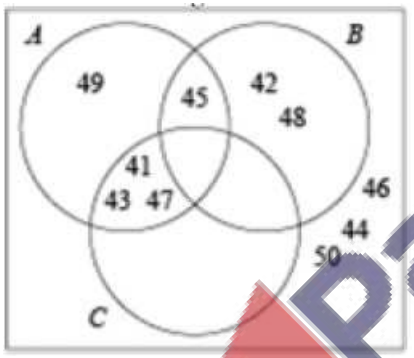
Topical Worksheets for Cambridge O LEVEL

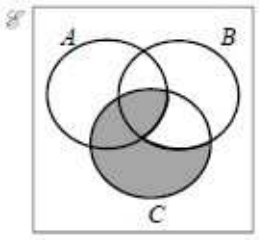
Mathematics (4024)

Numbers, Algebra and Graphs

Mark Scheme

1st edition, for examination until 2025

Question	Answer	Marks	AO Element	Notes	Guidance
1	34	**2**		**M1** for 12 + 0.5 or 4 + 0.5 or better seen	
2	33 500	**2**		**M1** for $36\,515 \div \frac{100 + 9}{100}$ oe	
3	$2^5 \times 3^4 \times 13^2$	**1**			
4	56	**2**		**B1** for $56k$ or lists of multiples of 8 and 14 (at least 3 of each)	
5(a)	Correct Venn diagram 	**3**		**B2** for 8 or 9 numbers correct or **B1** for 6 or 7 numbers correct	
5(b)(i)	41, 43, 47	**1**		**FT** *their* Venn diagram	

Question	Answer	Marks	AO Element	Notes	Guidance
5(b)(ii)	44, 46, 49, 50	**1**		**FT** *their* Venn diagram	
5(c)	0	**1**		**FT** *their* Venn diagram	
6		**1**			
7(a)	8	**1**			
7(b)	26 244	**1**			
7(c)	1	**1**			
8(a)	Jan	**1**			
8(b)	9	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
8(c)	9.5	**2**		**M1** for correctly ordering at least 7 months from one end **or** identifying the middle two, 8 and 11	
8(d)	8.8	**3**		**M1** for attempt to add the temperatures ÷ 12 **A1** for 8.83[3.....] After **M1 A0**, award **SC1** for their mean correct to 2 sf	
9	$\frac{11}{30}$ cao	**3**		**B2** for $\frac{33}{90}$ oe as final answer or **M1** for $36.\dot{6} - 3.\dot{6}$ or $36.6^{r} - 3.6^{r}$ oe or **B1** for $\frac{k}{90}$	
10	1.83×10^{-1} 18.4% $\frac{5}{27}$ 5^{-1}	**2**		**M1** for 3 in correct order or for three of $\left[\frac{5}{27} =\right] 0.185...$, [18.4% =] 0.184, $\left[1.83 \times 10^{-1} =\right] 0.183$, $\left[5^{-1} =\right] 0.2$	

Question	Answer	Marks	AO Element	Notes	Guidance
11	$\frac{9}{25}$ oe	**1**			
12	6	**3**		**B2** for $5\frac{1}{4}$ or 5.25 shown in working isw **or M1** for $\frac{3}{4} \times 7$ soi by answer 5	
13	0.048 cao	**1**			
14(a)	**M1** for $\left[BC^2 =\right] 80^2 + 115^2 - 2 \times 80 \times 115 \cos 72$ oe **A2** for 118.06…	**3**		**A1** for 13939…	
14(b)	67.8 or 67.9 or 67.83 to 67.88	**3**		**M2** for $[\sin B =] \frac{115 \times \sin 72}{118.1}$ oe or **M1** for $\frac{115}{\sin B} = \frac{118.1}{\sin 72}$ oe	
14(c)(i)	255	**3**		**B1** for bearing of B from A is 75 soi **M1** for 180 + 75 oe	

