UNIVERSITY *of* CAMBRIDGE
International Examinations

As part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature, The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise.  All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one.  For any individual country, it is intended that only one variant is used.  This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

| **Question Paper** | **Mark Scheme** | **Principal Examiner's Report** |
|---|---|---|
| Introduction | Introduction | Introduction |
| First variant Question Paper | First variant Mark Scheme | First variant Principal Examiner's Report |
| Second variant Question Paper | Second variant Mark Scheme | Second variant Principal Examiner's Report |

**Who can I contact for further information on these changes?**
Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

# MARK SCHEME for the October/November 2008 question paper

# 0580 and 0581 MATHEMATICS

**0580/21 and 0581/21**   Paper 21 (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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
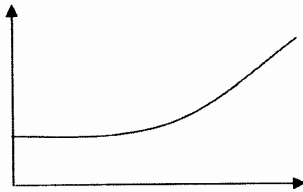
**UNIVERSITY of CAMBRIDGE**
International Examinations

| Page 2 | Mark Scheme | Syllabus | Paper |
|---|---|---|---|
| | IGCSE – October/November 2008 | 0580/0581 | 21 |

## Abbreviations

cao      correct answer only
ft        follow through after an error
oe      or equivalent
SC     Special Case
www    without wrong working

| 1 | **(a)** 2 | 1 | |
| | **(b)** 0 | 1 | Allow none oe |
| 2 | $a = 3$ <br> $b = 4$ | 2 | **W1** one correct <br> If no marks scored **M1** $(3 \times 2)(2 \times 4)$ oe |
| 3 | 1.59(459…) or 59/37 or $1\frac{22}{37}$ | 2 | **M1** $\frac{22}{37}$ or 0.5945… seen |
| 4 | **(a)** $2.67 \times 10^{-2}$ | 1 | cao – must be correct notation |
| | **(b)** 0.0267(00…) | 1ft | correct or ft |
| 5 | Correct locus | 2 | **M1** arc through $D$ radius $BD$ <br> **A1** some indication that the arc is from $D$ to $D'$ |
| 6 | 60 <br> 120 | 2 | **W1** one correct   Allow 60.00.. or 120.00.. <br> or if **W0**, **SC1** the angles add up to 180° |
| 7 | 50.1225 cao | 2 | **M1** 6.15 and 8.15 seen |
| 8 | $x^2(a + b)$ <br> $(\pm) \sqrt{((p^2 + d^2)/(a + b))}$ | 1 <br> 2 | **M1** 2 moves **completed** correctly |
| 9 | **(a)** $y = 2x - 4$ | 2 | **W1** $2x + c$ **or** **W1** $mx - 4$ |
| | **(b)** (2, 0) | 1ft | For $y = 2x + k$ only, allow $(-k/2, 0)$ |
| 10 | $x = 8$   $y = 5$ | 3 | **M1** ×2 and add or ×3 and subtract <br> **A1** |
| 11 | $\dfrac{-18}{(2x+3)(x-3)}$ oe | 3 | **W1** denominator correct in answer space (including any brackets) <br> **M1** $4(x - 3) - 2(2x + 3)$ **A1** –18 |
| 12 | $x > -0.16$ or $-0.16 < x$ <br> or $x > -\dfrac{4}{25}$ | 3 | **M1** 2 moves **completed** correctly <br> **M1** 2 more moves **completed** correctly <br> Final mark must be given for answer line |
| 13 | 1.25 | 3 | **M1** $p = k/(q + 2)^2$ <br> or $p(q + 2)^2 = k$       **M1** $p = (k/(q + 2))^2$ <br> **A1** $k = 125$          **A1** $k^2 = 125$ or $k = \sqrt{125}$ <br> If no marks awarded <br> **SC1** 5 : $k/25$      in this form <br>        $p$ : $k/100$    (colon optional) <br> or **SC1** for either <br> $5 = k/(3 + 2)^2$ or $5 = k/5^2$ <br> Allow 5/4 |
| 14 | **(a)** 45498 or $4.5498 \times 10^4$ cao | 2 | **M1** $2.656 \times 10^9 \div 58376$ |
| | **(b)** 7240 | 2 | **M1** $\dfrac{\textbf{(a)}}{2\pi} = (r)$ |

| Page 3 | Mark Scheme | Syllabus | Paper |
|---|---|---|---|
| | IGCSE – October/November 2008 | 0580/0581 | 21 |

