



# Mark Scheme (Results)

January 2015

Pearson Edexcel International GCSE  
Mathematics A (4MA0)  
Paper 2FR

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

**IGCSE Maths Jan 2015 - Paper 2FR Mark scheme**

Apart from Questions 20 and 25a where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

| Ques | Working        | Answer                         | Mark | Notes                               |
|------|----------------|--------------------------------|------|-------------------------------------|
| 1a   |                | 16                             | 1    | B1                                  |
| b    |                | 20                             | 1    | B1                                  |
|      | $20 + 10 = 30$ | 3 full eggs and three quarters | 2    | M1 '20' + 10 or 1.5 full eggs drawn |
| c    |                |                                |      | A1 ft                               |
|      |                |                                |      | <b>Total 4 marks</b>                |

| Ques | Working | Answer        | Mark | Notes                |
|------|---------|---------------|------|----------------------|
| 2a   |         | $\frac{3}{8}$ | 1    | B1                   |
| b    |         | $\frac{3}{5}$ | 1    | B1 oe                |
| c    |         | 0.4           | 1    | B 1                  |
|      |         |               |      |                      |
|      |         |               |      | <b>Total 3 marks</b> |

| Ques | Working | Answer             | Mark | Notes                |
|------|---------|--------------------|------|----------------------|
| 3ai  |         | acute              | 2    | B1                   |
| aii  |         | 60                 |      | B1 58 - 62           |
| b    |         | R placed correctly | 1    | B1                   |
|      |         |                    |      | <b>Total 3 marks</b> |

| Ques | Working | Answer         | Mark | Notes                                                                                                                           |
|------|---------|----------------|------|---------------------------------------------------------------------------------------------------------------------------------|
| 4    |         | Correct circle | 2    | B2 correct circle<br>(B1 circle with radius 6 cm or for circle partially within guidelines or radius 3 cm centre P or centre Q) |
|      |         |                |      | <b>Total 2 marks</b>                                                                                                            |

| Ques | Working                                   | Answer | Mark | Notes                      |
|------|-------------------------------------------|--------|------|----------------------------|
| 5    | $3 \times 1000$ or $340 \div 1000$        |        | 3    | M1                         |
|      | $3000 \div 340$ or $3 \div 340 = 8.82...$ |        |      | M1 allow “3000” $\div$ 340 |
|      |                                           | 8      |      | A1                         |
|      |                                           |        |      | <b>Total 3 marks</b>       |

| Ques | Working                                                    | Answer        | Mark | Notes                                                                                               |
|------|------------------------------------------------------------|---------------|------|-----------------------------------------------------------------------------------------------------|
| 6a   |                                                            | 19 00         | 1    | B1 19 00                                                                                            |
| b    | 8:40 to 9:40 to 10:00 $+(45 - 20)$<br>$8:40 + 1:45 = 9:85$ |               | 2    | M1 for a correct approach by addition eg 8:40 to 9:40 to 10:00 $+(45 - 20)$ or $8:40 + 1:45 = 9:85$ |
|      |                                                            | 10:25         |      | A1 10:25                                                                                            |
| c    | $\frac{40}{60}$                                            | $\frac{2}{3}$ | 2    | B2 for $\frac{2}{3}$<br>(B1 any other equivalent fraction)                                          |
|      |                                                            |               |      | <b>Total 5 marks</b>                                                                                |

| Ques | Working | Answer        | Mark | Notes                     |
|------|---------|---------------|------|---------------------------|
| 7ai  |         | Marked at 0.5 | 1    | B1 professional judgement |
| aii  |         | Marked at 0   | 1    | B1 professional judgement |
| b    |         | Likely        | 1    | B1                        |
|      |         |               |      | <b>Total 3 marks</b>      |

| Ques | Working                    | Answer | Mark | Notes                |
|------|----------------------------|--------|------|----------------------|
| 8    | $84 \div 3 = 28$           |        | 3    | M1                   |
|      | $84 - 28$ or $2 \times 28$ |        |      | M1 dep               |
|      |                            | 56     |      | A1                   |
|      |                            |        |      | <b>Total 3 marks</b> |