Question	Answer	Marks	AO Element	Notes	Guidance
14(c)(ii)	[00]7.2	**2**		**M1** for *their* **(c)(i)** – *their* **(b)** –180	
14(d)	11.8 or 11.82 to 11.83	**3**		**M1** for 115 ÷ 35 oe **M1** for *their* speed in m/s × 60 × 60 ÷ 1000	
14(e)	76.1 or 76.08 to 76.09	**3**		**M2**for $\frac{\text{distance}}{80} = \sin 72$ oe or **M1** for distance required is perpendicular to *AC* soi	
15(a)	23.27 final answer	**2**		**M1** for 9 × 2.97 soi	
15(b)	2.75 final answer	**3**		**M2** for $2.97 \div \frac{108}{100}$ oe or **M1** for 108[%] associated with 2.97 oe	
16	4[.00...]	**3**		**M2** for $\sqrt[22]{\frac{2607}{6400}}$ or **M1** for $6400 \times x^{22} = 2607$ oe or better	

Question	Answer	Marks	AO Element	Notes	Guidance
17	$\frac{P}{2+\pi}$	**2**		**M1** for $P = r(2+\pi)$	
18	$5(2x+3y)(2x-3y)$ final answer	**3**		**B2** for $(2x+3y)(2x-3y)$ or $(10x+15y)(2x-3y)$ or $(2x+3y)(10x-15y)$ or **B1** for $5\left(4x^2-9y^2\right)$	
19	$\frac{x^2-3x-8}{2(x+1)}$ or $\frac{x^2-3x-8}{2x+2}$ final answer	**3**		**B1** for common denominator $2(x+1)$ or $2x+2$ **M1** for $x(x+1)-2(2x+4)$ or better	
20	$9x^6$	**2**		**B1** for $9x^k$ or kx^6	
21(a)	$y \geqslant x$ oe	**1**			
21(b)	**M1** for $2.25x + 1.5y \leqslant 22.5$ oe **A1** for one step shown to $3x + 2y \leqslant 30$	**2**			

Question	Answer	Marks	AO Element	Notes	Guidance
21(c)	**B1** for $y = 10$ ruled **B2** for $3x + 2y = 30$ ruled **B1** for $y = x$ ruled **B1** for correct region indicated	**5**		Broken line Solid line **B1** for line passing through (0, 15) or (10, 0) Solid line	
21(d)	412	**2**		**M1** for (4, 9) identified or for evaluation $40x + 28y$ for an integer point in the region ($x > 0$ and $y > 0$)	
22(a)	40 54 26 34	**4**		**B1** for each	
22(b)	$n^2 + 3n$ or $n(n + 3)$ oe	**2**		**B1** for a quadratic expression or for 2nd common difference 2 (at least 2 shown) or for 2 correct equations seen or for subtracting n^2	
22(c)	100	**2**		**M1** for *their* **(b)** = 10300 seen	

Question	Answer	Marks	AO Element	Notes	Guidance
22(d)	$[a =] \frac{1}{2}$ oe and $[b =] \frac{5}{2}$ oe	**2**		**B1** for each or **M1** for one correct equation or for 2nd difference = 1 soi (at least 2 shown)	
23	$\frac{3x + 1}{5}$	**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 $y + \frac{1}{3} = \frac{5x}{3}$	
24(a)	$\left(-\frac{1}{3}, -\frac{22}{27}\right)$ oe and $(-5, 50)$	**6**		**B2** for $3x^2 + 16x + 5$ Or **B1** for one correct **M1** for derivative = 0 or *their* derivative = 0 **M1** for $[x =] -\frac{1}{3}$ and $[x =] -5$ **B1** for $-\frac{22}{27}$ and 50	

Question	Answer	Marks	AO Element	Notes	Guidance
24(b)	$\left(-\frac{1}{3},\ -\frac{22}{27}\right)$ minimum $(-5,\ 50)$ maximum with correct reasons	**3**		**B2** for one correct with reason or **M1** for correct attempt e.g. 2nd derivatives, gradients or sketching	
25(a)	$(x+5)^2-11$	**2**		**M1** for $(x+5)^2+k$ or $(x+\textit{their}\ 5)^2+14-(\textit{their}\ 5)^2$ or $a=5$	
25(b)	Sketch of U-shaped parabola with a minimum indicated at (–5, –11) with no part of graph in 4th quadrant	**3**		**FT** *their* $(x+5)^2-11$ provided in that form **B1** for U shape curve **B1FT** for turning point at (–5, k) or (k, –11)	
					[Total: 106]