



Mark Scheme (Results)

January 2015

Pearson Edexcel International GCSE
Mathematics B (4MB0)
Paper 01

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2015

Publications Code UG040604

All the material in this publication is copyright

© Pearson Education Ltd 2015

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.
Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- **Types of mark**
 - M marks: method marks
 - A marks: accuracy marks
 - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
 - cao – correct answer only
 - ft – follow through
 - isw – ignore subsequent working
 - SC - special case
 - oe – or equivalent (and appropriate)
 - dep – dependent
 - indep – independent
 - eeoo – each error or omission

- **No working**

If no working is shown then correct answers normally score full marks

If no working is shown then incorrect (even though nearly correct) answers score no marks.
- **With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

If there is no answer on the answer line then check the working for an obvious answer.
- **Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. Incorrect cancelling of a fraction that would otherwise be correct.

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.
- **Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

| Question | Working | Answer | Mark | Notes |
|----------|---|-------------------|------|--------------------|
| 1. | $\frac{25}{8} \times \frac{10}{41}$ OR $3.125 \div 4.1$ | | 2 | M1 |
| | | $\frac{125}{164}$ | | A1 No working M0A0 |
| | | | | Total 2 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------------------------------------|---------------------------|------|---------------|
| 2. | $4 + \frac{1}{2x^2}$ (1 term correct) | | 2 | M1 |
| | | $4 + \frac{1}{2x^2}$ (oe) | | A1 |
| | | | | Total 2 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------------------------------------|--------|------|---------------|
| 3. | Prime factors of two of 28, 30 and 45 | | 2 | B1 |
| | | 1260 | | B1 |
| | | | | Total 2 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------|--------|------|---------------|
| 4. (a) | | 2 | 1 | B1 |
| (b) | | 2 | 1 | B1 |
| | | | | Total 2 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------|----------------|------|----------------------|
| 5. (i) | | $8x - 18$ (oe) | 1 | B1 |
| (ii) | | $x = 3$ | 1 | B1 ft |
| | | | | Total 2 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------------------|----------------------------|------|---------------------------------|
| 6. | $\frac{-2-3}{-5-1}$ | | 2 | M1 oe, allow one sign incorrect |
| | | $\frac{5}{6}$, awrt 0.833 | | A1 |
| | | | | Total 2 marks |

| Question | Working | Answer | Mark | Notes |
|----------|--------------------------|--------|------|----------------------|
| 7. | $\frac{408 \times 5}{8}$ | | 2 | M1 |
| | | 255 | | A1 |
| | | | | Total 2 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------|-----------------|------|----------------------|
| 8. (a) | | 200 000 000 | 1 | B1 |
| (b) | | 2×10^8 | 2 | B1 ft B1 ft |
| | | | | Total 3 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------|--|------|----------------------|
| 13. | | $\{w, x\}, \{w, y\}, \{w, z\}, \{x, y\}, \{x, z\}, \{y, z\}$ | 3 | B1, B1, B1 (-1 ecoo) |
| | | | | Total 3 marks |

| Question | Working | Answer | Mark | Notes |
|----------|--|-------------|------|----------------------|
| 14. | Number of bricks = 1000 (can be implied) and $\frac{350}{1000}$ " $\frac{350}{1000}$ " $\times 360$ | | 3 | B1 |
| | | | | M1 |
| | | 126° | | A1 |
| | | | | Total 3 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---|----------------------------|------|----------------------|
| 15. (a) | Arcs drawn above and below AC | | 2 | M1 |
| | Perpendicular bisector drawn accurately | | | A1 |
| (b) | | $4.3 (\pm 0.1) \text{ cm}$ | 1 | B1 |
| | | | | Total 3 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---|-----------------|------|----------------------|
| 16. | $3x - x(2 - x + x^2)$ (Removed inner brackets) OR $3x - 2x + x^2(1 - x)$ (Removed outer brackets) $3x - 2x + x^2 - x^3$ (Removed all brackets) | | 3 | M1 |
| | | | | M1 DEP |
| | | $x + x^2 - x^3$ | | A1 |
| | | | | Total 3 marks |