| Ques | Working                           | Answer | Mark | Notes                             |
|------|-----------------------------------|--------|------|-----------------------------------|
| 9a   | $6 \times 40 = 240$<br>$240 + 50$ |        | 2    | M1                                |
|      |                                   | 290    |      | A1                                |
| b    | $410 - 50 = 360$                  |        | 2    | M1 or $6 + (410 - '290') \div 40$ |
|      | $360 \div 40$                     | 9      |      | A1                                |
|      |                                   |        |      |                                   |
|      |                                   |        |      | <b>Total 4 marks</b>              |

| Ques | Working          | Answer | Mark | Notes                |
|------|------------------|--------|------|----------------------|
| 10a  |                  | $7m$   | 1    | B1                   |
| b    |                  | $5x$   | 1    | B1                   |
| c    |                  | $12y$  | 1    | B1                   |
| d    | $4 \times 2 + 9$ | 17     | 1    | B1                   |
| e    | $2 \times 3^2$   | 18     | 1    | B1                   |
|      |                  |        |      | <b>Total 5 marks</b> |

| Ques  | Working                                                                                                                                                                                                                                                                                                                                          | Answer            | Mark | Notes                                                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|---------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------|---|----------------------------------------------------------|
| 11a   | <table border="1"> <tr> <td>A \ B</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr> <td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr> <td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> </table> | A \ B             | 1    | 2                                                                         | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 | 7 | 4 | 5 | 6 | 7 | 8 | Correct table | 2 | B2 fully correct table<br>(B1 6 or more correct entries) |
| A \ B | 1                                                                                                                                                                                                                                                                                                                                                | 2                 | 3    | 4                                                                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
| 1     | 2                                                                                                                                                                                                                                                                                                                                                | 3                 | 4    | 5                                                                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
| 2     | 3                                                                                                                                                                                                                                                                                                                                                | 4                 | 5    | 6                                                                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
| 3     | 4                                                                                                                                                                                                                                                                                                                                                | 5                 | 6    | 7                                                                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
| 4     | 5                                                                                                                                                                                                                                                                                                                                                | 6                 | 7    | 8                                                                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
| b     |                                                                                                                                                                                                                                                                                                                                                  |                   | 2    | M1 for $\frac{n}{16}$ with $0 < n < 16$ or for $\frac{3}{m}$ with $m > 3$ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
|       |                                                                                                                                                                                                                                                                                                                                                  | $\frac{3}{16}$ oe |      | A1                                                                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
| c     |                                                                                                                                                                                                                                                                                                                                                  |                   | 2    | M1 all 6 cases identified (condone 1 error)                               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
|       |                                                                                                                                                                                                                                                                                                                                                  | $\frac{6}{16}$ oe |      | A1                                                                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |
|       |                                                                                                                                                                                                                                                                                                                                                  |                   |      | <b>Total 6 marks</b>                                                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |                                                          |

| Ques | Working | Answer                                   | Mark | Notes                                                                                                                         |
|------|---------|------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------|
| 12a  |         | Rectangle with 8 squares                 | 1    | B1                                                                                                                            |
| b    |         | Isosceles triangle with $8 \text{ cm}^2$ | 2    | B2<br>(B1 for isosceles triangle with area not $8 \text{ cm}^2$ or for non-isosceles triangle with area of $8 \text{ cm}^2$ ) |
|      |         |                                          |      | <b>Total 3 marks</b>                                                                                                          |

| Ques | Working     | Answer | Mark | Notes                |
|------|-------------|--------|------|----------------------|
| 13a  |             | 3      | 1    | B1 2.8 - 3.2         |
| b    |             | -14    | 1    | B1 ft                |
| c    | $20 + '14'$ | 34     | 1    | B1 ft Accept -34     |
|      |             |        |      | <b>Total 3 marks</b> |

| Ques | Working                  | Answer | Mark | Notes                             |
|------|--------------------------|--------|------|-----------------------------------|
| 14a  | $8 \times 5 \times 50$   |        | 2    | M1                                |
|      |                          | 2000   |      | A1                                |
| b    | $12.5 \times 25 = 312.5$ |        | 3    | M1 for $12.5 \times 25 (= 312.5)$ |
|      | $2000 \div 312.5$        |        |      | M1 "2000" $\div 312.5$            |
|      |                          | 6.4    |      | A1 ft                             |
|      |                          |        |      | <b>Total 5 marks</b>              |

| Ques | Working                 | Answer | Mark | Notes                         |
|------|-------------------------|--------|------|-------------------------------|
| 15a  |                         | 23     | 1    | B1                            |
| b    | $1200 \div 8 \times 12$ |        | 2    | M1 $1200 \div 8 \times 12$ oe |
|      |                         | 1800   |      | A1                            |
|      |                         |        |      | <b>Total 3 marks</b>          |

