

| Notes | Mark Scheme | Syllabus |
|-------|--------------------------------|-----------|
| | IGCSE EXAMINATIONS – JUNE 2003 | 0580/0581 |

TYPES OF MARK

Most of the marks (those without prefixes, and 'B' marks) are given for accurate results, drawings or statements.

- **M** marks are given for a correct method.
- **B** marks are given for a correct statement or step.
- **A** marks are given for an accurate answer following a correct method.

ABBREVIATIONS

| | |
|--------|---|
| a.r.t. | Anything rounding to |
| b.o.d. | Benefit of the doubt has been given to the candidate |
| c.a.o. | Correct answer only (i.e. no 'follow through') |
| e.e.o. | Each error or omission |
| o.e. | Or equivalent |
| SC | Special case |
| s.o.i. | Seen or implied |
| ww | Without working |
| www | Without wrong working |
| √ | Work followed through after an error: no further error made |
| ⊕ | Work followed through and another error found |

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INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 56

SYLLABUS/COMPONENT: 0580/01, 0581/01

MATHEMATICS

Paper 1 (Core)



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* indicates that it is necessary to look in the working following a wrong answer.

| | | | |
|----|---|--------------------|--|
| 1 | (a) 19.55249(345) (b) 19.55 | 1 1 ✓ | |
| 2 | (a) 3.3 to 3.7 (b) - 0.9 | 1 1 ✓ | Allow negative values 2.6 - I(a) |
| 3 | (a) $\frac{33}{50}$ 67% 0.68 (b) $\frac{17}{25}$ | 1 1 | Allow 0.66, 0.67, 0.68 o.e. |
| 4 | 42 | 2* | M1 72 ÷ 12 |
| 5 | 781000 | 2* | M1 for 550 000 x 1.42 |
| 6 | 366 | 2* | M1 for "97.60" x 3.75 |
| 7 | $\frac{4}{9}$ | 2* | M1 for $\frac{9}{4}$ or 0.44....., $2\frac{1}{4}$, $\frac{2}{3}$, $\frac{2}{3}^2$ |
| 8 | (a) - 30 c.a.o. (b) $v(4u - 3)$ | 1 1 | c.a.o. |
| 9 | $\frac{1}{2}$ | 3* | M1 6 – 3x M1 $x + 3x = 6 - 4$ |
| 10 | (a) 0.004 (b) 4×10^{-3} | 2* 1 ✓ | M1 figs 2 : 500000 or figs 4 in answer |
| 11 | a = 3, b = -1 | 3* | M1 adding or x 2 nd equation by 3 and subtracting A1 A1 o.e. (Rearrange and substitute scores M1) Working essential if only one answer is correct |
| 12 | (a) 88 c.a.o. (b) 85.5, 86.5 | 1 1, 1 | Not 88.0 B1 both correct and reversed |
| 13 | (a) 20 05 (b) (i) 0.4 (ii) 24 | 1 2* 1 ✓ | Allow 20:05, 8.05pm. Not 20.5 or 20h5m M1 30 ÷ 75 (i) × 60 |

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| | | | |
|--------------|--|-----------|---|
| 14 | (a) $\frac{3+4}{6} = \frac{7}{6}$ | 2* | M1 for first term o.e. |
| | (b) $\frac{6}{5} \times \frac{7}{4} = \frac{21}{10}$ | 2* | M1 for improper fractions |
| 15 | (a) (i) 28 | 2* | M1 for $\frac{1}{2} \times 8 \times 7$ |
| | (ii) 176 | 2√ | M1 for $4 \times (i) + 8^2$ A1√ |
| | (b) pyramid | 1 | |
| 16 | (a) 90 | 1 | |
| | (b) 7.71 | 2* | M1 $\sin 40 = PB/12$ or $\frac{12}{\sin(a)} = \frac{PB}{\sin 40}$ |
| | (c) 113 | 2* | M1 $\pi \times 6^2$ |
| 17 | (a) 9.59 | 2* | M1 $8.3^2 + 4.8^2$ |
| | (b) 210 | 3* | M1 $\tan x = \frac{4.8}{8.3}$ M1 $180 + x$ at P If sin or cos used then allow √ from (a). NO marks for scale drawing |
| 18 | (a) (i) 35 | 1 | |
| | (ii) 25 | 1√ | 60 – (i) |
| | (b) similar | 1 | |
| | (c) 11(.0) | 2* | M1 $\frac{16.6}{8.3} = \frac{CX}{5.5}$ o.e. Not 11.1 or M1 for $\frac{16.6}{\sin 120} = \frac{CX}{\sin 35}$ |
| TOTAL | | 56 | |

