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MATHEMATICS (SYLLABUS D) **4042/22**

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MARK SCHEME

Maximum Mark: 100

Published

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Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1(a)	A by 240	**4**	**B3** for 4980 **and** 5220 seen or difference = 240 **Or** **M1** for 4500 ÷ 5 and 12 × 340 oe **and** **M1** for 0.12 × 4500 and 24 × 195 oe **and** **M1** for the difference between *their* 5220 and *their* 4980
1(b)	10.61 cao	**3**	**M2** for 240 ÷ 100 × 5.2 × 0.85 soi **Or** **M1** for 240 ÷ 100 × 5.2 or *their* 12.48 × 0.85 or 5.2 × 0.85
1(c)	42	**3**	**B2** for 280 **Or** **M1** for 1.15 x = 322 soi **and** **M1** for 322 – *their* 280
2(a)(i)	12 40 85 107	**1**	
2(a)(ii)	Correct cumulative frequency curve	**2**	**B1FT** for at least 5 correct plots
2(b)(i)	47 to 49	**1FT**	
2(b)(ii)	28 to 32	**2FT**	**B1** for 63 to 65 or 32 to 35

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Question	Answer	Marks	Partial Marks
2(c)	49.3	**3**	**M1** for (12×10 + 28×30 + 45×50 + 22×70 + 13×90) **and** **B1 dep** for *their* $\Sigma fx \div 120$
3(a)	$\begin{pmatrix}5\\6\\8\end{pmatrix}$ cao	**1**	
3(b)(i)	$\begin{pmatrix}440\\540\end{pmatrix}$ cao	**2**	**B1** for one element correct
3(b)(ii)	The amount Anya makes for men's T-shirts and women's T-shirts	**1**	
3(c)(i)	$\begin{pmatrix}290 & 630 & 537.5[0]\end{pmatrix}$	**2**	**B1** for two correct values seen in a row of 3 elements or column of 3 elements isw
3(c)(ii)	48.7%	**3**	**M1FT** for *their* (440 + 540) and *their* (290 + 630 + 537.5) **and** **M1** for (*their* 1457.5 – *their* 980) ÷ *their* 980 oe
4(a)(i)	Triangle *B* at (4, –1), (4, –4), (5, –4)	**2**	**B1** For triangle B the correct size and orientation
4(a)(ii)	Triangle *C* at (1, 4), (3, 4) (3, –2)	**2**	**B1** for correct size and orientation, incorrect position **or** for triangle with two vertices correct **or** for triangle at (–3, 0), (–5, 0), (–5, 6)
4(b)(i)	Triangle *Q* at (3, 1), (9, 1), (6, 3)	**2**	**B1** for coordinates (3, 1), (9, 1) and (6, 3) soi or for triangle with two vertices correct
4(b)(ii)	(Stretch) factor 3 *y*-axis invariant **or** parallel to *x*-axis	**2**	**B1** for either

Question	Answer	Marks	Partial Marks
5(a)	$\frac{14-x}{(x-2)(x+1)}$ Final answer	**2**	**M1** for $\frac{4(x+1)-5(x-2)}{(x-2)(x+1)}$ or better soi
5(b)	–4 or 1.5 oe	**3**	**B1** for $2x^2 + 5x - 12$ [= 0] **and** **M1** for $(2x - 3)(x + 4)$ [= 0] **OR** **M1** for FT factorising their 3-term quadratic equation Or for correct FT substitution into formula oe **and** **A1FT** for solutions from their quadratic equation
5(c)(i)	$3p + 2n = 4.8$[0] or $3p + 2n = 480$ $5p + 4n = 9$[.00] or $5p + 4n = 900$	**1**	
5(c)(ii)	0.6[0] 1.5[0]	**3FT**	**M1** for a correct method to eliminate one variable **A1** for either $p = 0.6$[0] or $n = 1.5$[0] www After **A0** , **B1FT** for a correct substitution to find the other variable After **0**, **SC1** for a pair of values that satisfy either equation
6(a)(i)	1	**1**	
6(a)(ii)	10, 12, 14, 15, 16, 18, 20	**1**	
6(a)(iii)	$\frac{7}{11}$ oe	**1**	
6(b)(i)	8	**2**	**M1** for $14 + 10 + 24 - x = 40$ oe or for correct Venn diagram with algebraic expressions. **Or B1** for Venn diagram with at least 3 numbers correct

