Topical Worksheets for Cambridge O LEVEL Mathematics D (4024)

Mark Scheme

1st edition, for examination until 2025

Question	Answer	Marks	AO Element	Notes	Guidance
1	$7n + 5$ oe final answer	**2**		**B1** for $7n + a$ or $bn + 5$ $b \neq 0$	
2	52	**1**			
3	7	**3**		**M2** for $166 + 2x = 180$ or better or **M1** for $97 - 3x + 69 + 5x = 180$ oe	
4	$x^2 - 12x + 35$	**2**		**B1** for any three of x^2, $-5x$, $-7x$, $+35$	
5	$4p^7q^{-1}$	**2**		**B1** for $4p^7q^a$ or $4p^bq^{-1}$ or $\frac{4p^b}{q}$	
6	$7a\,(3a + 4b)$ final answer	**2**		**B1** for partial factorisation $7\left(3a^2 + 4ab\right)$ or $a\,(21a + 28b)$	
7	**M2** for $x + x + 8 + 2x - 3 = 117$ or better **M1** for $4x + 5 = 117$ oe or better **A1** for 28	**4**		or **B1** for $x + 8$ or $2x - 3$ If 0 scored, **SC1** for the correct answer with no algebra	

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8	28, –34	**4**		Trial and improvement OR **B1** for $x + y = -6$ oe **B1** for $x - y = 62$ oe **B1** for 28 or –34	
9	$2t^4$	**2**		**B1** for $2t^n$ or kt^4 ($n, k \neq 0$)	
10(a)	p^6	**1**			
10(b)	m^{10}	**1**			
10(c)	k^{15}	**1**			
11	$11h - 2w$ final answer	**2**		**M1** for $11h + kw$ or $kh - 2w$	
12	$[y =] 5x - 4$	**1**			

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13	1.8 or $1\frac{4}{5}$	**3**		**M2** for $m = \frac{k}{(p-1)^2}$ or **M1** for $m = \frac{\textit{their } k}{(6-1)^2}$ OR **M2** for $5(4-1)^2 = m(6-1)^2$ oe	
14	$5\,(2x+3y)\,(2x-3y)$ final answer	**3**		**B2** for $(2x+3y)\,(2x-3y)$ or $(10x+15y)\,(2x-3y)$ or $(2x+3y)\,(10x-15y)$ or **B1** for $5\left(4x^2-9y^2\right)$	
15	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	

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16	$\frac{3x+1}{5}$	**3**		**M2** for $x = \frac{3y+1}{5}$, $5y = 3x + 1$ or $y - \frac{1}{5} = \frac{3x}{5}$ **M1** for $x = \frac{5y-1}{3}$, $3y = 5x - 1$ or $y + \frac{1}{3} = \frac{5x}{3}$	
17	$3x^3 - 7x^2 - 43x + 15$	**3**		**B2** for correct expansion and simplification of two of the brackets or **B1** for correct expansion of two brackets with at least 3 terms correct	
18	$[p =] -13$	**2**		**M1** for $4(5x - 4) + 3$ or better	

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19	$x + y < 4$ $y \geqslant 1.5$ $y \leqslant 2x + 1$	**4**		**B3** for any two correct OR **B1** for $y \geqslant 1.5$ **B2** for $x + y < 4$ or $y \leqslant 2x + 1$ or $x + y = 4$ and $y = 2x + 1$ or with incorrect inequality signs or **B1** for $x + y = 4$ or $y = 2x + 1$ or **SC3** for > instead of ≥ etc.	
20	4	**2**		**M1** for $y^{\frac{2}{3}} = x^{\frac{1}{6}}$ or $y^2 = \sqrt{x}$ or $y^4 = x$	
21	–2	**2**		**M1** for (–3)(–2) + (–8)	

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22	$\frac{2x-5}{a-2b}$ final answer	**5**		**B2** for $(2x-5)(x+3)$ or **B1** for $(2x+p)(x+q)$ where $pq=-15$ or $p+2q=1$ **B2** for $(x+3)(a-2b)$ or **B1** for $x(a-2b)+3(a-2b)$ or $a(x+3)-2b(x+3)$	
23(a)	$125x^{12}$	**2**		**B1** for $125x^k$ or kx^{12}	
23(b)	$8x^{96}$	**2**		**B1** for $8x^k$ or kx^{96}	
24	$[\pm]\sqrt{\frac{h^2-x^2}{2}}$	**3**		**M1** for correct rearrangement for y or y^2 term **M1** for correct square root **M1** for correct division by 2 or $\sqrt{2}$	
25	–14	**2**		**M1** for $1-x=3\times5$ or better or $\frac{x}{3}=5-\frac{1}{3}$ or better	