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MARK SCHEME

MAXIMUM MARK: 70

SYLLABUS/COMPONENT: 0580/02, 0581/02

MATHEMATICS

Paper 2 (Extended)



| | | | |
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| Question Number | Mark Scheme | Part Marks | Notes | Question Total |
|-----------------|---|------------------|---|----------------|
| 1 | $0.049 < 5\% < 5/98$ o.e. | 2 | M1 for <i>figs</i> 51... seen after 0, SC1 for 2 correct entries | 2 |
| 2 (a) | 7.85 to 8(.00...) | 1 | | 2 |
| (b) | 56.25 to 57.5(0) | 1 | | |
| 3 | 194(.4) | 2 | M1 for $54 \times 3600/1000$ or SC1 for <i>figs</i> 194....seen | 2 |
| 4 | $\begin{pmatrix} -4 \\ -7 \end{pmatrix}$ c.a.o. | 1 1 | | 2 |
| 5 | 38 | 2 | M1 for $665/(17 + 18)$ s.o.i. by equivalent complete method | 2 |
| 6 | 201.25 | 2 | allow 201 or 201.3 in ans. space if 201.25 seen M1 for 17.5×11.5 s.o.i. | 2 |
| 7 | $4 < x < 6$ | 2 | SC1 for either one after 0, M1 for $8 < 2x < 12$ s.o.i. | 2 |
| 8 | $\begin{matrix} \pm 11 & - & \pm 1331 \\ 14 & 196 & - \\ -7 & 49 & - \end{matrix}$ | 3 | 2 for 4 or 5 correct 1 for 2 or 3 correct | 3 |
| | | | | 17 |
| 9 (a) | $\frac{1}{6}$ or 0.16(.....) or 0.17 | 1 | | 3 |
| (b) | art 9.5(°) | 2 | M1 for correct use of tan o.e. | |
| 10 | $\frac{x+11}{(x-3)(x+4)}$ o.e. | 3 | M1 for denom. $(x-3)(x+4)$ o.e. M1 for $2(x+4) - (x-3)$ o.e. | 3 |
| 11 | integer $\sqrt{(112/7)}$ rational nos. 2.6 4/17 irrational no. $\sqrt{12}$ | 1 1 1 1 | accept $\sqrt{16}$ or 4 accept 0.235 accept 3.46 | 4 |
| 12 (a) | 18 | 2 | M1 for $2p + 3p + 90 = 180$ o.e. or SC1 for 36 or 54 seen www. | 4 |
| (b) | 30 | 2 | M1 for $q + 5q = 180$ o.e. or SC1 for 150 seen | |
| | | | | 14 |

