi \times 6^2 \times h = \frac{4}{3} \times \pi \times 4.5^3$	
22	3.63 or 3.627 to 3.628	**3**		**M2** for $\frac{20^3}{40 \times \frac{4}{3}\pi}$ or **M1** for $40 \times \frac{4}{3} \times \pi \times r^3 = 20^3$	

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23	$\frac{3x}{2}$ or $1.5x$ or $1\frac{1}{2}x$	**3**		**B2** for $4R^2 = 9x^2$ oe or better or **M1** for $4\pi R^2 = 2\pi x^2 + \pi \times 2x \times \frac{7x}{2}$	
24	2700	**4**		**M2** for $15 \times 2.5 \times 20 \times 60 \times 60$ or **M1** for $15 \times 2.5 \times 20$ **M1** for *their* volume ÷ 1000 If 0 scored, **SC1** for figs 27 with no working	
25	576	**3**		**M2** for [2 ×] (15 × 4 + 12 × 4 + 12 × 15) oe or **M1** for one correct area, 15 × 4 or 12 × 4 or 12 × 15	
26	452 or 452.3 to 452.4...	**2**		**M1** for $12^2 \times \pi$	
27	460	**1**			

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28	3500 14 000	**2**		**B1** for each	
29	6.28 or 6.283 to 6.284	**3**		**M2** for $\frac{45}{360} \times \pi \times 5^2$ oe **and** $\frac{45}{360} \times \pi \times 3^2$ oe or **M1** for $\frac{45}{360} \times \pi \times 5^2$ oe or $\frac{45}{360} \times \pi \times 3^2$ oe or $\pi \times 5^2 - \pi \times 3^2$ oe	
30	2592	**4**		**M3** for $\frac{1.2 \times 100 \times 60 \times 60 \times 6}{1000}$ oe or **M2** for $1.2 \times 60 \times 60 \times 6$ oe or **M1** for figs 12 × figs 6 or 60×60 or correct conversion e.g. their value in $cm^3 \div 1000$ their value in $m^3 \times 1000$ 1.2×100 $6 \div 10\,000$	

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31(a)	Two correct lines drawn	**2**		**B1** for one correct, no extras or two correct and one extra	
31(b)	2.16	**2**		**M1** for 1.2×1.8	
32(a)	**B2** for 40 **B1** for cm^3	**3**		**M1** for $5 \times 4 \times 2$	
32(b)	Correct net	**3**		**B2** for 4 more correct faces in correct position **B1** for 2 or 3 more correct faces in correct position	
33	384	**2**		**M1** for 8×8 [$\times 6$]	
34	14.7	**2**		**M1** for $\frac{1}{2} \times 8.4 \times 3.5$ oe	
35	436 500	**1**			
36	36.7[0]	**1**			
37	5	**2**		**M1** for $180 \div 6^2$ oe	

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38	23.1 or 23.137 to 23.139 or 23.14	**3**		**M2** for $\frac{9\pi}{2}$ oe or **M1** for 9π	
39	40	**2**		**M1** for $5 \times 4 \times 2$	
40	160	**1**			
					[Total: 138]