

**MARK SCHEME for the October/November 2013 series**

**0607 CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/06**

Paper 40 (Extended), maximum raw mark 40

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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<b>A INVESTIGATION SUMS OF SEQUENCES</b>			
<b>1</b>	$108 \div 27 [= 4]$	<b>1</b>	
<b>2 (a) (i)</b>	21.42, 38.32, 59.74, 98.06	<b>1</b>	<b>FT</b> their total $\div$ their 5th number  <b>Dep on (b)(i) correct</b>
<b>(ii)</b>	4 www	<b>1FT</b>	
<b>(b) (i)</b>	Candidate's own negative sequence correct	<b>1</b>	
<b>(ii)</b>	4 www	<b>1</b>	
<b>3 (a)</b>	$p + 2q + 2p + 3q \quad   \quad 3p + 5q$	<b>1,1</b>	Accept different order
<b>(b)</b>	$8p + 12q$ oe isw or $5p + 7q$ plus their $3p + 5q$ or 4 times 5 <sup>th</sup> term	<b>1FT</b>	<b>FT</b> their 6th term in <b>3(a)</b> <b>C</b> opportunity
<b>(c)</b>	$2p + 3q = \frac{8p + 12q}{4}$ OR $8p + 12q = 4(2p + 3q)$ isw  OR $\frac{8p + 12q}{2p + 3q} = 4$	<b>1</b>	
<b>4 (a)</b>	$5p + 8q$ $8p + 13q$ $13p + 21q$ $21p + 34q$	<b>2FT</b>	<b>FT</b> their previous 6th term in $p$ and $q$ in <b>3(a)</b> <b>B1</b> for any two correct including after incorrect FT If 0 scored <b>SC1</b> for explicit sum of 2 previous terms not totalled for all 4 correct
<b>(b)</b>	$55p + 88q$ oe isw	<b>1</b>	<b>C</b> opportunity
<b>(c)</b>	$5p + 8q = \frac{55p + 88q}{11}$ OR $11(5p + 8q) = 55p + 88q$ isw  OR $\frac{55p + 88q}{5p + 8q} = 11$	<b>1</b>	

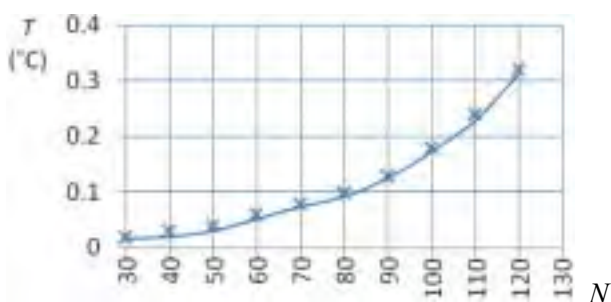
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<b>5</b>	<b>(a)</b>	$34p + 55q$ $55p + 89q$ $89p + 144q$ $144p + 233q$	<b>2FT</b>	<b>FT</b> their previous 9 <sup>th</sup> and 10 <sup>th</sup> terms in $p$ and $q$ in <b>4(a)</b> <b>B1</b> for any two correct including after incorrect FT If 0 scored <b>SC1</b> for explicit sum of 2 previous terms not totalled for all 4 correct		
	<b>(b)</b>	$377p + 609q$ oe isw			<b>1</b>	<b>C</b> opportunity
	<b>(c)</b>	29 soi			<b>1</b>	<b>C</b> opportunity
	<b>(d)</b>	$377p + 609q = 29 ( 13p + 21q)$ seen oe			<b>1</b>	<b>SC1</b> if this statement seen in <b>(c)</b> and not here
<b>6</b>		[sum of first 10 terms = ] 11 times 7th term [sum of first 14 terms = ] 29 times 9th term [sum of first 18 terms = ] 76 times 11th term	<b>1</b>			
		Communication seen in one of <b>3(b)</b> <b>4(b)</b> <b>5(b)</b> <b>5(c)</b>	<b>1</b>			
		Total	<b>20</b>			

**B MODELLING THE EARTH'S TEMPERATURE**

1 (a)

10 correctly plotted points  $\pm 1$  mm



**P2**  
**D1**

**P1** for 8 or 9 correct points  $\pm 1$  mm  
**D1** for smooth curve through plotted points

(b) (i)

$$T = aN^b$$

**1**

(ii)

$$0.03 = a [\times] 40^b$$

$$0.1 = a [\times] 80^b \text{ isw}$$

**1**

(iii)

$$(0.03 = a \times 40^b) \div (0.1 = a \times 80^b) \text{ oe isw}$$

**1**

(iv)

$$[b = ] 1.73696... \text{ correct to at least 3dp}$$

**1**

**C opportunity**

(v)

$$[a = ] (4.88... \text{ to } 4.95...) \times 10^{-5}$$

**1**

**C opportunity**

(vi)

$$T = (4.9 \times 10^{-5}) \times N^{1.74}$$

Substitute  $N = 60$  to give  $T \approx 0.06$   
(0.0606 – 0.0609) isw

**1FT**

**FT** their  $a$  in part (v)

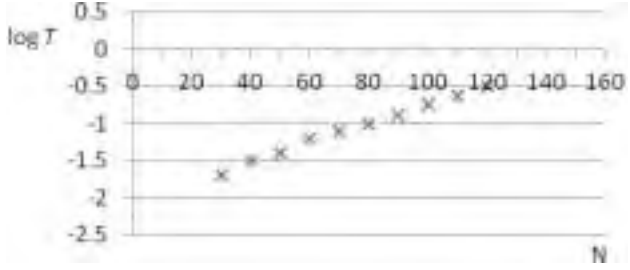

2 (a) (i)

Number of years since 1860 ( $N$ )	Temperature Increase $^{\circ}\text{C}$ ( $T$ )	$\log T$
30	0.02	-1.70
40	0.03	<b>-1.52</b>
50	0.04	<b>-1.4[0]</b>
60	0.06	-1.22
70	0.08	<b>-1.1[0]</b>
80	0.10	<b>-1[.00]</b>
90	0.13	-0.89
100	0.18	<b>-0.74</b>
110	0.24	-0.62
120	0.32	-0.49

**2**

-1 eeo

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(ii)	9 correctly plotted points $\pm 2$ mm 	<b>P1</b>	
(iii)		<b>1</b>	Line (within tolerance) through mean (within $-1.05$ to $-1.1$ )
(iv)	FT from <i>their</i> line of best fit in part (iii) Correct to 1dp	<b>2FT</b>	<b>M1</b> reading $\log T$ correctly from their graph $\pm 2$ mm Line must reach 160 If 0 scored in (iii) allow <b>M1</b> only
(b) (i)	[ $m =$ ] 0.006... to 0.018... [ $c =$ ] $-2.4$ ... to $-1.7$ ...	<b>1</b> <b>1</b>	If 0 scored <b>M1</b> for working using 2 points on the line <b>C</b> opportunity
(ii)	<b>FT</b> from <i>their</i> $m$ and $c$ in (i), substituted in model Accuracy to 1dp	<b>1FT</b>	<b>C</b> opportunity
(iii)	Comment on 2020 being outside range of given data	<b>1</b>	
	Communication seen in one of <b>1(b)(iv)</b> <b>1(b)(v)</b> <b>2(b)(i)</b> <b>2(b)(ii)</b>	<b>1</b>	
	Total	<b>20</b>	