Topical Worksheets for Cambridge O LEVEL

Mathematics D (4024)

Coordinate Geometry

Mark Scheme

1st edition, for examination until 2025

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$2x - 3$	**2**		**B1** for $kx - 3$ or $2x + k \quad k \neq -3$	
1(b)	Ruled line perpendicular to L	**1**			
					[Total: 3]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	(3, 1)	**1**			
1(b)	D plotted at (–2, –1)	**1**			
1(c)	E plotted at (1, –2)	**2**		**B1** for E plotted at $(1, k)$ or $(k, -2)$ or $\overrightarrow{AE} = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$	
					[Total: 4]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	3	**2**		**M1** for $\frac{3k}{1k}$	
1(b)	$y = 3x - 2$ oe	**1**		**FT** *their* (a)	
					[Total: 3]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	4 7 4	**2**		**B1** for one correct	
1(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	
1(c)	$x = 1$ oe	**1**			
1(d)	−1.9 to −1.7 and 3.7 to 3.9	**2**		**B1** for each	
					[Total: 9]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	Kite	**1**			
1(b)(i)	Translation $\begin{pmatrix} 4 \\ 9 \end{pmatrix}$	**2**		**B1** for each	
1(b)(ii)	Reflection $x = 0.5$ oe	**2**		**B1** for each	
1(b)(iii)	Rotation 90° clockwise oe [centre] (0, 0) oe	**3**		**B1** for each	
1(c)(i)	(−5, −6)	**1**			
1(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	
					[Total: 11]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	(−1, −2)	**1**			
1(b)	$\begin{pmatrix} 6 \\ 0 \end{pmatrix}$	**1**			
1(c)	C marked at (3, 3)	**1**			
1(d)(i)	$\begin{pmatrix} 4 \\ 5 \end{pmatrix}$	**1**		**FT** *their* **(b)** + $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$	
1(d)(ii)	$\overrightarrow{AC}$	**1**			
1(e)(i)	Correct parallelogram drawn	**1**		**FT** *their* **(c)** provided *ABCD* forms a parallelogram	
1(e)(ii)	30 cm^2	**2**		**FT** the area of *their ABCD* provided it is a parallelogram. **B1** for each	
					[Total: 8]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	15.7 or 15.65...	**3**		**M2** for $\sqrt{(-4-10)^2+(4--3)^2}$ oe or **M1** for $(-4-10)^2+(4--3)^2$ oe	
1(b)	**M1** for $\frac{-10-4}{4--3}$ [= −2] oe **A1** for $10 = -2(-3) + c$ or $-4 = -2(4) + c$ and correct completion to $y = -2x + 4$	**2**			
1(c)	$y = \frac{1}{2}x + \frac{11}{4}$ oe	**4**		**M1** for grad = $\frac{1}{2}$ soi **M1** for [midpoint =] $(\frac{1}{2}, 3)$ **M1** for substitution of $(\frac{1}{2}, 3)$ into *their* $y = mx + c$ oe	

[Total: 9]

Question	Answer	Marks	AO Element	Notes	Guidance
1	(0, –2)	**1**			

[Total: 1]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$\frac{3}{8}$	**2**		**M1** for $8y = 3x + 20$ or better	
1(b)	(0, 2.5) oe	**1**			

[Total: 3]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	15.6 or 15.62…	**3**		**M2** for $\sqrt{(9--3)^2+(-2-8)^2}$ oe seen or **M1** for $(9--3)^2$ or $(-2-8)^2$ oe seen	
1(b)	$y=-\frac{5}{6}x+4$ oe	**3**		**M1** for gradient $\frac{-2-8}{9--3}$ oe **M1** for substituting (6, −1) into a linear equation oe	
1(c)	$y=\frac{6}{5}x-\frac{3}{5}$ oe	**4**		**M1** for gradient $-1/\textit{their}\left(-\frac{5}{6}\right)$ **B1** for midpoint at (3, 3) **M1** for their midpoint substituted into $y=\textit{their } m \times x+c$ oe	
					[Total: 10]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$4x+2$	**3**		**B2** for $4x+c$ or **B1** for $mx+2$, $m\neq 0$ and **M1** for rise/run of $\frac{4k}{k}$	
1(b)(i)	3	**1**			
1(b)(ii)	(0, –4)	**1**			
1(c)	Correct ruled line from $x=-4$ to $x=5$	**3**		**B2** for 2 correct points plotted or **B1** for one correct point plotted soi or **M1** for line with gradient –2 If **B0** or **M0** scored, **SC1** for a correct table with a minimum of 3 correct coordinates	
					[Total: 8]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	–3, –1	**1**			
1(b)	1.5 oe	**2**		**M1** for rise ÷ run e.g. $\frac{6}{4}$	
1(c)	[$y=$] $1.5x-1$ oe	**2**		**B1** for $jx-1$ $j\neq 0$ or $1.5x+k$ or *their* (**b**) $x+k$	
					[Total: 5]

