## **CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**Cambridge International General Certificate of Secondary Education** 

## MARK SCHEME for the May/June 2015 series

## 0580 MATHEMATICS

0580/21 Paper 2 (Extended), maximum raw mark 70

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

Question.	Answer	Mark	Part Marks
1	9.5	1	
2	7.37 or 7.371	1	
3	$2.7 \times 10^5$	1	
4	$2x^2 + 8x - 35 $ final answer	2	<b>B1</b> for 2 correct terms in final answer or <b>M1</b> for $2x^2 + 3x$ or $5x - 35$
5	Sammy and correct reason with 25.7% oe shown	2	<b>B1</b> for 25.7% or 0.257 seen or conversion of 26% to fraction and common denominator
6	44	2	<b>B1</b> for 75.5 or 119.5 seen
7	$24u^2w^3$ final answer	2	<b>B1</b> for 2 correct elements in final answer
8	13.6 or 13.60	3	M2 for $\sqrt{(-4-7)^2 + (6-(-2))^2}$ oe or M1 for $(-4-7)$ oe or $(6-(-2))$ oe
9	$\frac{9}{5}$	B1	or $\frac{63}{35}$
	their $\frac{9}{5} \times \frac{7}{3}$ or $\frac{9 \times 7}{5 \times 3}$	M1	or <i>their</i> $\frac{63}{35} \div \frac{15}{35}$ or equivalent division with fractions with common denominators
	$\frac{21}{5}$ or $4\frac{1}{5}$ cao	A1	
10	2520	3	<b>M2</b> for $12 \times (1+6) \div 2$ oe
			or M1 for 1 area correct
			If zero scored <b>B1</b> for top speed = 720 m per min or total time = 360 sec

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Question.	Answer	Mark	Part Marks
11 (a)	4n oe final answer	1	
(b)	$3n^2 + 8$ oe final answer	2	M1 for a quadratic expression as final answer or $3n^2 + 8$ oe in working
12	18	3	<b>M2</b> for $2(2+4)^2 = p(-2+4)^2$ oe
			<b>M1</b> for $p = \frac{k}{(q+4)^2}$ <b>A1</b> for $k = 72$
			AT 101 K = 72
13	72	3	<b>M2</b> for $\frac{1280}{64} \times \frac{60 \times 60}{1000}$
			M1 for working out distance ÷ speed
			e.g. figs $1280 \div 64$ or figs $\frac{1280}{their speed}$
			or for working out km/h to m/s conversion
			e.g. $64 \times \frac{1000}{60 \times 60}$ oe
			or their $\left(\frac{1280}{64}\right) \times \frac{60 \times 60}{1000}$ oe
14 (a)	$\mathbf{a} + 2\mathbf{b} - \mathbf{a}$ or $\mathbf{a} - (\mathbf{a} - 2\mathbf{b})$ oe	1	
<b>(b)</b>	Parallelogram	1	
	PM equal and parallel to QR	1	SC1 for answer trapezium with reason PM
	or		parallel to QR
	PM or $PS$ parallel to $QRand MR found = a so 2 pairs ofparallel sides$		
15	y < 8	1	
	$y \ge 6 - x$ oe and $y \ge x + 2$ oe	3	<b>B2</b> for either $y \ge 6 - x$ oe or $y \ge x + 2$ oe or $y \ge 6 - x$ oe and $y = x + 2$ oe or <b>SC2</b> for $y = 6 - x$ oe and $y = x + 2$ oe or <b>SC1</b> for $y > 6 - x$ or $y = 6 - x$ or $y > x + 2$ or $y = x + 2$

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Question.	Answer	Mark	Part Marks
16	1597 cao	4	B3 for 1597.39 or 1597.3[9] or 1597.4 or 6597 or B2 for 6597.3[9] or 6597.4 or B1 for $5000\left(1+\frac{2}{100}\right)^{14}$ If B1 scored or B0 scored and an attempt at compound interest is shown SC1 for <i>their</i> 6597[] – 5000 evaluated correctly provided answer positive and SC1 for <i>their</i> final answer rounded correctly to nearest \$ from their more accurate answer
17 (a)	$2\times3\times5$	2	<b>B1</b> for 2, 3, 5 as prime factors
<b>(b)</b>	90	2	B1 for $90k$ or for listing multiples of each up to $90$ or $2 \times 3^2 \times 5$
18	Correctly equating one set of coefficients	M1	
	Correct method to eliminate one variable	M1	Dependent on the coefficients being the same for one of the variables Correct consistent use of addition or subtraction using their equations
	x = 0.8	<b>A1</b>	If zero scored SC1 for
	y = -3	A1	2 values satisfying one of the original equations or
			if no working shown, but 2 correct answers given
19 (a)	7.5	2	M1 for $[10] \times \frac{6}{8}$ oe
<b>(b)</b>	12 cao	2	M1 for $9 \times \frac{8}{6}$ oe or $9 \times \frac{10}{their (a)}$
20 (a)	(p+t)(y+2x) final answer	2	<b>B1</b> for $y(p+t)+2x(p+t)$ or $p(y+2x)+t(y+2x)$
(b)	7(h+k)(h+k-3) final answer	2	<b>B1</b> for $7((h+k)^2 - 3(h+k))$ or $(h+k)(7(h+k)-21)$

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Question.	Answer	Mark	Part Marks
21	285 cao	4	<b>M1</b> for $\frac{1}{3} \times \pi \times 4^2 \times 9$ , $48\pi$
			M1 for $\frac{1}{2} \times \frac{4}{3} \times \pi \times 4^3$ , $\frac{128\pi}{3}$
			<b>A1</b> for 284.8 to 284.9, $\frac{272\pi}{3}$
			If <b>A0</b> then <b>B1</b> for <i>their</i> final answer rounded correctly to nearest whole number from their more accurate answer dependent on at least <b>M1</b>
22 (a)	$\begin{pmatrix} 22 & 17 \\ 18 & 7 \end{pmatrix}$	2	M1 for a $2 \times 2$ matrix with 2 correct elements
(b)	$\frac{1}{2} \begin{pmatrix} 4 & -3 \\ -6 & 5 \end{pmatrix}$	2	<b>M1</b> for $\frac{1}{2} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or $k \begin{pmatrix} 4 & -3 \\ -6 & 5 \end{pmatrix}$ soi
			or det = 2 soi
23 (a)	-13	1	
(b)	-3x - 1 or $5 - 3(x + 2)$	1	
(c)	9x - 10 cao	2	<b>M1</b> for $5 - 3(5 - 3x)$
(d)	$\frac{5-x}{3}$ final answer oe	2	M1 for correct first step e.g.
			$y+3x = 5$ or $\frac{y}{3} = \frac{5}{3} - x$ or $y-5 = -3x$ or
			better
			or
			for interchanging x and y, e.g. $x = 5 - 3y$ , this does not need to be the first step