**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

## MARK SCHEME for the May/June 2014 series

# 0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

**0607/43** Paper 4 (Extended), maximum raw mark 120

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.

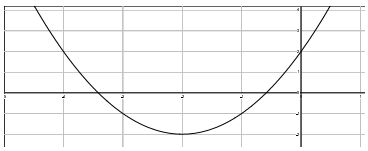
Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

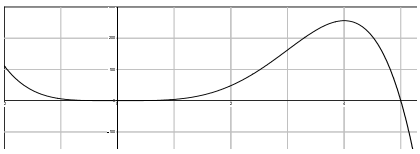
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|---|---|---|---|---|
| **1** | **(a)** | 357 200 | **3** | **M1** for $230\,000 \times 1.045^{10}$ oe<br>**A1** for 357 000, 357 180, 357 182 to 357 183 |
| | **(b)** | 34 | **3** | **M2** for $\log_{1.045}(1\,000\,000/230\,000)$ oe<br>or<br>suitable sketch indicating solution<br>or trial and improvement giving values either side of 1 000 000.<br>or **M1** $230\,000 \times 1.045^{n} = 1\,000\,000$ oe<br>or for suitable sketch but not indicating solution or for trial and improvement by using powers of 1.045 with at least 3 trials greater than 10.<br>**SC2** for 33 |
| | **(c)** | 335 or 334.7 to 334.8 | **3** | **M2** for $\frac{1000000 - 230000}{230000} \times 100$ or<br>$\frac{1000000}{230000} \times 100 - 100$<br>or **M1** for $\frac{1000000 - 230000}{230000}$ or<br>$\frac{1000000}{230000} \times 100$<br>(3.34782…) or (434.782…) |
| **2** | **(a)** **(i)** | [0]9 10 oe cao | **3** | **M1** for $\frac{30}{40}$ and $\frac{50}{100}$ oe<br>and **M1** for 07 55 + *their* two times |
| | **(ii)** | 64 cao | **2** | **M1** for $\frac{50 + 30}{\textit{their}\text{ two times added}}$ |
| | **(iii)** | 12.16 | **2** | **M1** for $\frac{80}{100} \times 9.5 \times 1.6$ oe |
| | **(b)** | 65.35 | **2** | **M1** for $2 \times 8.80 + 3 \times 5.5 + 5 \times 6.25$ |
| | **(c)** | 22.78 | **2 FT** | **M1** for (2 × *their* **(a)(iii)** + *their* **(b)** + 24.23) ÷ 5<br>**SC1 FT** for 20.34 to 20.35 |

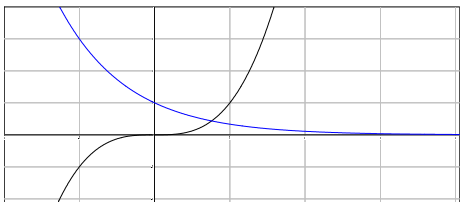
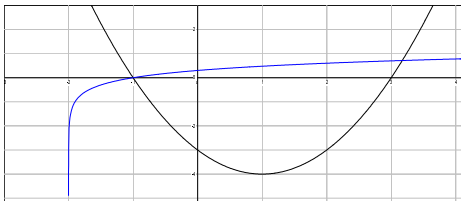
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| **3** | **(a)** | $2 < x \leqslant 7$ | **2** | **B1 B1** |
| | **(b)** | $-2 < x < 0,\ 1 < x < 4$ | **3** | **SC2** for inequalities with $\leqslant$ for $<$.<br>**SC1** for either inequality, condoning $\leqslant$ for $<$ or for the 4 values seen |
| | **(c)** |  | | |
| | | | **M1** | |
| | | or $\dfrac{-4 \pm \sqrt{(4)^2 - 4(1)(2)}}{2(1)}$ | | |
| | | or $x + 2 = \pm\sqrt{2}$ | | |
| | | – 3.41,<br>– 0.59 | **B1**<br>**B1** | If **B0**, **SC1** for – 3.4 and – 0.6 or – 3.414…<br>and – 0.586 or – 0.5858 to – 0.5857 |
| **4** | **(a) (i)** | $-\mathbf{p} + \mathbf{q}$ | **1** | |
| | **(ii)** | $\mathbf{q} + 2\mathbf{p}$ | **1** | |
| | **(b) (i)** | (9, 5) | **1, 1** | |
| | **(ii)** | $x - 3y = -6$ or $-x + 3y = 6$ | **4** | **M1** for gradient = $\dfrac{\text{rise}}{\text{run}}$ $\left(\dfrac{2}{6}\right)$<br>and **M1** for substituting a pair of given co-ordinates into a linear equation.<br>**A1** for correct equation in another form seen. |
| **5** | **(a)** | 58.5, 44, 72 | **3** | |
| | **(b)** | 58.1, 60.3 | **2** | |
| | **(c)** | $-0.0214g + 61.5$<br>– 0.02137... , 61.54… | **2** | **SC1** for 0.022 or 0.02217… $g$ + 59.04 to 59.05<br>or $-0.0214g + k$ (– 0.02137... ) $k \neq 0$<br>or $kg$ + 61.5 (61.54…) $k \neq 0$ |
| | **(d) (i)** | 60 or 60.3 to 60.4 | **1FT** | **FT** *their* **(c)** |
| | **(ii)** | No correlation oe | **1** | |