| Question | Working | Answer | Mark | Notes |
|------------|---------|----------------|------|-------------------------------|
| 17. (a)(i) | | -6 | 3 | B1 |
| (a)(ii) | | $f(x) \geq -6$ | | B1 ft (Allow $y \geq -6$) |
| (b) | | 3/2 OR 1.5 | | B1 |
| | | | | Total 3 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---|---|------|----------------------|
| 18. (a) | | 1 hour 30 mins, 90 mins, $1\frac{1}{2}$ hours | 1 | B1 |
| (b) | $\frac{175\text{km}}{2\text{ hrs}}$ (oe) 87.5 km/h | | 2 | M1 |
| (c) | | 1212 (± 3 mins) | 1 | A1 |
| | | | | B1 |
| | | | | Total 4 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---------|---|------|-----------------|
| 19. | | $AB = \begin{pmatrix} 5 & 4 \\ 13 & 10 \end{pmatrix}$ | 4 | B1 |
| | | $BA = \begin{pmatrix} 9 & 14 \\ 4 & 6 \end{pmatrix}$ | | B1 |
| | | $\begin{pmatrix} -4 & -10 \\ 9 & 4 \end{pmatrix}$ | | B2 ft (-1 eooo) |
| | | | | Total 4 marks |

| Question | Working | Answer | Mark | Notes |
|----------|--|-------------|------|---------------|
| 20. | $28 = \frac{k}{3^2}$ | | 4 | M1 |
| | | $k = 252$ | | A1 |
| | $x = (\pm) \sqrt{\left(\frac{252}{63}\right)}$ | | | M1 |
| | | $x = \pm 2$ | | A1 |
| | | | | Total 4 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---|--|------|----------------------|
| 21. (a) | $\angle ABC = \frac{(2 \times 6 - 4) \times 90}{6}$ (oe) | | 2 | M1 |
| | | $\angle ABC = 120^\circ$ | | A1 |
| (b) | $\angle EAF = 30^\circ$ or $\angle FEA = 30^\circ$ $\angle BAD = 60^\circ$ or $\angle FAD = 60^\circ$ or $\angle ADE = 60^\circ$ or $\angle AED = 90^\circ$ | $\angle EAF = 30^\circ$ $\angle FAD = 60^\circ$ | 3 | B1 B1 |
| | | $\angle DAE = 30^\circ$ | | B1 |
| | | | | Total 5 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---|--------|------|----------------------|
| 22. (a) | | 5 | 1 | B1 |
| (b) | Rearranging minutes in ascending/descending order | 6 | 2 | M1 |
| | | | | A1 |
| (c) | $\frac{6+5+11+9+4+8+5+14+6+5+4}{11}$ | | 2 | M1 |
| | | 7 | | A1 |
| | | | | Total 5 marks |

| Question | Working | Answer | Mark | Notes |
|----------|--|-------------|------|----------------------|
| 23. | $\frac{4}{\sin \angle CBA} = \frac{5}{\sin 30}$ | | 5 | M1 |
| | $\angle CBA = \sin^{-1} \left(\frac{4 \times \sin 30}{5} \right)$ | | | M1 DEP |
| | $\frac{BC}{\sin 126.422^\circ} = \frac{5}{\sin 30}$ | | | M1 DEP |
| | $BC = \frac{5 \times \sin 126.422^\circ}{\sin 30}$ | | | M1 DEP |
| | OR (Cosine rule) | | | OR |
| | $5^2 = 4^2 + BC^2 - 2 \times 4 \times BC \times \cos 30^\circ$ | | | (M1) |
| | Attempt to rearrange above into a trinomial quadratic in BC (allow 1 sign incorrect) | | | (M1 DEP) |
| | $BC^2 - 6.928BC - 9 = 0$ (correct signs) | | | (M1 DEP) |
| | $BC = \frac{-(-6.928) \pm \sqrt{6.928^2 - 4 \times 1 \times (-9)}}{2 \times 1}$ | | | (M1 DEP) |
| | OR Dropping perpendicular from A to BC [AN] | | | OR |
| | Finding CN ($= 3.464\dots$) | | | (M1) |
| | Finding AN ($= 2$) and $\angle ABC$ ($= 23.578$) | | | (M1 DEP) |
| | Finding BN ($= 4.583$) | | | (M1 DEP) |
| | Adding CN to BN | | | (M1 DEP) |
| | | | | |
| | | $BC = 8.05$ | | A1 |
| | | | | Total 5 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---|----------------------|------|----------------------|
| 24. | Area of rectangle = $10\,000\text{ cm}^2$ | | 5 | B1 |
| | Height of triangle = $\sqrt{(5^2 - 3^2)}$ | | | M1 |
| | Area of 1 triangle = $\frac{1}{2} \times 6 \times \sqrt{(5^2 - 3^2)}$ (=12) | | | M1 DEP |
| | OR Heron's formula | | | OR |
| | $s = \frac{5+5+6}{2}$ (=8) | | | M1 |
| | Area of 1 triangle = $\sqrt{8 \times (8-5) \times (8-5) \times (8-6)}$ | | | M1 DEP |
| | Fraction = $\frac{300 \times "12"}{10000} \times 100$ | | | M1 DEP |
| | | Fraction = 35% (cao) | | A1 |
| | | | | Total 5 marks |