Question	Answer	Marks	AO Element	Notes	Guidance
1	(0, –8)	**1**			
					[Total: 1]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$y = 2x - 3$ oe	**3**		**B2** for $2x - 3$ or $y =$ *their* $m\,x - 3$ or $y = 2x + c$ or **M1** for $\frac{9-(-3)}{6-0}$ oe or $9 = 6m - 3$ oe or **B1** for $2x$ seen or $[y =]mx - 3$ $m \neq 0$	
1(b)	$y = -\frac{1}{2}x + 2$ oe	**2**		**FT** *their* **(a)** $y = -\frac{1}{\text{their } m}x + 2$ **B1** for gradient $-\frac{1}{2}$, gradient **FT** *their* **(a)** or for $y = mx + 2$ $m \neq 0$	
					[Total: 5]

Question	Answer	Marks	AO Element	Notes	Guidance
1	3	**1**			
					[Total: 1]

Question	Answer	Marks	AO Element	Notes	Guidance
1	13.9 or 13.92 to 13.93	**3**		**M2** for $\sqrt{(7-2)^2 + (12--1)^2}$ oe or **M1** for $(7-2)^2 + (12--1)^2$ oe	
					[Total: 3]

Question	Answer	Marks	AO Element	Notes	Guidance
1	$y = 6x$ oe	**1**			
					[Total: 1]

Question	Answer	Marks	AO Element	Notes	Guidance
1	(0, –3)	**1**			
					[Total: 1]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	–3 5 2	**2**		**B1** for 2 correct	
1(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	
1(c)(i)	Ruled line $x = 1$ drawn	**1**			
1(c)(ii)	$x = 1$	**1**			
1(d)	–0.5 to –0.3 and 2.3 to 2.5	**2**		**B1** for each If 0 scored, **B1** for $y = 4$ drawn	
1(e)(i)	Correct ruled continuous line	**1**			
1(e)(ii)	$[y =] 2x + 4$	**3**		**B2** for $[y =] 2x + k$ or **M1** for $\frac{\text{rise}}{\text{run}}$ **B1** for $kx + 4$, $k \neq 0$, or $c = 4$	
					[Total: 14]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)(i)	16	**1**			
1(a)(ii)	12	**1**			
1(b)(i)	(5, 2)	**1**			
1(b)(ii)A	(−5, 2)	**1**			
1(b)(ii)B	(5, 10)	**2**		**B1** for (5, k) or (7, 2)	
1(b)(iii)	$\begin{pmatrix} 44 \\ -14 \end{pmatrix}$	**2**		**FT** *their* **(b)(i)** **B1** for $\begin{pmatrix} 44 \\ k \end{pmatrix}$ or $\begin{pmatrix} 49 - their5 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -14 \end{pmatrix}$ or $\begin{pmatrix} k \\ -12 - their2 \end{pmatrix}$	
1(c)(i)	Enlargement (SF) 0.5 oe (centre) (−3, 1)	**3**		**B1** for each	
1(c)(ii)	Rotation 180° (centre) (4, 8)	**3**		**B1** for each	

[Total: 14]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	−1	**2**		**M1** for $[a =] \frac{2}{3} \times 9 - 7$ or better	
1(b)	15	**2**		**M1** for $3 = \frac{2}{3} b - 7$ or better	

[Total: 4]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$y = -2$ drawn, ruled	**1**			
1(b)	$y = -2x$ drawn, ruled	**1**			

[Total: 2]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	1.5 oe	**1**			
1(b)	(0, 2)	**1**			