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| **6** | **(a)** |  | **2** | **B1** for reasonable shape<br>**B1** for minimum at (0, 0) |
| | **(b)** | 0, 5 | **2** | **SC1** for (0, 0) and (5, 0) |
| | **(c)** | (4, 256) | **1** | |
| | **(d)** | –146 or –146.2… $\leqslant f(x) \leqslant 256$ | **2** | **B1** for either limit. Condone strict inequalities |
| | **(e)** | Any negative integer or integer $> 256$ | **1** | |
| **7** | **(a)** | 145 | **3** | **M2** for $(6 \times 180 - 5 \times 129) \div 3$ oe<br>or **M1** for sum of interior angles = $6 \times 180$ or $135 \times 8$ or 1080. |
| | **(b)** | 18 | **3** | **B2** for $2x = 36$<br>or **M1** for $6x + 2 = 2(2x + 19)$ oe |
| | **(c)** | 14.2 or14.16 to 14.17 | **3** | **M2** for $5.1 \times \left(\frac{5}{3}\right)^2$ oe<br>or **M1** for use of $\left(\frac{5}{3}\right)^2$ or $\left(\frac{3}{5}\right)^2$ |
| **8** | **(a) (i)** | 141 or 141.3 to 141.4 | **3** | **M2** for $\frac{40}{360} \times \pi \times 9^2 \times 5$<br>or **M1** for $\frac{40}{360} \times \pi \times 9^2$<br>$9\pi$ or 28.27 to 28.28 or 28.3 |
| | **(ii)** | 178 or 177.9 to 178.0 | **5** | **M1** for $\frac{40}{360} \times \pi \times 9^2$ or *their* area in part **(i)**<br>and **M1** for $5 \times 9$<br>and **M2** for $\frac{40}{360} \times \pi \times 18 \times 5$<br>or **M1** for $\frac{40}{360} \times \pi \times 18$ $(2\pi)$ |
| | **(b)** | 1.44 | **2** | **B1** for 1440<br>or **B1FT** for *their* total ÷ 1000 |

