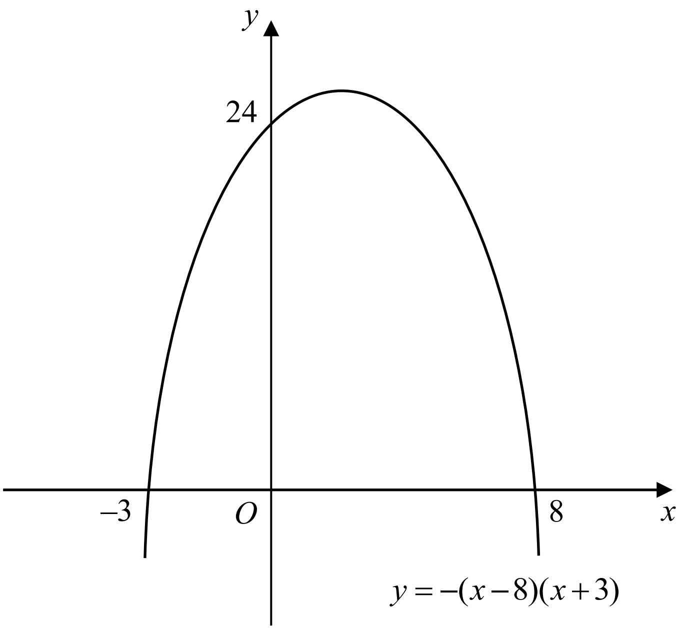
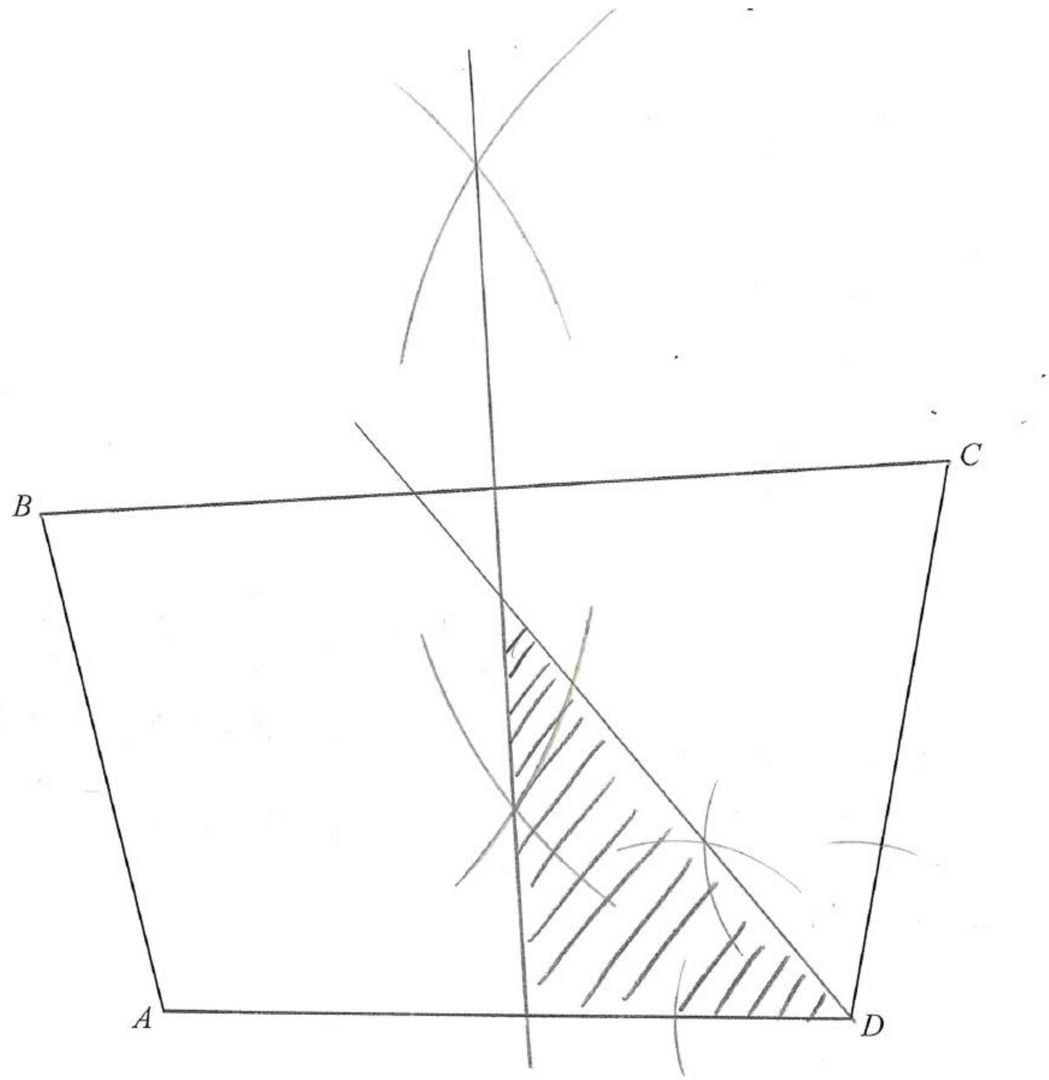
General Certificate of Education Ordinary Level 2017
Mathematics 4048/01
Syllabus 4048 Paper 1
SUGGESTED Solutions & Marking Scheme Mark Allocation
Prepared by: Jordan Tew (*@math_stuff_here*)