| Question | Working | Answer | Mark | Notes |
|----------|-------------------------------------|------------------------------------|------|----------------------|
| 25. (a) | $60^2 = 50 \times DA$ | | 2 | M1 |
| | | $DA = 72\text{ cm}$ | | A1 |
| (b) | $AC = \sqrt{"72" \cdot "2" - 60^2}$ | | 3 | M1 |
| | | $AC = \text{awrt } 39.8\text{ cm}$ | | A1 |
| | | Radius = "19.9" cm | | B1 ft |
| | | | | Total 5 marks |

| Question | Working | Answer | Mark | Notes |
|----------|---|------------------------|------|----------------------|
| 26. (a) | $90 + 28t - 3t^2$ (2 terms correct) | $90 + 28t - 3t^2$ | 2 | M1 A1 |
| (b) | $\begin{aligned} & \text{"}90 + 28t - 3t^2 \text{"} = 0 \\ & \frac{+28 \pm \sqrt{(-28)^2 - 4 \times (3) \times (-90)}}{2 \times 3} \end{aligned}$ | | 4 | M1 oe M1 DEP |
| | | $\sqrt{1864}$ or 43.17 | | BI |
| | | Awrt 11.9 | | A1 |
| | | | | Total 6 marks |

| Question | Working | Answer | Mark | Notes |
|----------|--|---|------|----------------------|
| 27. (a) | $10^2 = 5^2 + 13^2 - 2 \times 5 \times 13 \times \cos \angle BAC$ | | 3 | M1 |
| | $\angle BAC = \cos^{-1} \left(\frac{5^2 + 13^2 - 10^2}{2 \times 5 \times 13} \right)$ | | | M1 DEP |
| | | $\angle BAC = 43.691 \rightarrow 43.7^\circ$ | | A1 |
| (b) | $CY = 13 \sin 43.69^\circ$ (= 8.980) | | 4 | M1 |
| | $BY = \sqrt{10^2 - 13 \times \sin 43.69^\circ}$ (=4.400) | | | M1 |
| | $\triangle BCY = \frac{1}{2} \times 8.980 \times 4.400$ | | | M1 |
| | | $\triangle BCY = 19.76 \rightarrow 19.8$ (19.7 using 43.7) | | A1 |
| | | | | Total 7 marks |

| Question | Working | Answer | Mark | Notes |
|----------|--|---------------------------|------|----------------------|
| 28. (a) | $6(-3)^3 + 11(-3)^2 + k(-3) + 6 = 0$ | | 2 | M1 |
| | OR Attempt at $(x + 3)(6x^3 + 11x^2 + kx + 6$ | | | |
| | “ $6 - 3(21 + k) = 0$ ” | | | (M1) oe, cao |
| | | $k = -19$ | | A1 |
| (b) | $6x^2 - 7x \dots$ | | 4 | M1 |
| | | $6x^2 - 7x + 2$ | | A1 |
| | attempt to factorise trinomial quadratic | | | M1 |
| | | $(x + 3)(2x - 1)(3x - 2)$ | | A1 |
| | | | | Total 6 marks |