| Ques | Working | Answer                                | Mark | Notes                |
|------|---------|---------------------------------------|------|----------------------|
| 16   |         | A $x = 3$<br>B $y = -2$<br>C $y = -x$ | 3    | B1<br>B1<br>B1       |
|      |         |                                       |      | <b>Total 3 marks</b> |

| Ques | Working                                                                 | Answer | Mark | Notes                |
|------|-------------------------------------------------------------------------|--------|------|----------------------|
| 17   | $600 \times 67.1 (= 40260)$ <b>or</b><br>$67.1 \div 82.5 (=0.813\dots)$ |        | 3    | M1                   |
|      | “40260” $\div 82.5$ <b>or</b><br>“0.813..” $\times 600$                 |        |      | M1 dep               |
|      |                                                                         | 488    |      | A1<br>SC: B2 for 712 |
|      |                                                                         |        |      | <b>Total 3 marks</b> |

| Ques | Working                                                     | Answer                   | Mark | Notes                              |
|------|-------------------------------------------------------------|--------------------------|------|------------------------------------|
| 18a  | $\pi \times 150$ oe                                         |                          | 2    | M1                                 |
|      |                                                             | 471                      |      | A1 awrt 471                        |
| b    | $30 \times 60 (=1800)$ <b>or</b><br>“471” $\div 30 (=15.7)$ |                          | 3    | M1                                 |
|      | “471” $\div$ ”1800” <b>or</b><br>“15.7” $\div 60$           |                          |      | M1 dep                             |
|      |                                                             | 0.262                    |      | A1 for 0.26 – 0.262 or ft from (a) |
| c    | Radius = $x - h$ <b>or</b><br>$\frac{D}{2} = x - h$ oe      |                          | 2    | M1                                 |
|      |                                                             | $h = x - \frac{D}{2}$ oe |      | A1 or $h = \frac{2x - D}{2}$       |
|      |                                                             |                          |      | <b>Total 7 marks</b>               |

| Ques | Working                                                                                                    | Answer | Mark | Notes                                                           |
|------|------------------------------------------------------------------------------------------------------------|--------|------|-----------------------------------------------------------------|
| 19   | Angle $DAB = 110$                                                                                          |        | 4    | B1 can be implied by angle $DAX = \text{angle } BAX = 55^\circ$ |
|      | Angle $BAX = 110 \div 2 (= 55)$ <b>or</b><br>Angle $DAX = 110 \div 2 (= 55)$ <b>or</b><br>Angle $AXD = 55$ |        |      | M1                                                              |
|      | Angle $AXD = 55$ <b>or</b><br>Angle $CBA = 180 - 110 (=70)$ <b>or</b><br>Angle $ADC = 180 - 110 (=70)$     |        |      | M1                                                              |
|      |                                                                                                            | 125    |      | A1                                                              |
|      |                                                                                                            |        |      | <b>Total 4 marks</b>                                            |

| Ques | Working                                              | Answer          | Mark | Notes                                                                             |
|------|------------------------------------------------------|-----------------|------|-----------------------------------------------------------------------------------|
| 20   | $2y - - y = 3 - 6$<br><b>or</b><br>$x + 2x = 3 + 12$ |                 | 3    | M1 for a complete method to eliminate one variable (condone one arithmetic error) |
|      |                                                      |                 |      | A1 $x = 5$                                                                        |
|      |                                                      | $x = 5, y = -1$ |      | A1 $y = -1$<br>NB: Candidates showing no working score 0 marks                    |
|      |                                                      |                 |      | <b>Total 3 marks</b>                                                              |

| Ques          | Working | Answer                     | Mark | Notes                                                                                                                        |
|---------------|---------|----------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 21a           |         | $8 \times 10 + 1, 81, 9^2$ | 2    | B2 All three correct<br>(B1 two correct)                                                                                     |
| b             |         | 19                         | 1    | B1 cao                                                                                                                       |
| ci            |         | $n(n+2)+1$                 | 2    | B1 for $n(n+2)+1$ on answer line or in table                                                                                 |
| ii            |         | $(n+1)^2$                  |      | B1 for $(n+1)^2$ on answer line or in table<br><br>SC : If no marks scored in (i) or (ii) award B1 for $n^2 + 2n + 1$ in (b) |
| Total 5 marks |         |                            |      |                                                                                                                              |

