MARK SCHEME for the October/November 2015 series

4024 MATHEMATICS (SYLLABUS D)

4024/11　　　　Paper 1, maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Question		Answers	Mark	Part marks
1	**(a)**	19	1	
	(b)	$\dfrac{8}{45}$ oe	1	
2	**(a)**	8	1	
	(b)	48; or FT $6 \times their(a)$	1 ✓	
3	**(a)**	700	1	
	(b)	147; or 3×7^2	1	
4	**(a)**	320	1	
	(b)	150	1	
5		4	2 *	**M1** for $\left(\sqrt{50}\right)^2 - \left(\sqrt{34}\right)^2$
6	**(a)**	30 700	1	
	(b)	(0).538	1	
7		(0).28 oe	2 *	**B1** for (0).4 oe seen
8	**(a)**	123	1	
	(b)	7 WWW	2 *	**M1** for $5a - 2 = 33$ oe
9	**(a)**	11	1	
	(b)	x^2	1	
	(c)	8	1	
10	**(a)**	–8 and 2	1	
	(b)	–3	1	
	(c)	–2, 0, 2 all three	1	
11	**(a)**	(0).75	1	
	(b)	4.65	2 *	**M1** for 5.5 – (0).85
12	**(a)**	4 WWW	2 *	**M1** for (3.8 × 5) soi by 19
	(b)	3	1	

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13	(a)	3	1	
	(b)	2.08; or $2\frac{8}{100}$, or better and isw	2 *	**M1** for numerical $\frac{\sum fx}{50}$
14	(a)	$(\pm)\frac{1}{3}$	1 *	
	(b)	999	1	
	(c)	4	1	
15		$\frac{17}{16d - c}$	3 *	**M1** for squaring *both* sides **M1** (indep.) for collecting *both their x* terms onto one side and the numerical terms onto the other side
16	(a)	7.53×10^{-5}	1	
	(b)	6.045×10^{24}	2	**C1** for figs. 6.0(4)5 or for $A \times 10^{24}$ where $1 < A < 10$
17		1 or 5 WWW	3 *	*Either* **M1** for $5 + (3 - t)^2 = 9$ and **M1** for $t^2 - 6t + 5 = 0$; *or* **M1** for $(3 - t)^2 = 4$ and **M1** for $3 - t = \pm 2$
18	(a)	21	1	
	(b)	$5p + 1$ oe	2	**C1** for $5p + c$; or for $kp + 1$ ($k \neq 0$)
19	(a)	295°	1	
	(b)	Perpendicular bisectors of *AB* and *BC* with region around *B* shaded	2 *	**B1** for either perpendicular bisector correct
20	(a) (i)	20	1	
	(ii)	40	1	
	(b)	300 WWW; or FT $5 \times \{their(i) + their (ii)\}$	2 * $\sqrt{}$	**M1** for $\frac{1}{2} \times (their\ 20 + their\ 40) \times 10$ oe
21	(a)	Pie chart completed accurately, and labelled with Bananas and Oranges	2 *	**M1** for $4 \times 18\ (= 72)$ oe or for $4 \times 32\ (= 128)$ oe
	(b)	20	2 *	**M1** for $\frac{72 - 60}{60} \times 100$ oe

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22	(a)	$16 - 9x$	1	
	(b)	$\dfrac{x+5}{3x-1}$	3 *	**B1** for $(3x+1)(x+5)$ oe **B1** for $(3x+1)(3x-1)$ oe
23	(a)	$15a + 12c = 324$ seen	1	
	(b)	Correctly equating one set of coefficients	**M1**	
		Correct method to eliminate one variable	**M1**	
		Either $a = 16$ or $c = 7$ WWW	**A1**	If **A0**, then **C1** for a pair of values that satisfy either original equation.
		Both $a = 16$ and $c = 7$ WWW	**A1**	
	(c)	99; or FT $(4 \times their\ a + 5 \times their\ c)$ provided both a and c are positive	1 ↙	
24	(a)	112°	2 *	**B1** for $P\hat{R}Q = 31°$; or for $P\hat{R}S = 68°$; or for $P\hat{T}S = 180° - their\ P\hat{R}S$
	(b) (i)	37.5° WWW	2 *	**M1** for $E\hat{O}D$, or other angle at the centre, $= \dfrac{360 - 60}{4}$ (= 75°)
	(ii)	12.56	2 *	**M1** for $\dfrac{60}{360} \times 2 \times 3.14 \times 12$ or better
25	(a)	Two corresponding pairs of angles equated, with reasons, from $B\hat{A}E = F\hat{C}B$ opp. angles of a parm. $A\hat{B}E = C\hat{F}B$ alternate angles $A\hat{E}B = C\hat{B}F$ alternate angles	2 *	**B1** for any one pair, with correct reason
	(b)	7.5 oe	2 *	**M1** for $\dfrac{BC}{5} = \dfrac{6}{4}$ oe
	(c)	$12x$	2 *	**B1** for seeing $4x$ or $9x$ as ΔABE or ΔBCF respectively

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