[Total: 2]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	12.6 or 12.64 to 12.65	**3**		**M2** for $\sqrt{(8 - -4)^2 + (5 - 1)^2}$ oe **M1** for $(8 - -4)^2 + (5 - 1)^2$ oe	
1(b)	(2, 3)	**2**		**B1** for each	

[Total: 5]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	[$y =$] $4x + 5$	**3**		**B2** for answer [$y =$] $4x + c$ oe (c can be numeric or algebraic) OR **M2** for $\frac{y-9}{x-1} = \frac{9-(-3)}{1-(-2)}$ oe OR **M1** for $\frac{9--3}{1--2}$ oe **M1** for correct substitution of (–2, –3) or (1, 9) into $y = (\textit{their } m)x + c$ oe	
1(b)	76[.0] or 75.96...	**2**		**M1** for tan[ ] = 4 oe	
1(c)(i)	[$y =$] $-\frac{1}{4}x + \frac{23}{8}$ oe	**3**		**B2FT** for [$y =$] $-\frac{1}{\textit{their } m \text{ from (a)}}x+c$ oe (c can be numeric or algebraic) OR **M2** for $\frac{y-2}{x-3.5} = -\frac{1}{\textit{their } m \text{ from (a)}}$ oe OR **M1** for $-\frac{1}{\textit{their } m \text{ from (a)}}$ soi **M1** for correct substitution of (3.5, 2) into $y = (\textit{their } m)x + c$ oe	
1(c)(ii)	(–4.5, 4)	**2**		**B1** for each value or for $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$ seen	
					[Total: 10]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$y = -2x + 6$ oe final answer	**3**		**B2** for $y = -2x + c$ oe or $y = mx + 6$ oe $m \neq 0$ or for answer $-2x + 6$ or **B1** for [gradient =] $-\frac{6}{3}$ oe or $c = +6$ soi	
1(b)	$y = 0.5x - 1.5$ oe final answer	**3**		**B1** for [gradient =] -1 divided by *their* gradient from **(b)(i)** evaluated soi **M1** for substitution of (9, 3) into $y = (\textit{their}\ m)x + c$ seen in working	
					[Total: 6]

Question	Answer	Marks	AO Element	Notes	Guidance
1	[$y =$] $\frac{5}{8}x + \frac{7}{4}$	**4**		**M1** for $\frac{-5-3}{7-2}$ oe **M1** for $-1/\textit{their} -\frac{8}{5}$ **M1** for $3 = 2 \times \textit{their}$ gradient $+ c$ oe	
					[Total: 4]

Question	Answer	Marks	AO Element	Notes	Guidance
1	(4.5, –1)	**2**		**B1** for each	
					[Total: 2]

Question	Answer	Marks	AO Element	Notes	Guidance
1	[$y =$] $-\frac{1}{2}x + 3$	**3**		**B2** for [$y =$] $-\frac{1}{2}x + c$ or **M1** for $\frac{rise}{run}$ or $m = \pm\frac{1}{2}$ oe and **B1** for [$y =$] $kx + 3$, $k \neq 0$ or $c = 3$	
					[Total: 3]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$\frac{1}{2}$ or 0.5	**2**		**M1** for $\frac{Rise}{Run}$ e.g. $\frac{2}{4}$ or $\frac{2--1}{2--4}$	
1(b)	$y = \frac{1}{2}x + 1$ oe	**1**		**FT** *their* **(a)** e.g. [$y =$] *their* **(a)** $x + 1$ oe	
					[Total: 3]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	–3, 2	**1**			
1(b)	*B* plotted at (1, –3)	**1**			
					[Total: 2]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	(5, 3)	**1**			
1(b)	Point plotted at (4, −3)	**1**			
1(c)	$\begin{pmatrix} -8 \\ 2 \end{pmatrix}$	**1**			
					[Total: 3]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	4 cao	**1**			
1(b)	−6 cao	**1**			
					[Total: 2]

Question	Answer	Marks	AO Element	Notes	Guidance
1	$\left(2w, \frac{r+t}{2}\right)$ final answer	**2**		**B1** for $2w$ oe nfww or $\frac{r+t}{2}$ oe	
					[Total: 2]

