

**MARK SCHEME for the October/November 2012 series**

**0444 MATHEMATICS (US)**

**0444/23**

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
cso	correct solution only
dep	dependent
ft	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
www	without wrong working
art	anything rounding to
soi	seen or implied

Qu.	Answers	Mark	Part Marks
<b>1</b>	96	<b>2</b>	<b>M1</b> for $\frac{600 \times 2 \times 8}{100}$ oe. If zero <b>SC1</b> 696
<b>2</b>	$\frac{1}{100} + \frac{4}{25}$ or $0.1^2 + 0.4^2$ oe $\frac{1}{100} + \frac{16}{100} = 0.17$ or $0.01 + 0.16 = 0.17$	<b>M1</b> <b>M1</b>	Independent
<b>3</b>	180	<b>2</b>	<b>M1</b> for $\frac{300 \times 12}{20}$ oe
<b>4</b>	$3y - y^4$ final answer	<b>2</b>	<b>B1</b> for $3y$ or $-y^4$ as part of 2 term expression
<b>5</b>	88.2(0)	<b>2</b>	<b>M1</b> for $84 \times 1.05$ oe
<b>6</b>	2.5	<b>2</b>	<b>M1</b> for relevant distance / relevant time, e.g. 250/6
<b>7</b>	4	<b>2</b>	<b>B1</b> for 1.8 seen
<b>8</b>	$x \geq -2$ or $-2 \leq x$ oe	<b>2</b>	<b>B1</b> for $-7 + 3 \leq 2x$ oe or better
<b>9</b>	Correct working seen	<b>M1</b> <b>M1</b>	Correct step Correct step
<b>10</b>	$4w^{64}$	<b>2</b>	<b>B1</b> for $4w^n$ or $kw^{64}$
<b>11</b>	(6, 2)	<b>1,1</b>	<b>B1, B1</b> If B0, <b>M1</b> for $(2, -1) + (4, 3)$ soi <b>SC1</b> for $B(10, 5)$
<b>12</b>	40    6	<b>2</b>	<b>B1</b> for one correct
<b>13 (a)</b>	(i) $\frac{20}{100}$ oe (ii) $\frac{90}{100}$ oe	<b>1</b> <b>1</b>	
<b>(b)</b>	80	<b>1</b>	

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14	3, -3 or $\pm 3$	3	M1 for $y = k/\sqrt{x}$ oe A1 for 18
15	3600	3	M2 for $4 \times 900$ oe B1 for figs 36
16	$\sqrt{\frac{\pi x^2 - A}{\pi}}$ oe	3	M1 for one correct move M1 for second correct move M1 for third correct move
17 (a)	150n	1	
(b)	3, 4, 6, 7	2	B1 for 3 out of 4 correct or 3 4 5 6 7
18	$10r^2$ cao WWW	3	B1 for $\left(\frac{\theta}{360}\right) \frac{4r}{2 \times \pi 5r}$ M1 for $\frac{4r}{2 \pi 5r} \times (5r)^2 \pi$
19 (a)	$\frac{1}{3}(c-d)$ oe	2	M1 for $\overrightarrow{DC} = c - d$ oe or correct route
(b)	$\frac{1}{3}c + \frac{2}{3}d$ oe	2ft	Their (a) + $d$ simplified M1 for any correct route from O to E stated
20 (a)	$\frac{x}{x-1}$ final answer	2	M1 for $\frac{1+x-1}{x-1}$ oe
(b)	$\frac{23-2x}{12}$	3	M1 for two correct algebraic fractions with a common denominator of 12 M1 for correctly collecting their terms M1 for dealing correctly with the 1
21	$h+4$ $h+5$	4	B2 for $(h-5)(h+4)$ seen B1 for $(h-5)(h+5)$ If B2 not scored then SC1 for $(h+a)(h+b)$ where $a+b = -1$ or $ab = -20$
22 (a)	0.5	2	M1 for $\frac{\sin A}{15} = \frac{0.2}{6}$ oe or better
(b)	150	2	B1 for 30 seen
23 (a)	43	2	M1 for $g(11)$ or $4[4(3) - 1] - 1$
(b)	$12x + 2$	2	M1 for $3(4x - 1) + 5$
(c)	38	1	

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<b>24 (a)</b>	7	<b>3</b>	<b>M2</b> for $6^2 + 2^2 + 3^2$ or better or <b>M1</b> for one of $6^2 + 2^2$ or $2^2 + 3^2$ or $6^2 + 3^2$
<b>(b)</b>	$36 + 6\sqrt{13}$	<b>3</b>	<b>M2</b> for correct area statement $6 \times 3 + 6 \times 2 + \frac{2 \times 3}{2} \times 2 + 6 \times \sqrt{13}$ Or <b>M1</b> for two correct areas