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| | | | | |
|----------------|--|--------|---|-----------|
| 13 (a) | 100 | 1 | | |
| (b) | $1200 \sqrt{\quad}$ | 1 | $\sqrt{\quad}$ for $(12 \times \textit{their a})$ | |
| (c) | $10 < x < 30$ ht 30 mm $60 < x < 100$ ht 22 mm | 1 1 | | 4 |
| 14 (a) | $\begin{matrix} 10 & 17 & 4 \\ -6 & -9 & 0 \end{matrix}$ | 2 | SC1 if 4 or 5 correct | |
| (b) | $\frac{1}{2} \begin{pmatrix} -2 & -4 \\ 3 & 5 \end{pmatrix} \text{oe}$ | 2 | 1 for $\frac{1}{2}$ s.o.i., 1 for $k \begin{pmatrix} -2 & -4 \\ 3 & 5 \end{pmatrix}$ s.o.i. | 4 |
| 15 (a) | 50.3 | 2 | M1 for $\frac{(7087000 - 4714900)}{4714900}$ o.e. must be recognisable complete correct method | |
| (b) (i) | 4710000 or 4.71×10^6 | 1 | | |
| (ii) | 7.087×10^6 | 1 | accept 7.09×10^6 , ignore superfluous zeros | 4 |
| 16 (a) | 24.7 | 2 | M1 for $80 \times \sin 18^\circ$ seen | |
| (b) | 46.2 | 2 | M1 for $3(4 + 11.4)$ o.e. (no MRs) 3×3.8 does not imply 11.4 | 4 |
| | | | | 16 |
| 17 (a) | Correct shear $\pm 1\text{mm}$ | 2 | M1 for shear with either axis invariant | |
| (b) (i) | Correct stretch $\pm 1\text{mm}$ | 2 | M1 for stretch with either axis invariant | |
| (ii) | $\begin{pmatrix} 1 & 0 \\ 0 & 3 \end{pmatrix} \text{cao}$ | 1 | | 5 |
| 18 (a) | 1:1000 | 1 | | |
| (b) (i) | accurate perp bisector of AD, with two pairs of arcs | 2 | SC1 if accurate but no arcs SC1 if accurate arcs but no line | |
| (ii) | accurate bisector of $\angle BCD$, with two pairs of arcs T marked in correct position | 2 1 | SC1 if accurate but no arcs SC1 if accurate arcs but no line Indep. | 6 |
| | | | | 11 |

| | | | |
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| | | | | |
|---------------|---|---------|---|----------|
| 19 (a) | correct demonstration | 2 | M1 for $20x + 80y$ seen | 6 |
| (b) | $x + 2y = 120$ o.e. fully simplified | 2 | M1 for $25x + 50y = 3000$ seen condone inequality signs for method mark. Ignore \$ | |
| (c) | straight line thr. (120,0) and (0,60) 60 cars, 30 trucks | 1√ 1 | √ from <i>their b</i> . Line must be complete, and be on given grid also allow 80,20; 100,10; 120,0 or points on the correct section of the line ($60 \leq x \leq 120$) | |
| | | | | 6 |
| 20 (a) | art 0.1, 0.3, 0.6, 1, 1.7 and 3 | 3 | SC2 for 4 or 5 correct SC1 for 2 or 3 correct | 6 |
| (b) | correct curve drawn | 2 | P1 for correct or √ 6 or 7 points correctly plotted $\pm 1\text{mm}$ | |
| (c) | $1.6 \leq x < 1.65$ | 1 | | |
| | | | | 6 |

TOTAL MARKS 70

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MARK SCHEME

MAXIMUM MARK: 104

SYLLABUS/COMPONENT: 0580/03, 0581/03

MATHEMATICS

Paper 3 (Core)



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|---|---------|--|----------|---|
| 1 | (a) | 7 | 1 | |
| | (b) | 42 | 1 | |
| | (c) (i) | 9 | 1 | |
| | (ii) | 8 | 2 | M1 for evidence of idea of mid-value |
| | (iii) | 8.3 | 3 | M1 for $4 \times 5 + 7 \times 6 + \dots + 3 \times 12$ or 415 M1 (dep) for $\div 50$ |
| | (d) | 5cm | 2 | M1 for 1cm to 2 students o.e. |
| | (e) | 36° | 2 | M1 for $\frac{5}{50} \times 360$ |
| | (f) | \$7.5(0) | 2 | M1 $\div 3$ |
| | (g) | 22 | 2 | M1 for $\frac{11}{50} (x 100)$ SC1 for $\frac{19}{50} (x 100) = 38\%$ |
| | (h) (i) | $\frac{6}{50}$ | 1 | } Accept equivalent fractions, decimals or percentages |
| | (ii) | $\frac{14}{50}$ | 1 | |
| | (iii) | 1 | 1 | |
| | | | | 19 |
| 2 | (a) | 120,24, 20 | 1, 1, 1 | |
| | (b) | 7 correctly plotted points f.t. correct curve | P3 C1 | Deduct 1 for each error (± 1 mm) Must be a reasonable hyperbola |
| | (c) | 1.6 to 1.8 | 1 | Accept f.t. |
| | (d) | 120,0 | 2 | |
| | (e) | Straight line through 4 points | L2 | L1 if short or not ruled SC1 for \surd if all straight lines |
| | (f) | (1.2 – 1.4, 92 – 96) (4.6 – 4.8, 24 – 26) | 1 1 | } Accept f.t. |
| | (g) | -20 | 2 | SC1 for 20 <u>or</u> M1 for rise/run seen (numerical attempt) |
| | | | | 16 |

