



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**MATHEMATICS (US)**

**0444/33**

Paper 3 Core

**October/November 2016**

MARK SCHEME

Maximum Mark: 104

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**Published**

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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
nfw	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part marks
<b>1 (a) (i)</b>	64 81 and no others	<b>2</b>	<b>B1</b> for 1 correct and no others or 2 correct and 1 wrong
<b>(ii)</b>	90 <i>k</i>	<b>1</b>	accept any multiple of 90
<b>(iii)</b>	1, 3, 9, 27 only	<b>2</b>	<b>B1</b> for three correct and no extras or four correct and one extra
<b>(iv)</b>	16	<b>2</b>	<b>B1</b> for 2, 4 or 8 as answer
<b>(b) (i)</b>	$\frac{9}{4}$ or 2.25 oe	<b>1</b>	
<b>(ii)</b>	$\frac{1}{2}$ oe	<b>1</b>	
<b>(iii)</b>	625	<b>1</b>	
<b>(iv)</b>	1.318 cao	<b>2</b>	<b>B1</b> for $\frac{112}{85}$ or 1.317647059 rounded to 3 or 5 or more sig figs
<b>2 (a)</b>	258[.00] <u>25.56</u> 758.56	<b>1</b> <b>1</b> <b>1FT</b>	<b>FT</b> their two previous answers + 475
<b>(b) (i)</b>	85	<b>1</b>	
<b>(ii)</b>	739.2[0]	<b>3</b>	<b>M1</b> for 4400 – 3740 or soi by 660 <b>M1</b> for <i>their</i> 660 × 1.12 oe
<b>(c)</b>	26.75 cao	<b>1</b>	
<b>(d)</b>	Van and 12.6 > 12.4 oe or 0.0792 < 0.0806 or 0.982 < 1	<b>2</b>	<b>B1</b> for 12.6[...] or 0.0806[...] or 0.982[...]
<b>(e)</b>	2800	<b>2</b>	<b>M1</b> for [2×] 4200 ÷ (1 + 2) oe or soi by 1400

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Question	Answer	Mark	Part marks
<b>3</b>	<b>(a) (i)</b>	[0].45	<b>1</b>
	<b>(ii)</b>	6.115 or 6.12	<b>2</b> <b>M1</b> for adding the lengths (soi by $48.92 \div 8$ )
	<b>(b) (i)</b>	4 correct points	<b>2</b> <b>B1</b> for 2 or 3 correct points
	<b>(ii)</b>	Negative	<b>1</b>
	<b>(iii)</b>	No [because] the faster an athlete runs the further they jump oe	<b>1</b> Accept any correct statement
	<b>(iv)</b>	Correct ruled line of best fit	<b>1</b>
	<b>(v)</b>	Correct distance from <i>their</i> line of best fit	<b>1FT</b> <b>Strict FT</b> from straight line with negative gradient
<b>4</b>	<b>(a) (i)</b>	35	<b>1</b>
	<b>(ii)</b>	74	<b>1</b>
	<b>(b)</b>	43 <b>and</b> valid reasons	<b>3</b> reasons include external angle of a triangle equals the sum of the internal opposite angles or angles on a straight line [sum to 180] and angles in a triangle [sum to 180] <b>B2</b> for 43 or <b>M1</b> for $180 - 128$ soi 52 or $128 - 85$ <b>B1</b> for valid reasons
	<b>(c)</b>	32.2 or 32.23...	<b>2</b> <b>M1</b> for $\sin [\dots] = 8 \div 15$ oe
	<b>(d) (i)</b>	$[AB] = \sqrt{300^2 + 225^2}$	<b>2</b> <b>M1</b> for $300^2 + 225^2$
	<b>(ii)</b>	1535	<b>4</b> <b>M1</b> for $375 \div 450$ or $[0].833[\dots]$ <b>M1</b> for <i>their</i> $[0].833 \times 60$ or soi by 50 <b>M1</b> for $1445 + \text{their } 50$