| Ques          | Working                                                                                                                                                                           | Answer | Mark | Notes                                                                                                                                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 22            | $3 \times 8 + 8 \times 10 + 13 \times 18 + 18 \times 20 + 23 \times 10 + 28 \times 4$ <b>or</b><br>$24 + 80 + 234 + 360 + 230 + 112$<br><b>or</b><br>1040                         |        | 4    | M1 finds products $f \times x$ consistently within intervals (inc end points) allow 1 error<br>NB. products do not have to be evaluated |
|               |                                                                                                                                                                                   |        |      | M1 (dep on first M1) –uses midpoints                                                                                                    |
|               | $\frac{3 \times 8 + 8 \times 10 + 13 \times 18 + 18 \times 20 + 23 \times 10 + 28 \times 4}{8 + 10 + 18 + 20 + 10 + 4}$<br><b>or</b><br>“1040” $\div (8 + 10 + 18 + 20 + 10 + 4)$ |        |      | M1 (dep on first M1) $\Sigma fx \div \Sigma f$                                                                                          |
|               |                                                                                                                                                                                   | 14.9   |      | A1 14.8 – 14.9 or $14\frac{6}{7}$<br>Accept 15 if full working shown                                                                    |
| Total 5 marks |                                                                                                                                                                                   |        |      |                                                                                                                                         |

| Ques | Working                                                                                    | Answer | Mark | Notes                    |
|------|--------------------------------------------------------------------------------------------|--------|------|--------------------------|
| 23a  | $\frac{1}{2}(14 + 20) \times 8$ <b>or</b><br>$8 \times 14 + \frac{1}{2} \times 6 \times 8$ |        | 2    | M1 for a complete method |
|      |                                                                                            | 136    |      | A1                       |
| b    | $20 - 14 (= 6)$                                                                            |        | 4    | M1                       |
|      | '6' <sup>2</sup> + 8 <sup>2</sup> <b>or</b> 36 + 64 <b>or</b> 100                          |        |      | M1 dep on previous M1    |
|      | $\sqrt{('6'^2 + 8^2)}$                                                                     |        |      | M1 dep on previous M1    |
|      |                                                                                            | 10     |      | A1                       |
|      |                                                                                            |        |      | <b>Total 6 marks</b>     |

| Ques | Working | Answer           | Mark | Notes                                                                      |
|------|---------|------------------|------|----------------------------------------------------------------------------|
| 24a  |         | 3, 6, 9          | 1    | B1 condone {3, 6, 9}                                                       |
| b    |         | {2,3,4,6,8,9,10} | 1    | B1 condone omission of brackets                                            |
| c    |         | {6}              | 1    | B1 condone omission of brackets                                            |
| d    |         | 3, 9             | 2    | B2 cao<br>(B1 for one of 3, 9 with no incorrect numbers <b>or</b> 3, 6, 9) |
|      |         |                  |      | <b>Total 5 marks</b>                                                       |

| Ques | Working                                                                                                                                                                       | Answer                                           | Mark | Notes                                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------|-------------------------------------------------------------------------------------------|
| 25a  | $224 = 2 \times 112 = 2 \times 2 \times 56 =$<br>$2 \times 2 \times 2 \times 28 = 2 \times 2 \times 2 \times 2 \times 14$<br>$2 \times 2 \times 2 \times 2 \times 2 \times 7$ |                                                  | 3    | M1 for at least 2 correct steps in repeated factorisation (may be seen in a tree diagram) |
|      |                                                                                                                                                                               |                                                  |      | A1 2, 2, 2, 2, 2, 7 ( condone inclusion of 1)                                             |
|      |                                                                                                                                                                               | $2^5 \times 7$                                   |      | A1 $2^5 \times 7$<br>NB: Candidates showing no working score 0 marks                      |
| b    | $56 + 32 + 16$<br>$56 + 32 + 14$<br>$56 + 28 + 16$                                                                                                                            |                                                  | 2    | M1 for any 3 correct distinct factors (excluding 1 and 224)                               |
|      |                                                                                                                                                                               | eg. 56, 32, 16<br>or 56, 32, 14<br>or 56, 28, 16 |      | A1 correct and have a sum between 99 and 110                                              |
|      |                                                                                                                                                                               |                                                  |      | <b>Total 5 marks</b>                                                                      |