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|-----------|-----------|--|---------------------|--|
| 3 | (a) (i) | 175 cents | 1 | |
| | (ii) | 25 <i>b</i> cents | 1 | |
| | (iii) | \$1.75 | 1 or $\sqrt{\quad}$ | |
| | (iv) | $\$ \frac{b}{4}$ (allow $\frac{25b}{100}$) (0.25 <i>b</i>) | 1 or $\sqrt{\quad}$ | If involves <i>b</i> |
| | (b) (i) | $\frac{T}{n}$ | 1 | |
| | (ii) | The cost of one bar | 1 | |
| | (c) (i) | 4.5(0) | 1 | |
| | (ii) | 4.2(0) | 2 | M1 for (36 – 6.60)/7 |
| | (iii) | $\frac{y}{x}$ | 1 | |
| | (iv) | $\frac{y-7}{x-1}$ | 2 | B1 for <i>y</i> – 7 or <i>x</i> – 1 seen |
| 12 | | | | |
| 4 | (a) (i) | <i>P</i> with vertices (4, 11), (2, 11), (2, 12) | 2 | SC1 if translated by $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$, $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ etc. |
| | (ii) | <i>Q</i> with vertices (9, 7), (11, 7), (11, 8) | 2 | SC1 if reflected in <i>y</i> = 8 or $\sqrt{\quad}$ from <i>P</i> |
| | (iii) | <i>R</i> with vertices (7, 7), (7, 5), (6, 5) | 2 | SC1 if 90° clockwise from <i>A</i> or $\sqrt{\quad}$ from <i>Q</i> |
| | (iv) | <i>S</i> with vertices (7, 7), (3, 7), (3, 9) | 2 | SC1 if different scale factor about <i>A</i> or enlargement of triangle <i>T</i> s.f. 2 about <i>B</i> or <i>C</i> |
| | (b) (i) | Translation $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ | 1 1 | |
| | (ii) | Enlargement Scale factor 1/2 centre <i>A</i> | 1 1 1 | |
| | (c) (i) | 90° (anti-clockwise) | 1 | Accept 270° clockwise |
| | (ii) | (3, 3) | 2 | B1 for 1 correct |
| | 16 | | | |