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Part marks</b>
<b>5 (a)</b>	<i>B</i> correct  <i>C</i> correct	<b>1</b>  <b>2FT</b>	<b>B1</b> for <i>C</i> correct without arcs or correct pair of arcs or correct lengths reversed with arcs  If zero scored, <b>SC1</b> for $AB=8$ or $AC=6$ or $BC=5$
<b>(b)</b>	14.9 to 15.3	<b>1</b>	Correct or <b>FT</b>
<b>(c)</b>	203	<b>2</b>	<b>M1</b> for $180 + 23$
<b>6 (a)</b>	325 150 450 75	<b>3</b>	<b>B2</b> for 3 correct  or <b>B1</b> for 2 correct  or <b>M1</b> for $45 \div 18$ soi by 2.5
<b>(b) (i)</b>	632	<b>2</b>	<b>M1</b> for $(395 \times 8) \div 5$ oe
<b>(ii)</b>	0.632	<b>1FT</b>	<b>FT</b> <i>their</i> <b>(b)(i)</b> $\div 1000$
<b>(c) (i)</b>	$\frac{9C+160}{5}$ or $(9C+160) \div 5$  or $\frac{9C}{5} + 32$	<b>2</b>	<b>B1</b> for $9C + \frac{160}{5}$ or $9C + 160 \div 5$
<b>(ii)</b>	356	<b>1</b>	

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Question	Answer	Mark	Part marks
7	(a)	6h oe	1
	(b) (i)	4x oe	1
	(ii)	$x^2$ oe	1
	(c)	7.5	5
			M1 for $2x + 1 + x + 3 + 2x + 1 + x + 3$ oe
			M1 for $6x + 8$ or <i>their</i> expression simplified correctly
			M1 for <i>their</i> $6x + 8 = 53$
			M1 for a correct first step in solving <i>their</i> linear equation
	(d) (i)	-3	1
	(ii)	$6a + b$ final answer	2
8	(e) (i)	$5x - 20$ final answer	1
	(ii)	$x^3 + 3x$ final answer	2
	(f)	$4x(2x - 1)$ final answer	2
			B1 for $x(8x - 4)$ or $4(2x^2 - x)$ or $2(4x^2 - 2x)$ or $2x(4x - 2)$
	(a)	Correct reflection	1
	(b)	Correct translation	2
	(c)	Rotation	1
		[about] (0,0)	1
		90° [anti-clockwise] oe	1
	(d)	Enlargement	1
		[centre] (0,0)	1
		[sf] 2	1

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Question	Answer	Mark	Part marks
<b>9</b> (a)	15 8 ... 0 ... 0 ... 8	<b>3</b>	<b>B1</b> for 8 and 8 in the correct place <b>B1</b> for 0 and 0 in the correct place <b>B1</b> for 15 in the correct place
(b)	Correct curve	<b>4</b>	<b>B3FT</b> for 7 or 8 points correctly plotted <b>FT</b> their table or <b>B2FT</b> for 5 or 6 points correctly plotted <b>FT</b> their table or <b>B1FT</b> for 3 or 4 points correctly plotted <b>FT</b> their table
(c)	Correct ruled line	<b>1</b>	
(d)	–1.8 or –1.7 or –1.6 3.6 or 3.7 or 3.8	<b>2FT</b>	<b>B1FT</b> for one correct or <b>B1FT</b> for both correct answers as co-ordinates or <b>B1FT</b> for both answers correct to more than 1dp
<b>10</b> (a)	$0 < x < 10$ cao	<b>2</b>	accept $0 < x, x < 10$ <b>B1</b> for $k < x < 10$ or $0 < x < k$ or $0 < \dots < 10$ or $0 \leq x \leq 10$
(b)	$-5 [ < f(x) < ] 25$	<b>2</b>	<b>B1</b> for each
(c)	$x - 5$	<b>1</b>	
(d)	4	<b>2</b>	<b>M1</b> for $3x - 5 = 7$
(e)	$g(x) = f(x + 4)$ indicated only	<b>1</b>	