General Certificate of Education Ordinary Level 2020
Mathematics 4048/01
Syllabus 4048 Paper 1
SUGGESTED Solutions & Marking Scheme Mark Allocation
Prepared by: Jordan Tew (*@math_stuff_here*)

1		–1.46	B1		
					[1]
2		Diagram **3**	B1		
					[1]
3		Angle $BOA = 66°$ (alternate angles, CB is parallel to OA) Angle $OBA = 90°$ (tangent perpendicular to radius)	M1	s.o.i.	
		Angle $OAB = 180° - 90° - 66° = 24°$	A1		
					[2]
4	(a)	The vertical axis does not start from zero.	B1	Do not accept the use of 'y-axis'	
	(b)	It may seem that the newspaper circulation has decreased significantly by 5 times from 2013 to 2016.	B1	o.e.	
					[2]
5	(a)	2^{10}	B1		
	(b)	$\frac{4a^2}{3b} \times \frac{21}{10ab}$	M1	Flip fraction	
		$= \frac{14}{5b^2}$	A1	o.e.	
					[3]
6		Let one side of the hexagon be x.			
		$\frac{\text{Area of hexagon}}{\text{Area of triangle}} = \frac{\frac{1}{2}(x)^2 \sin 60° \times 6}{\frac{1}{2}(4x)^2 \sin 60°}$	M1	Some attempt to use area of triangle formula	
		3 : 8	A1		
					[2]
7	(a)	83 minutes	B1		
	(b)	108 minutes and 69 minutes	B1		
					[2]
8	(a)	0.25	B1	o.e.	
	(b)	$\text{Total} = \frac{9}{0.15}$	M1		
		$= 60$	A1		
					[3]

9		$\frac{4x-10x+15}{20}=-3$	M1	Join fraction	
		$-6x+15=-60$	M1		
		$-6x=-75$ $x=12.5$	A1	o.e.	
					[3]
10	(a)	$\left(x+\frac{9}{2}\right)^2-\left(\frac{9}{2}\right)^2-4$	M1	Completing the square	
		$=\left(x+\frac{9}{2}\right)^2-\frac{97}{4}$	A1	o.e.	
	(b)	$\left(-\frac{9}{2},-\frac{97}{4}\right)$	B1	o.e.	
					[3]
11	(a)	$9n+2$	B1		
	(b)	$9n+2=335$	M1	Equate	
		$9n=333$ $n=37$	A1		
					[3]
12		Kim \$171	B1		
		Pat \$69	B1		
		Xin \$45	B1		
					[3]
13	(a)	$y=0$	B1		
	(b)	$4x^2=16-y$	M1	Rearrange	
		$x^2=\frac{16-y}{4}$ $x=\pm\sqrt{\frac{16-y}{4}}$	A1	o.e.	
					[3]

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14		Total amount of water $= \frac{100}{84} \times 378 = 450$ litres	M1	$\frac{100}{84}$ s.o.i.	
		Capacity $= \frac{100}{60} \times 450$	M1	$\frac{100}{60}$ s.o.i.	
		$= 750$ litres	A1		
					[3]
15		$850\left(1+\frac{r}{100}\right)^{12} = 1120$	M1	Correct use of formula	
		$1+\frac{r}{100} = \sqrt[12]{\frac{112}{85}}$	M1	Remove brackets	
		$r = 100\left(\sqrt[12]{\frac{112}{85}} - 1\right)$ $= 2.325354541 = 2.33$ (3 s.f.)	A1		
					[3]
16	(ai)	{s, a, r, e}	B1		
	(aii)	$\varnothing$ or { }	B1	o.e.	
	(b)	$(P \cap Q)'$	B1		
					[3]
17	(a)	1 : 200000 1 cm : 20 km	M1	Express map in the form cm : km	
		Distance in cm $= \frac{950}{20} = 47.5$ cm	A1		
	(b)	1 cm : 20 km 1 cm^2 : 400 km^2	M1		
		Area in cm^2 $= \frac{330803}{400} = 827.0075$ cm^2	A1	c.a.o.	
					[4]

18		$\tan 36° = \frac{45}{BC}$	M1		
		$BC = \frac{45}{\tan 36°} = 61.93718642$ m	M1		
		$\tan \angle ADB = \frac{45}{61.93718642 + 22}$	M1		
		Angle of elevation $= \tan^{-1}\left(\frac{45}{61.93718642 + 22}\right)$ $= 28.19643473° = 28.2°$ (1 d.p.)	A1		
					[4]
19	(a)	$9x + 6y - 5x + 15y$	M1	Expand	
		$= 4x + 21y$	A1		
	(b)	$3a(4b - 3x) - 2y(4b - 3x)$	M1	Grouping or M0	
		$= (4b - 3x)(3a - 2y)$	A1	or B1 per bracket	
					[4]
20	(a)	Appropriate method to prime factorise	M1	or M0	
		$2^2 \times 3^3 \times 11$	A1	or B1 for any two correct factors and B1 for all correct	
	(b)	$p = 2$	B2	B1 for any two correct values B1 for all correct	
		$q = 3$			
		$r = 1$			
	(c)	HCF $= 66$	B1	c.a.o.	
					[5]

21	(ai)	Angle $EDC = 102°$	B1		
		because of interior angles where AB is parallel to CD.	B1	Must state parallel sides AB and CD	
	(aii)	Angle $BCD = 96°$	B1		
		because of the sum of interior angles in a pentagon.	B1	Must mention pentagon	
	(b)	Angle $BAC = 18°$ (Base angles of an isosceles triangle)	M1	Must state reason	
		Since angle CAE + angle $AED = 120° + 78° - 18° = 180°$, they sum up to interior angles where AC is parallel to ED. Thus, as $ACDE$ has two pairs of parallel sides, it is a parallelogram.	A1		
					[6]
22	(a)	By similar triangles, $\frac{BD}{36} = \frac{36}{24}$ $BD = \frac{36}{24} \times 36 = 54$ m (Shown)	B1 AG		
	(b)	$\frac{1}{2}(CF + 30)(37 + 24) = 1586$	M1		
		$CF = 22$ m	M1		
		Total area $= \frac{1}{2}(24)(36) + \frac{1}{2}(36)(54) + \frac{1}{2}(22)(54) + 1586$	M1		
		$= 3177$ m^2	A1		
					[5]
23	(a)	13.5 hours	B1		
	(bi)	$40\% \times 140 = 56$	M1	s.o.i.	
		$n = 14.75$	A1	M0A0	
	(bii)	$\frac{60 - 12}{140}$	M1	60 or 12 s.o.i.	
		$= \frac{12}{35}$	A1		
					[5]

24	(a)	$\overrightarrow{OP} = m\mathbf{a} + (1-m)\mathbf{c}$	B1	o.e.	
	(bi)	$\overrightarrow{OB} = 4\left(m\mathbf{a} - (1-m)\mathbf{c}\right)$	M1	Factorise 4 s.o.i.	
		$\overrightarrow{OB} = 4\overrightarrow{OP}$ Thus, $\overrightarrow{OB}$ is a scalar multiple of $\overrightarrow{OP}$, with common point O, then O, P and B lie on a straight line.	A1 AG	Must state common point in conclusion	
	(bii)	$\overrightarrow{CB} = \overrightarrow{OB} - \overrightarrow{OC}$	M1	s.o.i. in any step	
		$m = \frac{3}{4}$	A1	o.e.	
		$k = 3$	A1		
	(c)	3 : 4	B1		
					[7]

END OF MARKING SCHEME