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|----------|----------------|---|--------------------------------|---|
| 5 | (a) (i) | Accurate and with arcs | 2 | B1 without arcs or inaccurate |
| | (ii) | Accurate quarter-circle $r = 5$ | 2 | SC1 for $r > 4.8$ or < 5.2 with compass or correct r but freehand |
| | (b) | Correct region shaded | 1 or \sqrt | If convinced |
| | (c) (i) | 45° correct 12cm correct | 1 1 | $\pm 2^\circ$ $\pm 1\text{mm}$ |
| | (ii) | Reasonable tangent | 1 | Must be ruled $\pm 5^\circ$ |
| | (iii) | 6.8 to 7.2 | 1 | Accept f.t. ± 0.1 |
| | | | | 9 |
| 6 | (a) | $3 \times 1 \times 1.5 + 9 \times 1$ o.e. | 2 | M1 for appropriate strategy M1 (dep.) for correct numbers used |
| | (b) | 3780 | 3 | M1 for volume is area \times length, 13.5×2.8 or 37.8 B1 for 280 seen |
| | (c) (i) | 1.92 | 2 | M1 for $2 \times 1.2 \times 0.8$ |
| | (ii) | 1 920 000 f.t. | 2 | M1 for (their) (i) $\times 10^6$ or $200 \times 120 \times 80$ |
| | (iii) | 507 f.t. | 2 | M1 for (c) (ii) \div (b) or $507 \cdot \dots$ or 508 |
| | (d) | One vertical line drawn | 1 | Within $\pm 0.2\text{cm}$ of the centre |
| | (e) | (order) 1 or no symmetry | 1 | |
| | | | | 13 |
| 7 | (a) (i) | 84° | 1 | |
| | (ii) | 22° | 1 | |
| | (b) | 11 | 1 | Accept 10.8 \rightarrow 11, 10min 48sec \rightarrow 11min |
| | (c) | 16° | 1 | |
| | (d) (i) | 32, (16), 8, 4 | 3 | B1 for each |
| | (ii) | Halving o.e. | 1 | |
| | (e) | 20° | 1 | Allow answer >20 and <22 |
| | | | | 9 |

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|----------|------------|---|----------|-------------------------|
| 8 | (a) | 3 new lines from the vertex to the base | 2 | |
| | (b) | 6, 7, $n + 2$ | 3 | B1 for each |
| | (c) | 15, 21, 55 | 3 | B1 for each |
| | (d) | 12 | 2 | SC1 for 10 or 11 |
| | | | | 10 |

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MARK SCHEME

MAXIMUM MARK: 130

SYLLABUS/COMPONENT: 0580/04, 0581/04

MATHEMATICS

Paper 4 (Extended)



| | | | |
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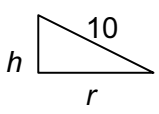
Marks in brackets are totals for questions or part questions.

| | | | | | |
|---|-----|--|--|------------------------------------|---|
| 1 | (a) | (\$) 3490 | | B1 (1) | |
| | (b) | $16n + 1570 = 4018$ o.e. $n = 153$ c.a.o. | | M1 A1 (2) | ww2 |
| | (c) | $x + y = 319$ o.e. $10x + 16y = 3784$ o.e. Correct method s.o.i. $x = 220$ $y = 99$ | | B1 B1 M1 A1 A1 (5) | e.g. $1^{\text{st}} \times 10$ and subtraction. Condone arith. error (available on wrong eqtns provided coefficients not equal.) or 220 \$10 tickets or 99 \$16 tickets (ww Correct answer \Rightarrow M1) |
| | (d) | $0.85 \times \$16$ o.e. (\$)13.6(0) c.a.o. | | M1 A1 (2) | [\$16 – 0,15 \times \$16] ww2 |
| | (e) | $\frac{100}{125} \times \$10$ o.e. (\$)8 | | M1 A1 (2) | ww2 |
| | | TOTAL | | 12 | |
| 2 | (a) | $120^2 = 77^2 + 55^2 - 2.55.77 \cos x$ $\cos x = \frac{77^2 + 55^2 - 120^2}{2.55.77}$ or $-\frac{5446}{8470} = \cos x = -0.64(29752)$ s.o.i. (-0.643) $x = 130(.0)$ | | M1 M1 A1 A1 (4) | Implied by next line Implied by correct answer which rounds to 130° Scale drawing \Rightarrow M0. ww \Rightarrow SC2 |
| | (b) | $\sin y = \frac{55 \sin 45^\circ}{60}$ $\sin y = 0.648 (1812)$ s.o.i. $y = 40.4$ | | M2 A1 A1 (4) | If not scored, allow M1 for correct implicit eqtn Implied by answer 40° after some working Accept more accuracy but not less. www4 ($40.39^\circ - 40.41^\circ$; 40° ww \Rightarrow SC2) |
| | (c) | (i) 225° (ii)* 275° | | B2 B2 \checkmark (4) | Correct method seen OR answer $222-224^\circ$, allow Sc1 $\checkmark 405^\circ$ – their x (provided $< 360^\circ$). Answer $291-293^\circ$, allow SC1 |
| | | TOTAL | | 12 | |