1		$k=-4$	B1		
					[1]
2		$-3<x\le 6.5$	B1	o.e.	
					[1]
3	(a)	37 grams	B1		
	(b)	210 grams	B1		
					[2]
4			B2	B1 for correct x and y values B1 for correct shape and relative position	
					[2]
5	(a)	$v=16.5$	B1	o.e.	
	(b)	$\frac{33}{68}=0.485$ m/s^2 (3 s.f.)	B1	Accept exact FT from (a)	
					[2]
6	(a)	$\{2, 10\}\subset A$	B1		
	(b)	$3\in B$	B1		
	(c)	$B\cap C=\varnothing$	B1		
					[3]

7		Let x be the number of adults who joins the club.			
		$\frac{58+x}{95+x} \geq \frac{7}{10}$	M1	Form inequality	
		$580+10x \geq 665+7x$ $3x \geq 85 \Rightarrow x \geq 28\frac{1}{3}$	A1	Solve inequality o.e.	
		Smallest number is 29 adults	A1		
					[3]
8		Angle $FDE = 360° - 96° - 108° = 156°$	M1		
		Exterior angle $= 180° - 156° = 24°$	*M1*		
		Number of sides $= \frac{360}{24} = 15$	*A1*		
		<u>Alternatively (using sum of interior angles):</u>			
		$(n-2) \times 180 = 156n$	*M1*	Form equation	
		$180n - 360 = 156n$ $24n = 360$ $n = 15$	*A1*		
					[3]
9		$\pi r^2 h = \frac{2}{3}\pi r^3$ $h = \frac{2}{3}r$	M1	Expression for h in terms of r	
		Total surface area $= 2\pi r^2 + 2\pi r\left(\frac{2}{3}r\right)$	M1		
		$= \frac{10}{3}\pi r^2$	A1		
					[3]