| 15 | **(a)** $0.5$ or $\frac{1}{2}$ | 1 | |
|---|---|---|---|
| | **(b)** $-1$ or $-1.(00)$ cao www | 2 | **M1** cos180 |
| | **(c)** $\dfrac{\cos x - 4}{2}$ oe | 2 | **M1** subtracting 4 and then dividing by 2 seen <br> e.g. $\dfrac{x-4}{2}$ or $\dfrac{y-4}{2}$ or $\dfrac{f(x)-4}{2}$ |
| 16 | **(a)** 1000  1400  1960  2744  3842 <br>(2740) (3840) | 2 | **W1** three correct 3 sf answers or better |
| | **(b)**  | 2 | **P1**ft 4 or 5 plots correct or ft from their table <br> **C1**  smooth curve cao <br> To half a small square <br><br><br><br> If a curve and a line are drawn mark the curve |
| | **(c)** 3.2 or 3.3 | 1ft | cao or ft from their **(b)** |
| 17 | **(a)** **(i)** $-3\mathbf{p} - 2\mathbf{q}$ | 1 | allow $-(3\mathbf{p} + 2\mathbf{q})$ |
| | **(ii)** $-3\mathbf{p} + 4\mathbf{q}$ | 1 | allow $-(3\mathbf{p} - 4\mathbf{q})$ |
| | **(iii)** $-4\mathbf{p}$ | 2 | **M1 (ii)** $- (\mathbf{p} + 4\mathbf{q})$ or $BC - AC = BA$ <br> or **(ii)** $- \mathbf{p} - 4\mathbf{q}$ |
| | **(b)** 8 | 1 | |
| 18 | **(a)** 1.05 | 2 | **M1** clear attempt at $y$–step/$x$–step |
| | **(b)** 3360 | 3 | **M1** attempting the area under the graph <br> **W1** $\dfrac{(140+180)\times 21}{2}$ <br> May be done by triangles and rectangles |
| | **(c)** 18.7 | 1ft | **(b)** / 180 evaluated correctly |
| 19 | **(a)** 53.4 | 3 | **M1** $50/360 \times \pi \times 12^2$ or $30/360 \times \pi \times 6^2$ <br> **M1** $50/360 \times \pi \times 12^2 - 30/360 \times \pi \times 6^2$ |
| | **(b)** 49.6 | 3 | **M1** $50/360 \times 2 \times \pi \times 12$  or  $30/360 \times 2 \times \pi \times 6$ <br> **M1** $12 + 6 + 12 + 6 +$ both their arcs |
| 20 | **(a)** $600x + 1200y \ge 720000$ | 1 | seen |
| | **(b)** $x + y \le 900$ | 1 | |
| | **(c)**  | 4 | **W1**  drawing $x + y = 900$ <br> **W1**  drawing $x + 2y = 1200$ <br> **W1**  R is below $x + y = 900$ <br> **W1**  R is above $x + 2y = 1200$ <br> The lines must be in the right place <br> Accurate to one small square |
| | **(d)** 300 | 1ft | Correct or ft from their labelled R, <br> accuracy $\pm 10$ on the lowest $y$ value in R |
| | | 70 | |

© UCLES 2008

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

# MARK SCHEME for the October/November 2008 question paper

# 0580 and 0581 MATHEMATICS

**0580/22 and 0581/22**     Paper 22 (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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

CIE is publishing the mark schemes for the October/November 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
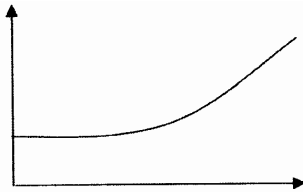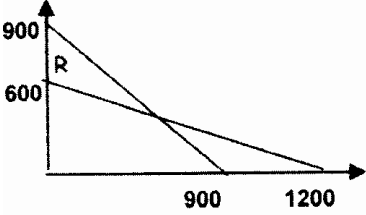
**UNIVERSITY of CAMBRIDGE**
International Examinations

| Page 2 | Mark Scheme | Syllabus | Paper |
|---|---|---|---|
| | IGCSE – October/November 2008 | 0580/0581 | 22 |

### Abbreviations

cao — correct answer only
ft — follow through after an error
oe — or equivalent
SC — Special Case
www — without wrong working