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| | | | | |
|--------------|-----|---|---|--|
| 3 | (a) | | <p>B1</p> <p>B1</p> <p>B1 (3)</p> | <p>Accept percentages or fractions but not ratios</p> |
| | (b) | <p>(i) 0.4×0.65 <u>ONLY</u> 0.26 c.a.o.</p> <p>(ii)* <u>Either</u> $0.4 \times 0.35\sqrt{}$ <u>or</u> $0.6\sqrt{} \times 0.45$</p> <p>$0.4 \times 0.35\sqrt{} + 0.6\sqrt{} \times 0.45$ <u>ONLY</u> 0.41 c.a.o.</p> <p>(iii)* <u>Either</u> $1 - (.6\sqrt{} \times .55\sqrt{})$ <u>or</u> $.26 + .14\sqrt{} + .27\sqrt{}$ 0.67 c.a.o.</p> | <p>M1</p> <p>A1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1 (7)</p> | <p>www2</p> <p>Accepting their $\sqrt{}$ values for M marks</p> <p>www3</p> <p>www2</p> |
| | (c) | <p>(i) 18 c.a.o.</p> <p>(ii) $12 \div (\text{his } 18 + 6)$ o.e. 30 c.a.o.</p> | <p>B1</p> <p>M1</p> <p>A1 (3)</p> | <p>SC1 for 34.3 after 18 in (c) (i)</p> |
| | (d) | <p>(i) 22.5</p> <p>(ii)* Realises probability "STOP. STOP"</p> <p>0.33</p> | <p>B1</p> <p>M1</p> <p>dep.</p> <p>A1$\sqrt{}$</p> <p>(3)</p> | <p>Accept 22min 30sec</p> <p>Implied by correct answer after correct work. Dep. On 18 and 22.5 (approx.)</p> <p>$\sqrt{1 - \text{their (b) (iii)}}$ or $(\text{their } 0.6) \times (\text{their } 0.55)$</p> |
| TOTAL | | | 16 | |
| 4 | (a) | <p>Scales correct</p> <p>9 points correctly plotted (1mm)</p> <p>Reasonable curve through 9 points</p> | <p>S1</p> <p>P3</p> <p>C1$\sqrt{}$</p> <p>(5)</p> | <p>$-4 \leq x \leq 4$ and $-8 \leq y \leq 8$</p> <p>Allow P2 for 7 or 8 correct, P1 for 5 or 6 correct</p> <p>$\sqrt{}$ provided shape maintained, curvature OK and <u>not</u> ruled</p> |
| | (b) | <p>$-3.6 \leq x \leq -3.3, x = 0, 3.3 \leq x \leq 3.6$</p> | <p>B2 (2)</p> | <p>Allow B1 for 1 correct non-zero solution; condone $(-3.5, 0)$ (answers must be in range <u>and</u> correct for their graph)</p> |
| | (c) | <p>Line from $(-4, -3)$ to $(4, 5)$, and ruled</p> | <p>B2 (2)</p> | <p>If B0, allow B1 for gradient 1 <u>or</u> intercept 1 on single line</p> |
| | (d) | <p>$g(1) = 2$</p> <p>$fg(1) = -8$</p> <p>$g^{-1}(4) = 3$</p> <p>$3.75 \leq x \leq 3.9$</p> | <p>B1</p> <p>B1</p> <p>B1</p> <p>B1 (4)</p> | <p>Not $(1, 2)$</p> <p>Lost if y-coordinate given. Answer must be OK for their graph</p> |