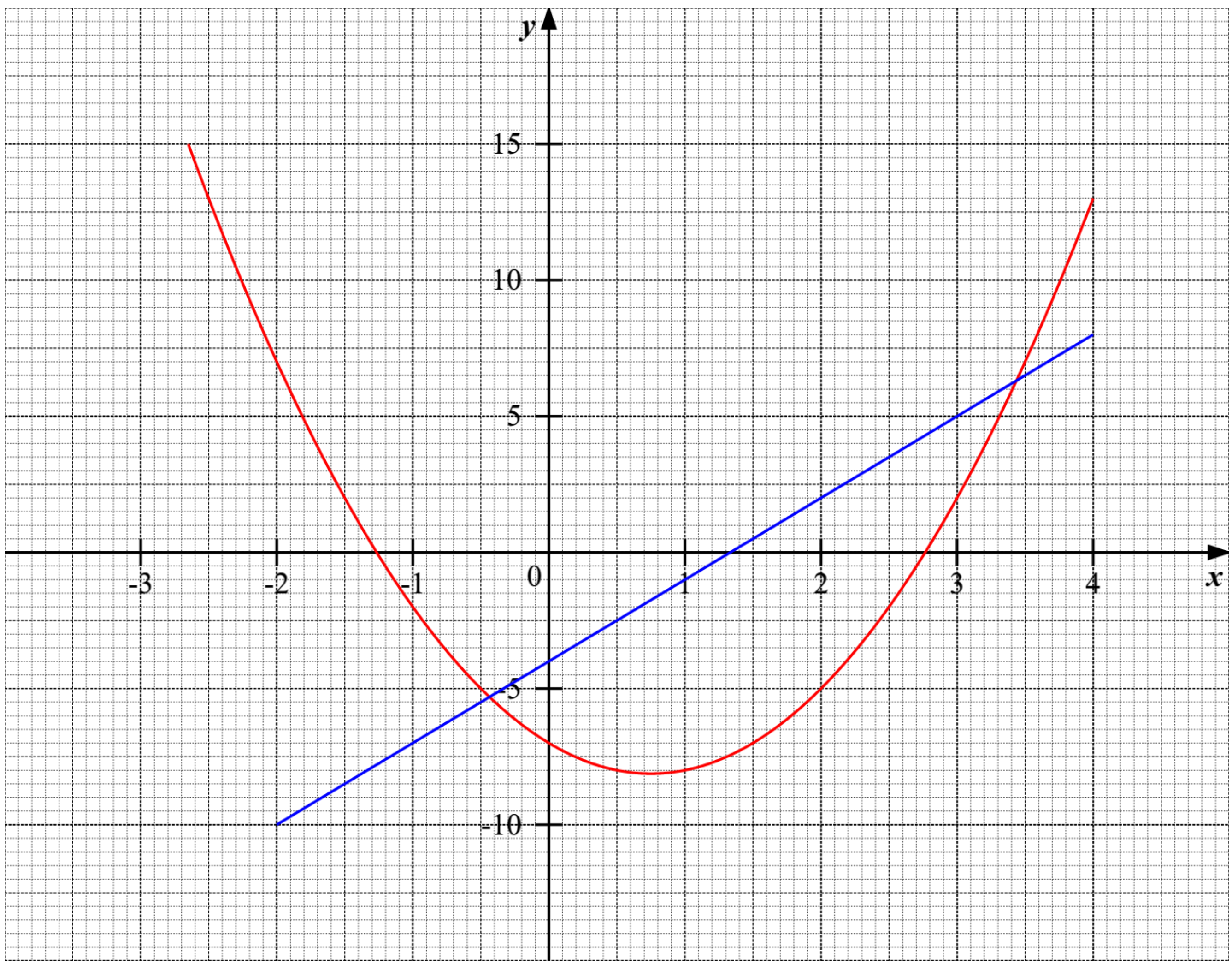
10		Refer to diagram below			
	(a)	Perpendicular bisector with arcs	B1		
	(b)	Angle bisector with arcs	B1		
	(c)	Correct shaded area	B1	FT from (a) & (b)	
					[3]
11		$\dfrac{3(3x-4)-4x}{6}=1$	M1	Join fraction	
		$9x-12-4x=6$	M1	Remove fraction	
		$5x=18$ $x=\dfrac{18}{5}$	A1	o.e.	
					[3]



12		$\overrightarrow{BC}=\begin{pmatrix}-5\\1\end{pmatrix}-\begin{pmatrix}-1\\8\end{pmatrix}=\begin{pmatrix}-6\\9\end{pmatrix}$	M1	Find $\overrightarrow{CB}$ o.e.	
		$\left\lvert\overrightarrow{BC}\right\rvert=\sqrt{(-6)^2+9^2}$	M1		
		$=10.81665383=10.8$ units (3 s.f.)	A1		
					[3]
13		$P\left(1+\frac{2.5}{100}\right)^4-P=674.79$	M1	Find total amount s.o.i.	
		$P\left(\left(1+\frac{2.5}{100}\right)^4-1\right)=674.79$ $P=\frac{674.79}{\left(1+\frac{2.5}{100}\right)^4-1}$	M1		
		$P=\$6500.9828=\$6500.06$ (2 d.p.)	A1		
					[3]
14	(a)	$(2x+3)(x-4)$	B2	B1 Each bracket	
	(b)	$\big(2(2y-3)-3\big)\big(2y-3-4\big)$	M1	Use result from (a)	
		$=(4y-6+3)(2y-7)$ $=(4y-3)(2y-7)$	A1	M0A0	
					[4]
15		Angle $ABC=90°$ (Right-angle in semicircle)	B1		
		$\tan\angle ACB=\frac{8.1}{13.8}$	M1		
		$\angle ACB=\tan^{-1}\left(\frac{8.1}{13.8}\right)=30.41108127°$	M1		
		$x=30.4$ (3 s.f.) (Angles in same segment)	A1	With reason	
					[4]
16	(a)	39.55 minutes	B1	c.a.o.	
	(b)	9.42 minutes	B1		
	(c)	Number of adults $=\frac{72°}{99°}\times 44$	M1	Either angle s.o.i.	
		$=32$	A1		
					[4]