Question	Answer	Marks	Partial Marks
6(b)(ii)	$\frac{28}{45}$ oe	**2FT**	**M1** for $\frac{their\,8}{k} \times \frac{their\,7}{k-1}[\times 2]$ where $k >$ their 8 Or **SC1** for $\left(\frac{their\,8}{10}\right)^2$
7(a)(i)	–4.5 –4.5	**1**	Both correct
7(a)(ii)	Correct smooth curve	**3FT**	**B2FT** for 8 or 9 points correctly plotted Or **B1FT** for 6 or 7 points correctly plotted Or **B1** for the correct scales drawn
7(a)(iii)	–2.4 to –1.6 dependent on tangent drawn	**2**	Accept a correctly formed $\Delta y \div \Delta x$ isw **B1** for tangent drawn at (3, 1.5)
7(a)(iv)(a)	–2 **cao**		
7(a)(iv)(b)	–2.4 to –2.3 and 4.3 to 4.4		**FT** reading their graph at $y = their\ -2$ Tolerance ± 1 small square **B1 FT** for one correct
7(b)(i)	4	**1**	
7(b)(ii)	3	**1**	
7(b)(iii)	324	**1**	
8(a)(i)	$\frac{y}{2}$ oe angle at centre = twice angle at circumference oe	**2**	**B1** for $\frac{y}{2}$
8(a)(ii)	$90 - y$ oe [Angle between] radius and tangent = 90°, [sum of angles in a triangle]	**2**	**B1** for $90 - y$

Question	Answer	Marks	Partial Marks
8(a)(iii)	$2y$ oe or 2(90 – *their* **(a)(ii)**) or 180 – 2 *their* **(a)(ii)** Angle in semicircle = 90°	**2FT**	**FT** dependent on expressions in y **B1** for $2y$
8(b)	*EFC*	**1**	
8(c)	Any two of • $\angle OCG$ is common oe • $\angle ADC = \angle OGC$ [= 90°] • $\angle DAC = \angle GOC$ [= y] with no incorrect reason or fact stated	**2**	**B1** for one pair of angles
8(d)	Trapezium	**1**	
8(e)(i)	1 : 4 oe	**1**	
8(e)(ii)	1 : 8 oe	**1**	
9(a)	7.54	**2**	**M1** for $\pi \times 0.4^2 \times 15$
9(b)	53.7	**4**	**M1** for $\frac{1}{2} \times 4.5^2 \times \sin 110$ oe **M1** for $\frac{250}{360} \times \pi \times 4.5^2$ or $\frac{110}{360} \times \pi \times 4.5^2$ **M1** for *their* 9.514 + *their* 44.18 oe
9(c)	2 minutes 20 seconds	**2**	**M1** for figs 175 ÷ 45 soi

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Question	Answer	Marks	Partial Marks
9(d)	146.5°	**4**	**B3** for 33.5° **Or** **M2** for $\sin Q = \frac{450\sin 62}{720}$ **Or** **M1** for $\frac{\sin Q}{450} = \frac{\sin 62}{720}$ **AND** **M1** for 180 – *their Q*
10(a)	$3x^2 + 16x - 460 = 0$ correctly derived	**4**	**B1** for $(x+4)(3x+4)$ oe **and** **M1** for expanding brackets and collecting like terms **and** **M1** for *their* area = 476 **and** **A1** for correct simplification leading to $3x^2 + 16x - 460 = 0$
10(b)	10 and $-\frac{46}{3}$ oe (-15.3)	**3**	**B2** for $(x - 10)(3x + 46)$ **Or** **M1** for such as $(x+a)(3x+b)$ with $ab = -460$ or $3a + b = 16$ **A1FT** for solutions from their factors
10(c)	[Height =] 14 [Length =] 34	**2FT**	**B1FT** for either, or for **both** correct but in the wrong places
10(d)	61.6 or 16(their +ve root + 1)×0.35	**3FT**	**M2** for (*their* 476 – *their* 10 × *their* 30) × 0.5 × 0.7 oe Or **M1** for *their* 476 – *their* 10 × *their* 30 oe

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Question	Answer	Marks	Partial Marks
11(a)	Need to see 2.58 rounded from a correctly obtained 2 581 or better.	**3**	Method 1 **M2** for $AY = 3.65\cos 45$ or $(3.65 \div 2) \div \sin 45$ **or** **M1** for e.g. $\frac{AY}{3.65} = \cos 45$ or $sin45 = \frac{3.65 \div 2}{AY}$ Method 2 **M1** for such as $AY^2 + AY^2 = 3.65^2$ or $3.65^2 + 3.65^2 = AC^2$ soi **M1** for $AY^2 = \frac{3.65^2}{2}$ oe **A1** for AY = 2.580[9…]
11(b)	7.93	**2**	**M1** for $7.5^2 + 2.58^2$
11(c)	26.6° or $2\sin^{-1}\left(\frac{0.5 \times 3.65}{their 7.93}\right)$	**3FT**	**M2** for $2\sin^{-1}\left(\frac{0.5 \times 3.65}{their 7.93}\right)$ or cos […] = $\frac{their7.93^2 + their7.93^2 - 3.65^2}{2 \times their7.93^2}$ **Or** **M1** for $\sin[...] = \frac{0.5 \times 3.65}{their 7.93}$ or 3.65^2 = their7.93^2 + their7.93^2 – 2 ×their 7.93^2 × cos […]
11(d)(i)	11.18 or 11.2	**2**	**M1** for $\tan 77 = \frac{XY}{2.58}$ oe
11(d)(ii)	80.7°	**2FT**	**M1** for tan […] = $\frac{their\ 11.2}{3.65 \div 2}$