Question	Answer	Marks	AO Element	Notes	Guidance
1	$-2x + 5$	**4**		**M1** for $\frac{7-2}{9-1}$ oe **M1** for gradient of perpendicular = $\frac{-1}{\textit{their}\ 0.5}$ **M1** for (1, 3) correctly substituted into *their* $y = -2x + c$	
					[Total: 4]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$y = \frac{1}{2}x + 2$ oe	**3**		**M2** for gradient = $-\frac{1}{2}$ oe soi or **M1** for rise / run or gradient = $\frac{1}{2}$ and **B1** for $y = mx + 2$, $m \neq 0$	
1(b)	Correct ruled line for $-5 \leqslant x \leqslant 5$	**2**		**B1** for line through (0, −1) or line parallel to line L or correct short line at least from (−4, 1) to (4, −3)	
					[Total: 5]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	(−2, 5)	**1**			
1(b)	$\begin{pmatrix} 4 \\ -3 \end{pmatrix}$	**1**			
1(c)	(5, 4) plotted	**1**			
1(d)	**B1** for parallelogram *PQRS* correctly drawn **B1** for (1, 7)	**2**		**FT** *their R* **FT** *their S* dep on first **B1**	
					[Total: 5]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	(5, 6)	**1**			
1(b)	$[y =] -\frac{4}{5}x + 3$ nfww	**3**		**B2** for $[y =] -\frac{4}{5}x + c$ nfww or **M1** for $\frac{rise}{run}$ using any two of (–5, 7), (0, 3) and (5, –1) **and B1** for $[y =]mx + 3$ $(m \neq 0)$	
1(c)	$y = -\frac{4}{5}x - 2$ oe	**2**		**FT** their gradient from **(b)** **B1** for $y =$ (*their* gradient)$x + c$ (c not 0) or for $y = mx - 2$ $(m \neq 0)$ or for $-\frac{4}{5}x - 2$ alone	
1(d)(i)	$y = \frac{5}{4}x + 4$ oe	**3**		**M1** for $\frac{1}{their\ \text{gradient}}$ from **(b)** **M1** for (8, 14) substituted into *their* $y = mx + c$ or $\frac{y - 14}{x - 8} = m$ or better	
1(d)(ii)	8.54 or 8.544...	**3**		**M2** for $(14 - their6)^2 + (8 - their5)^2$ or better or **M1** for $14 - their\ 6$ and $8 - their\ 5$ seen	
1(d)(iii)	(4, 6)	**2**		**B1** for each	
					[Total: 14]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	–3, 17	**2**		**B1** for each	
1(b)	Fully correct curve	**4**		**B3** FT for 10 or 11 points or **B2** FT for 8 or 9 points or **B1** FT for 6 or 7 points	
1(c)(i)	Correct ruled tangent for *their* curve through (0, –17)	**1**			
1(c)(ii)	(1.7 to 2.2, –1 to 2.5)	**1**			
1(c)(iii)	$[y =] 9x - 17$ final answer	**3**		**M2dep** for answer $[y =]9x [+] - c$ OR **M1dep** for gradient = $\frac{rise}{run}$ for *their* tangent at any point **B1** for answer $[y =]kx [+] - 17$ $(k \neq 0)$	
1(d)	$y = 3x + 2$ ruled correctly and –2.2 … to –2.1 –0.6 to –0.4 2.6 to 2.8	**4**		**B2** for $y = 3x + 2$ ruled or **B1** for $[y =] 3x + 2$ soi or $y = 3x + k$ ruled or $y = kx + 2$ but not $y = 2$ **B2** for all 3 values or **B1** for 2 values	
					[Total: 15]

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$\begin{pmatrix} 2 \\ 4 \end{pmatrix}$ cao	**1**			
1(b)	4.47 or 4.472…	**2**		**M1** for $(their\ 2)^2 + (their\ 4^2)$	
1(c)	(7, 10)	**2**		**B1** for each	
1(d)	$y = 2x - 4$ oe	**3**		**M1** for gradient $= \frac{6-2}{5-3}$ oe or answer $y = mx - 4$ **M1** for substituting (3, 2) or (5, 6) into $y = their\ mx + c$ or into $y - k = their\ m(x - h)$ or into $their\ y = mx - 4$	
1(e)	(0, –4)	**1**		**FT** *their* **(d)**	
					[Total: 9]