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| | | | | |
|---|-----|--|--|---|
| | (e) | Tangent drawn at $x = 3$ on curve Vert./Horiz. using scale Answer in range 5-10 and OK for theirs | B1 M1 A1 (3) | Not chord or daylight Dep. on reasonable approx to tangent used at $x = 3$ (N.B. Gradient = 4.5 + y-value of tangent at $x = 4$) |
| | | TOTAL | 16 | |
| 5 | (a) | $\frac{1}{2} 10 \cdot 10 \cdot \sin 60^\circ$ o.e. 43.3 cm² or 25 $\sqrt{3}$ | M1 A1 (2) | Any complete method including $\sqrt{15.5.5.5}$ ww2 |
| | (b) | $2\pi r = 10$ s.o.i. $r = 1.59$ (15494cm) | M1 A1 (2) | Accept $\pi D = 10$ ww2 |
| | (c) | (i) Tetrahedron or Triangular Pyramid 4 (his (a)) * 173(.2cm²) or 100 $\sqrt{3}$ (ii) Cylinder Uses π (any r) ² × 10 <u>ONLY</u> Uses π (his (b)) ² × 10 Correct or $\sqrt{\quad}$ in range 79.35- 79.65cm³ (iii) Cone  Appreciates hypotenuse = 10 $h = \sqrt{10^2 - (\text{his}(b))^2}$ 9.87(25362cm) | B1 M1 $\sqrt{A1}$ (3) B1 M1 M1 dep. A1 (4) B1 M1 A1 (4) | If not his (a) then correct Δ area method needed $\sqrt{4}$ (a) to 3s.f. Accept circular (based) prism <u>Not</u> $2\pi r^2 10$ or any other modifications Implies M2 Accept circular/round (based) pyramid e.g. right-angled Δ drawn or cos $x = \frac{\dots}{10}$ |
| | | TOTAL | 15 | |
| 6 | (a) | $2x(x + 4)(x + 1)$ (cm³) $2x^3 + 10x^2 + 8x$ (cm³) | B1 B1 (2) | Must see this. Ignore further <u>correct</u> work. |

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| | (b) | $2x - 2, x + 2, x$ Internal volume = $2x^3 + 2x^2 - 4x$ Wood = his (a) – his(Int. Vol.) Correctly simplifies to $8x^2 + 12x$ | B3 B1 M1 A1 (6) | B1 each correct answer, any order <u>but in this form</u> (Both could be wrong) No errors |
| | (c) | (i) $8x^2 + 12x = 1980$ $2x^2 + 3x - 495 = 0$ } $\frac{p \pm \sqrt{q}}{r}$ form $\Rightarrow p = -3$ and $r = 4$ or 2×2 \Downarrow $\Rightarrow q = 3^2 - 4 \cdot 2 - 495$ $\Rightarrow x = 15$ www $\Rightarrow x = -16.5$ or $-\frac{33}{2}$ www | B1 (1) B1 B1 B1 B1 (4) | No error seen. Needs = 0 Alt. method B2 $(x - 15)(2x + 33)$ or SC1 for sign error(s) in brackets Or $q = 3969$ or $\sqrt{q} = 63$. Allow for $p \mp \frac{\sqrt{q}}{r}$ If factorising method used, answers only score if correct <u>and</u> from correct bracket |
| | | (ii) Uses +ve answer * 30 by 19 by 16 | B1 $\sqrt{B1}$ (2) | Rejects –ve solution explicitly or implicitly $\sqrt{2}(\text{his}), (\text{his}) + 4, (\text{his}) + 1$ |
| TOTAL | | | 15 | |
| 7 | (a) | (i) $\overrightarrow{OS} = 3\mathbf{a}$ www (ii) $\overrightarrow{AB} = \mathbf{b} - \mathbf{a}$ www (iii) $\overrightarrow{CD} = \mathbf{a}$ www (iv) $\overrightarrow{OR} = 2\mathbf{a} + 2\mathbf{b}$ www (v) $\overrightarrow{CF} = 2\mathbf{a} - 2\mathbf{b}$ www | B1 B1 B1 B2 B2 (7) | If B0, allow SC1 for correct but unsimplified seen If B0, allow SC1 for correct but unsimplified seen |
| | (b) | (i) $ \mathbf{b} = 5$ (ii) $ \mathbf{a} - \mathbf{b} = 5$ www | B1 B1 (2) | |