17		Angle $OBA = 2x°$ (Base angles of an isos. triangle)	M1	s.o.i.	
		Angle $OBC = 5x°$ (Base angles of an isos. triangle)	M1	s.o.i.	
		$5x+5x+2x=180$	M1	Form equation	
		$12x=180$ $x=15$	A1		
					[4]
18	(a)	$28=2^2\times 7$ $63=3^2\times 7$	M1	Either one seen	
		$28\times 63=2^2\times 3^2\times 7^2$	M1		
		Since the powers of 28×63 are all even / multiples of 2 / divisible by 2, it is a perfect square.	A1		
	(b)	$k=2\times 7^2$	M1		
		$k=98$	A1		
					[5]
19	(a)	$\mathbf{P}=\begin{pmatrix} 28 & 170 & 95 \\ x & 176 & 89 \end{pmatrix}$	B1		
	(b)	$\mathbf{R}=\begin{pmatrix} 1314 \\ 3x+1236 \end{pmatrix}$	B2	B1 for each correct element	
	(c)	The total amount collected in Week 1 and 2 by the Tennis club are \$1314 and $\$(3x+1236)$ respectively.	B1		
	(d)	$x=26$	B1		
					[5]
20	(a)	$p=32,\ q=25,\ r=18$	B2	B1 for any two B1 for all correct	
	(b)	$46-7n$	B2	B1 for each term	
	(c)	$46-7n=-246 \Rightarrow n=41\frac{5}{7}$ Since n is not a postive integer, –246 is not a term of the sequence.	B1		
					[5]

21	(a)	For values of k less than the minimum value of the curve $y = 2x^2 - 3x - 7$, the line $y = k$ does not intersect the curve and thus the equation has no solutions.	B1		
	(b)	$2x^2 - x - 12 = 0$	B1	c.a.o.	
	(ci)	$y = 3x - 4$	B1		
	(cii)	Drawing of line in (c)(i)	M1	FT from (c)(i)	
		$x = -0.45$ or $x = 3.4$	A2		
					[6]



22	(a)	$A=\dfrac{12.17(1.615+2)}{5-1.615}$	M1	Substitution	
		$A=12.99691285=13.00$ (2 d.p.)	A1	c.a.o.	
	(b)	$A=\dfrac{b(c+2)}{5-c}\Rightarrow A(5-c)=b(c+2)$	M1	Remove fraction	
		$5A-Ac=bc+2b$	M1	Expand	
		$Ac+bc=5A-2b$ $c(A+b)=5A-2b$	M1	Factorise s.o.i.	
		$c=\dfrac{5A-2b}{A+b}$	A1		
					[6]
23	(a)	Let y be the cost of the shampoo and x be its quantity. Thus $y=kx$, where k is a constant.			
		When $x=30.80$, $y=400$. $k=\dfrac{400}{30.80}=\dfrac{1000}{77}$ When $x=19.25$, $y=250$. $k=\dfrac{250}{19.25}=\dfrac{1000}{77}$ When $x=5.95$, $y=75$. $k=\dfrac{75}{5.95}=\dfrac{1500}{119}$	M1	Any two distinct values of k calculated	
		Since k is not a constant, then the cost of the shampoo is not directly proportional to its quantity.	A1	Must conclude	
	(b)	Let h be the height of the 75 ml bottle.			
		$\left(\dfrac{h}{18.4}\right)^3=\dfrac{75}{250}$	M1	Form equation	
		$\dfrac{h}{18.4}=\sqrt[3]{\dfrac{75}{250}}\Rightarrow h=18.4\times\sqrt[3]{\dfrac{75}{250}}$	M1		
		12.31756628 cm = 12.3 cm (3 s.f.)	A1		
					[5]

END OF MARKING SCHEME

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