MARK SCHEME for the May/June 2015 series

0580 MATHEMATICS

0580/32   Paper 3 (Core), maximum raw mark 104

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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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

	Qu		Answer	Mark	Part answers
1	**(a)**	**(i)**	2, 3, 4	1	
		(ii)	2 or 3	1	
		(iii)	7	1	
		(iv)	7	1	
		(v)	3	1	
	(b)	**(i)**	9754	1	
		(ii)	Nine thousand seven hundred [and] fifty four	1FT	**FT** *their* **(b)(i)** provided it has at least four figures
	(c)	**(i)**	120	1	
		(ii)	361	1	
2	**(a)**		$11e - 6f$ as final answer	2	**B1** for either $11e$ or $-6f$ in their final answer
	(b)		67	2	**B1** for $8 \times 5 - 9 \times -3$ or 40 or +27
	(c)		9	2	**M1** for algebraic first step correct $4x = 29 + 7$ or $x - \dfrac{7}{4} = \dfrac{29}{4}$ or better
	(d)		k^{-7} oe	1	
	(e)	**(i)**	220	1	
		(ii)	$4p + 10w = 350$	1	
		(iii)	$[p =]$ 45, $[w =]$ 17	3	**M1FT** for correct elimination of one variable from their equations **A1** for $p = 45$ **A1** for $w = 17$ If zero scored, **SC1FT** for 2 values satisfying one of their original equations

	Qu		**Answer**	**Mark**	**Part answers**
3	**(a)**	**(i)**	66.0 or 65.97 to 65.98 …	**2**	**M1** for $\pi \times 21$
		(ii)	346 or 346.3 to 346.4 …	**2**	**M1** for $\pi \times (21 \div 2)^2$
	(b)	**(i)**	90	**1**	
		(ii)	$\sqrt{(21^2 - 9^2)}$	**M2**	**M1** for $21^2 = AB^2 + 9^2$ or $[AB^2] = 21^2 - 9^2$
			18.97(……)	**A1**	
	(c)	**(i)**	85.5	**2**	**M1** for $0.5 \times 19 \times 9$
		(ii)	87.5 or 87.65 to 87.823	**2FT**	**M1FT** for $0.5 \times$ *their* **(a)(ii)**
	(d)	**(i)**	Tangent	**1**	
		(ii)	Radius	**1**	
		(iii)	33.3 or 33.27(……)	**2**	**M1** for $\tan[\ ] = \dfrac{(21 \div 2)}{16}$ or better
4	**(a)**	**(i)**	10 -2	**1, 1**	
		(ii)	6 points correctly plotted correct smooth curve	**3**	**B2FT** for 5 or 6 points correctly plotted or **B1FT** for 3 or 4 points correctly plotted
		(iii)	(1.4 to 1.6, 10.1 to 10.4)	**1**	
	(b)	**(i)**	6 3	**1, 1**	
		(ii)	5 points correctly plotted correct curve	**3**	**B2FT** for 4 or 5 points correctly plotted or **B1FT** for 2 or 3 correct points
	(c)		1.1 to 1.3 4.1 to 4.3	**1FT, 1FT**	

	Qu		Answer	Mark	Part answers
5	**(a)**	**(i)**	Kite	**1**	
		(ii)	1	**1**	
	(b)		12	**1**	
	(c)	**(i)**	Translation	**1**	
			$\begin{pmatrix} 7 \\ -9 \end{pmatrix}$	**1**	
		(ii)	Reflection	**1**	
			$y = -1$ oe	**1**	
		(iii)	Enlargement	**1**	
			[Scale Factor] $\frac{1}{2}$	**1**	
			[Centre] $(-6, 0)$	**1**	
	(d)		Correct rotation	**2**	**B1** for a 'correct' rotation of 90° anti-clockwise or correct orientation but wrong position
6	**(a)**	**(i)**	$3\frac{1}{4} \times 60$ [= 195]	**1**	
		(ii)	22 45	**2**	**B1** for [Total time =] 6 [hours] 30 [minutes] or $6\frac{1}{2}$ [hours] or 390 [minutes] or **M1** for adding to 16 15 *their* attempt at $3\frac{1}{4} + 2\frac{1}{2} + 45$
		(iii)	13 : 10 : 3	**2**	**B1** for $3\frac{1}{4} : 2\frac{1}{2} : \frac{3}{4}$ or 195 : 150 : 45 or better or **SC1** for 13,10,3 in the wrong order in a ratio
	(b)	**(i)**	78	**1**	
		(ii)	30	**1**	
		(iii)	87	**1FT**	195 – (*their* **(b)(i)** + *their* **(b)(ii)**)
	(c)		8	**3**	**M2** for $\frac{22.5 - 20.7}{22.5} \times 100$ or better or **B1** for 22.5 – 20.7

	Qu		Answer	Mark	Part answers
7	(a)	(i)	15	1	
		(ii)	65	1	
		(iii)	4	1	
		(iv)	64.77 or 64.8	3	**M1FT** for $63 \times 12 + 64 \times 30 + 65 \times 35 + 66 \times$ *their* $15 + 67 \times 8$ **M1FT** dep for *their* total $\div 100$
		(v)	Line at 72° to the given line	3	**M2** for 288° or 72° or **M1** for $\dfrac{80}{100} \times 360$ or $\dfrac{20}{100} \times 360$
	(b)		64.5 65.5	1, 1	If zero scored, **SC1** for correct but wrong way round
8	(a)	(i)	116	2	**B1** for 5.8 seen
		(ii)	[0]65	1	
	(b)		Correct construction of point *C* with arcs	2	**B1** for correct position but no arcs or incorrect arcs or **B1** for one correct arc
	(c)		Correct point *D* with *AD* drawn	3	**B1** for [bearing] 135° **B1** for [*AD* =] 10 cm
	(d)		630 [m] to 646 [m]	3	**M2FT** for *their* **(a)(i)** + 140 + 200 + *their CD* × 20 **M1FT** for *their CD* or *their CD* × 20

	Qu		Answer	Mark	Part answers
9	**(a)**		650 225 875	**1** **1** **1FT**	
	(b)		546 or 546.4 or 546.44 or 546.45	**2**	**M1** for 10 000 ÷ 18.3
	(c)	**(i)**	1937 ÷ 2.83[3…] or 1937 ÷ 170 × 60	**M1**	
			683.6 to 684.4.....	**A1**	but not 684
		(ii)	14 35	**2**	**B1** for 16 05 [time in Mumbai on arrival] or **B1** for 11 45 [time in Dubai on departure from Mumbai] or **M1** for 2 hours 50 mins – 1 hour 30 mins + 1315 or **SC1** for answer 2 35pm