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| | (c) | (i) Enlargement , S.F. 3, Centre 0 | B2 | Allow SC1 for Enlargement or (S.F. 3 <u>and</u> Centre 0) } SC1 for 'Mirrored in CF' o.e. |
| | | (ii) Reflection In line CF o.e. | M1 A1 (4) | |
| | (d) | (i) 6 c.a.o. | B1 | |
| | | (ii) 60° | B1 (2) | |
| | | TOTAL | 15 | |
| 8 | (a) | (i) \$60-80 (ii) Midpoints 10, 30, 50, 70, 90 + 120 Σfx attempted (12880) $\Sigma fx \div 200$ Final answer \$64.40 c.a.o. | B1 M1 M1* M1 A1 (5) | Needs at least 4 correct s.o.i. Dep. on previous M1 or their midpoints ± 0.5 Dep. on M1* Needs 2 d.p., www4 (64.4 \Rightarrow M3 AO) |
| | (b) | (i) (\leq)20, (\leq)40, (\leq)60, (\leq)80, (\leq)100, (\leq)140 10, 42, 90, 144, 180, 200 (ii) Scales correct and labelled or used to 140 and 200 6 plots correct (20, 10) \rightarrow (140, 200) Graph from (0, 0), line or curve | B1 B1 S1 P2 C1 (6) | <u>Not</u> for $\frac{20-40}{42}$ type Vert. 20cm \equiv 200 and Horiz. \equiv 14cm 140. Reversed axes SO P1 for 4 or 5 correct. 1mm accuracy Through all 6 points. Dep. on P1 |
| | (c) | (i) Median (\$)63-64 (ii) U.Q. (\$)82-84 (iii) IQR (\$)38-41 (iv) Using \$75 reading on Cum. Freq. Graph – 67 or 68 or 69 or 70 or 71 or 72 | B1 B1 B1 M1 A1 (5) | <u>All</u> answers in (c) must <u>also</u> be correct for their graph (1mm) e.g. answer 130 implies this Must be integer answer and OK for their graph |
| | | TOTAL | 16 | |
| 9 | (a) | Diagram 1 \Rightarrow 25% c.a.o. Diagram 2 \Rightarrow 12½% o.e. Diagram 3 \Rightarrow 37½% o.e. Diagram 4 \Rightarrow 60% o.e. | B1 B2 B2 B2 (7) | <u>For whole section reversed (a)</u> <u>or (b)</u> , treat as MR-1 per section For Diagrams 2-4 accept non% equivalents Also in each case if 2 not scored, allow SC1 if correct idea seen (e.g. $\frac{1}{2}h \div 4h$ for Diagram 2) |

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| | (b) | Diagram 5 \Rightarrow 1/9 o.e. fraction Diagram 6 \Rightarrow 1/25 o.e. Diagram 7 \Rightarrow 5/9 o.e. | B1 B2 B3 (6) | In Diagrams 6 and 7, accept non-fraction equivalents. If B0, allow SC1 for $(\pi)5^2$ seen If B0, allow SC1 for $(k\pi)2^2$ and SC1 for $(k\pi)3^2$ seen ($k=1$ or $x/360$) N.B. 4π <u>must</u> be from π^2 and not $2\pi^2$ |
| | | TOTAL | 13 | |
| | | FINAL TOTAL | 130 | |

Grade thresholds taken for Syllabus 0580/0581 (Mathematics) in the June 2003 examination.

| | maximum mark available | minimum mark required for grade: | | | |
|-------------|------------------------|----------------------------------|----|----|----|
| | | A | C | E | F |
| Component 1 | 56 | - | 40 | 25 | 18 |
| Component 2 | 70 | 59 | 40 | 28 | - |
| Component 3 | 104 | - | 73 | 50 | 41 |
| Component 4 | 130 | 93 | 56 | 32 | - |

The threshold (minimum mark) for B is set halfway between those for Grades A and C.
The threshold (minimum mark) for D is set halfway between those for Grades C and E.
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.

Grade A* does not exist at the level of an individual component.