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26	$\frac{2p^2}{t}$	**2**		**B1** for correct unsimplified answer	
27	16	**3**		**M1** for $p = k(q+2)^2$ **M1** for $p = (their\ k)(10+2)^2$ OR **M2** for $\frac{p}{(10+2)^2} = \frac{1}{(1+2)^2}$ oe	
28(a)	Correct lines and correct region clear 	**5**		**B2** for $2x + y = 8$ correctly ruled or **B1** for ruled line with negative gradient **B1** for $y = x$ correctly ruled **B1** for $x = 2$ correctly ruled	
28(b)	6	**1**			
29(a)	0.3 oe	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
29(b)	3060	**3**		**M2** for $\frac{1}{2}(300 + 210) \times 12$ oe or **M1** for one correct part area	
30	[y =] 1	**3**		**M1** for $y = k \times \sqrt[3]{x + 3}$ **M1** for $y = \textit{their } k \times \sqrt[3]{24 + 3}$ OR **M2** for $\frac{y}{\sqrt[3]{24 + 3}} = \frac{2}{3} \times \frac{1}{\sqrt[3]{5 + 3}}$ oe	
31(a)	$(x - 9)^2 - 108$	**2**		**B1** for $(x + h)^2 - 108$ or $(x - 9)^2 + h$ or $k = -9$	
31(b)	19.4 or 19.39… – 1.39 or – 1.392…	**2**		**M1FT** for $x - \textit{their } 9 = \pm\sqrt{\textit{their } 108}$ **A1** for $9 \pm \sqrt{108}$ or $9 \pm 6\sqrt{3}$	
32(a)	4 7 4	**2**		**B1** for one correct	

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32(b)	Correct curve	**4**		**B3FT** for 6 or 7 points correct or **B2FT** for 4 or 5 points correct or **B1FT** for 2 or 3 points correct	
32(c)	$x = 1$ oe	**1**			
32(d)	−1.9 to −1.7 and 3.7 to 3.9	**2**		**B1** for each	
33	$[x =]$ 2.5	**2**		**M1** for $12x = 23 + 7$ or $x - \frac{7}{12} = \frac{23}{12}$	
34	8	**2**		**M1** for correct attempt e.g. 12 + 14 + 16 ….	
35	$[h =]$ 8.4	**3**		**B2** for $38.64 = 4.6h$ or $77.28 = 9.2h$ or $\frac{2 \times 38.64}{5.5 + 3.7}$ or **B1** for $38.64 = \frac{(5.5 + 3.7)h}{2}$ or **M1** for $[h =] \frac{2A}{a + b}$	

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36	$27 - 9x$	**1**			
37	$2c - 3d$ final answer	**2**		**B1** for $2c$ or $-3d$	
38(a)	$3x = 5y$ oe $2y = x + 4$ oe	**2**		**B1** for each	
38(b)	$[x =]$ 20 $[y =]$ 12	**3**		**M1** for correctly eliminating one variable **B1** for one correct	
39	$5x\,(1 - 4x)$ final answer	**2**		**B1** for $5\left(x - 4x^2\right)$ or $x\,(5 - 20x)$	
40(a)	25, 87, 329 circled	**1**			
40(b)	7	**1**			
40(c)	8	**2**		**M1** for $\frac{349}{39}$ or **B1** for at least four of 39, 78, 117, 156, 195, 234, 273, 312	
40(d)(i)	$2n - 1$ oe	**2**		**B1** for $2n + c$ or $kn - 1$, $k \neq 0$	

Question	Answer	Marks	AO Element	Notes	Guidance
40(d)(ii)	79	**1**		**FT** *their* **(d)(i)** if linear	
40(d)(iii)	175	**2**		**M1** for *their* $(2n - 1) = 349$ or $\frac{348}{2} + 1$ or $\frac{350}{2}$	
40(e)(i)	$350 - 2n$ oe	**2**		**B1** for $-2n + c$ or $kn + 350$, $k \neq 0$	
40(e)(ii)	174 $n \geqslant 175$ gives house numbers that are zero/negative	**2**		**B1** for each If 0 scored, **SC1** for 175	
[Total: 128]					