| 1 | **(a)** 2 | 1 | |
|---|---|---|---|
| | **(b)** 0 | 1 | Allow none oe |
| 2 | $a = 4$ <br> $b = 3$ | 2 | **W1** one correct <br> If no marks scored **M1** $(4 \times 2)(2 \times 3)$ oe |
| 3 | 1.59(459…) or 59/37 or $1\frac{22}{37}$ | 2 | **M1** $\frac{22}{37}$ or 0.5945… seen |
| 4 | **(a)** $3.85 \times 10^{-2}$ | 1 | cao – must be correct notation |
| | **(b)** 0.0385(00…) | 1ft | correct or ft |
| 5 | Correct locus | 2 | **M1** arc through $D$ radius $BD$ <br> **A1** some indication that the arc is from $D$ to $D'$ |
| 6 | 45 <br> 135 | 2 | **W1** one correct Allow 45.. or 135.00.. <br> or if **W0**, **SC1** the angles add up to 180° |
| 7 | 15.8025 cao | 2 | **M1** 2.45 and 6.45 seen |
| 8 | $x^2(a + b)$ <br> $(\pm)\surd((p^2 + d^2)/(a + b))$ | 1 <br> 2 | **M1** 2 moves **completed** correctly |
| 9 | **(a)** $y = 2x - 6$ | 2 | **W1** $2x + c$ **or** **W1** $mx – 6$ |
| | **(b)** (3, 0) | 1ft | For $y = 2x + k$ only, allow $(–k/2, 0)$ |
| 10 | $x = 5$  $y = 2$ | 3 | **M1** ×4, ×3 and add or ×3 and subtract <br> **A1** |
| 11 | $\dfrac{-17}{(5x+1)(2x-3)}$ oe | 3 | **W1** denominator correct in answer space (including any brackets) <br> **M1** $5(2x – 3) –2(5x + 1)$ **A1** –17 |
| 12 | $x > –0.16$ or $–0.16 < x$ <br> or $x > -\dfrac{4}{25}$ | 3 | **M1** 2 moves **completed** correctly <br> **M1** 2 more moves **completed** correctly <br> Final mark must be given for answer line |
| 13 | 0.64 $\dfrac{16}{25}$ | 3 | **M1** $p = k/(q + 2)^2$   **M1** $p = (k/(q + 2))^2$ <br> or $p(q + 2)^2 = k$   **A1** $k^2 = 64$ or <br> **A1** $k = 64$       $k = 8$ <br> If no marks awarded <br> **SC1** $4 : k/16$  in this form <br>      $p : k/100$  (colon optional) <br> or **SC1** for either <br> $4 = k/(2 + 2)^2$ or $4 = k/4^2$ |
| 14 | **(a)** 45498 or $4.5498 \times 10^4$ cao | 2 | **M1** $2.656 \times 10^9 \div 58376$ |
| | **(b)** 7240 | 2 | **M1** $\dfrac{(a)}{2\pi} = (r)$ |

| Page 3 | Mark Scheme | Syllabus | Paper |
|--------|-------------|----------|-------|
|        | IGCSE – October/November 2008 | 0580/0581 | 22 |

| 15 | (a) | 1 | 1 | |
|----|-----|---|---|---|
| | (b) | 0 | 2 | **M1** tan180 |
| | (c) | $\dfrac{\tan x - 6}{2}$ oe | 2 | **M1** subtracting 6 and then dividing by 2 seen<br>e.g. $\dfrac{x-6}{2}$ or $\dfrac{y-6}{2}$ or $\dfrac{f(x)-6}{2}$ |

| 16 | (a) | 1000   1400   1960   2744   3842<br>(2740)  (3840) | 2 | **W1** three correct 3 sf answers or better |
|----|-----|---|---|---|
| | (b) |  | 2 | **P1**ft 4 or 5 plots correct or ft from their table<br>**C1** smooth curve cao<br>To half a small square<br><br><br>If a curve and a line are drawn mark the curve |
| | (c) | 3.2 or 3.3 | 1ft | cao or ft from their **(b)** |

| 17 | (a) | (i) $-3\mathbf{p} - \mathbf{q}$ | 1 | allow $-(3\mathbf{p} + \mathbf{q})$ |
|----|-----|---|---|---|
| | | (ii) $-4\mathbf{p} + 2\mathbf{q}$ | 1 | allow $-(4\mathbf{p} - 2\mathbf{q})$ or $-2(2\mathbf{p} - \mathbf{q})$ or $2(\mathbf{q} - 2\mathbf{p})$ |
| | | (iii)    $-5\mathbf{p}$ | 2 | **M1 (ii)** $- (\mathbf{p} + 2\mathbf{q})$ or $BC - AC = BA$<br>or **(ii)** $- \mathbf{p} - 2\mathbf{q}$ |
| | (b) | 10 | 1 | |

| 18 | (a) | 1.05 | 2 | **M1** clear attempt at $y$–step/$x$–step |
|----|-----|---|---|---|
| | (b) | 3360 | 3 | **M1** attempting the area under the graph<br>**W1** $\dfrac{(140+180)\times 21}{2}$<br>May be done by triangles and rectangles |
| | (c) | 18.7 | 1ft | **(b)** / 180 evaluated correctly |

| 19 | (a) | 37.1 | 3 | **M1** $50/360 \times \pi \times 10^2$ or $30/360 \times \pi \times 5^2$<br>**M1** $50/360 \times \pi \times 10^2 - 30/360 \times \pi \times 5^2$ |
|----|-----|---|---|---|
| | (b) | 41.3 | 3 | **M1** $50/360 \times 2 \times \pi \times 10$ or $30/360 \times 2 \times \pi \times 5$<br>**M1** $10 + 5 + 10 + 5 +$ both their arcs |

| 20 | (a) | $600x + 1200y \geq 720000$ | 1 | seen |
|----|-----|---|---|---|
| | (b) | $x + y \leq 900$ | 1 | |
| | (c) |  | 4 | **W1** drawing $x + y = 900$<br>**W1** drawing $x + 2y = 1200$<br>**W1** R is below $x + y = 900$<br>**W1** R is above $x + 2y = 1200$<br>The lines must be in the right place<br>Accurate to one small square |
| | (d) | 300 | 1ft | Correct or ft from their labelled R,<br>accuracy $\pm 10$ on the lowest $y$ value in R |
| | | | **70** | |

© UCLES 2008