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| **9** | **(a)** |  | **2** | **B1** graph of $y = x^3$ correct shape oe<br>**B1** graph of $y = 3^{-x}$ correct shape oe |
| | | 0.758 or 0.7576 to 0.7577 | **1** | |
| | **(b)** |  | **2** | **B1** graph of $y = x^2 - 2x - 3$ correct shape oe<br>**B1** graph of $y = \log(x + 2)$ correct shape oe |
| | | – 1 | **1** | |
| | | 3.17 or 3.171… | **1** | (penalty – 1 if $y$-coords in answer) |
| **10** | **(a)** | 63.064… | **3** | **M2** for [cos = ] $\frac{18^2 + 26^2 - 24^2}{2.18.26}$ $\frac{424}{936}$ $\frac{53}{117}$<br>or **M1** for $24^2 = 18^2 + 26^2 - 2.18.26\cos C$ |
| | **(b)** | 24.1 or 24.07… | **3** | **M2** for $\frac{18\sin 78}{\sin 47}$<br>or **M1** for $\frac{\sin 78}{LV} = \frac{\sin 47}{18}$ oe |
| | **(c) (i)** | 16[.0] or 16.1 or 16.04 to 16.05… | **2** | **M1** for 18sin(63.06) |
| | **(ii)** | 208 or 209 or 208.0 to 209.3 | **2** | **M1** for $\frac{1}{2} \times 26$ *their* **(c)(i)**<br>or $\frac{1}{2} \times 18 \times 26$ sin(63.06) oe |
| | **(d) (i)** | 147 or 147.06 to 147.1 | **1** | |
| | **(ii)** | 327 or 327.06 to 327.1 | **1FT** | **FT** 180 + *their* part **(d)(i) only** if answer in range 270 to 360 |
| **11** | **(a)** | $\frac{7x - 5}{(2x - 1)(x - 2)}$ oe final answer | **3** | **B1** for correct denominator<br>**B1** for [numerator = ] $x - 2 + 3(2x - 1)$ or better |
| | **(b)** | $\frac{x + 1}{x + 3}$ final answer | **5** | **B2** for $[x](x - 1)(x + 1)$ or **B1** for $[x](x^2 - 1)$<br>**B2** for $[x](x + 3)(x - 1)$ or **SC1** for $[x](x + a)(x + b)$ where $ab = -3$ or $a + b = 2$ |

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| **12** | **(a)** | 34.4 or 34.41 to 34.42 | **2** | **M1** for at least 2 correct mid-values soi. |
| | **(b)** | Correct histogram | **3** | **B1** for correct column widths<br>and **B2** for heights of 0.2, 3.6, 1.4 and 0.3<br>or **B1** for 2 correct heights |
| **13** | **(a)** **(i)** | $\frac{5}{6}$ oe | **1** | |
| | **(ii)** | $\frac{2}{6}$ oe | **1** | |
| | **(b)** **(i)** | $\frac{12}{36}$ oe | **2** | **M1** for $\frac{4}{6}\times\frac{3}{6}$ oe |
| | **(ii)** | $\frac{30}{36}$ oe | **3** | **M2** for $1-\frac{2}{6}\times\frac{3}{6}$ or $\frac{4}{6}\times\frac{3}{6}+\frac{2}{6}\times\frac{3}{6}+\frac{4}{6}\times\frac{3}{6}$ oe<br>or **M1** for $\frac{2}{6}\times\frac{3}{6}$ with no other products<br>or $\frac{4}{6}\times\frac{3}{6}+\frac{2}{6}\times\frac{3}{6}+\frac{4}{6}\times\frac{3}{6}$ with two products correct |
| | **(iii)** | $\frac{11}{36}$ oe | **2** | **M1** for $1-\frac{5}{6}\times\frac{5}{6}$ or $\frac{1}{6}\times\frac{1}{6}+\frac{1}{6}\times\frac{5}{6}+\frac{5}{6}\times\frac{1}{6}$ oe<br>or $\frac{1}{6}+\frac{1}{6}-\frac{1}{6}\times\frac{1}{6}$ |
| **14** | **(a)** | 23.2 or 23.19 to 23.20 | **2** | **M1** for tan = $\frac{3}{7}$ oe |
| | **(b)** | 14.2 or 14.21… or $\sqrt{202}$ | **3** | **M2** for $\sqrt{12^2+7^2+3^2}$ oe<br>or **M1** for a correct Pythagoras statement for one face |
| | **(c)** | 12.2 or 12.18 to 12.20 | **2FT** | **FT** *their* **(b)** **M1** for sin = $\frac{3}{\textit{their}\textbf{(b)}}$ oe |

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