



# Mark Scheme (Results)

## Summer 2026

Pearson Edexcel International GCSE In Mathematics A  
4MA1/2FR

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June 2026

Question Paper Log Number P79789A

Publication Code 4MA1\_2FR\_2606\_MS

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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

- awrt – answer which rounds to
- 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.

If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown. 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: eg. 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.

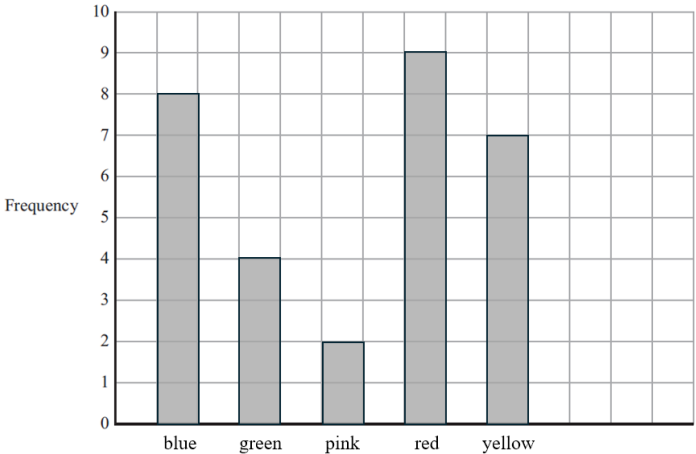
- **Parts of questions**

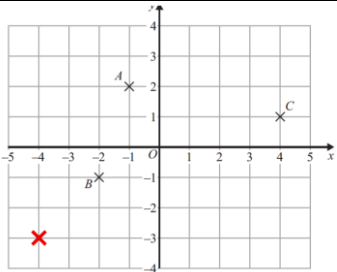
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

| International GCSE Maths                                                                                   |         |              |      |                                                      |
|------------------------------------------------------------------------------------------------------------|---------|--------------|------|------------------------------------------------------|
| Values in quotation marks must come from a correct method previously seen unless clearly stated otherwise. |         |              |      |                                                      |
| Question                                                                                                   | Working | Answer       | Mark | Notes                                                |
| 1 (a)                                                                                                      |         | Rahul Dravid | 1    | B1 accept Rahul, Dravid, RD or other shortened forms |
| (b)                                                                                                        |         | 4 hundreds   | 1    | B1 accept 400, hundred(s), 100(s)                    |
| (c)                                                                                                        |         | 4811         | 1    | B1                                                   |
| (d)                                                                                                        |         | 1725         | 1    | B1                                                   |
|                                                                                                            |         |              |      | <b>Total 4 marks</b>                                 |

|        |                                                                                   |                             |   |                                  |
|--------|-----------------------------------------------------------------------------------|-----------------------------|---|----------------------------------|
| 2 (a)  |  | Acute angle marked with $A$ | 1 | B1                               |
| (b)    |                                                                                   | 2                           | 1 | B1                               |
| (c)(i) |                                                                                   | B                           | 1 | B1 accept b                      |
| (ii)   |                                                                                   | D                           | 1 | B1 accept d<br>Allow pyramid     |
| (iii)  |                                                                                   | A                           | 1 | B1 accept a<br>Allow cube/cuboid |
|        |                                                                                   |                             |   | <b>Total 5 marks</b>             |

|       |                                                                                                                                   |                 |   |                      |
|-------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------|---|----------------------|
| 3 (a) |                                                                                                                                   | $11\frac{5}{6}$ | 1 | B1                   |
| (b)   |                                                                                                                                   | 0.3             | 1 | B1                   |
| (c)   | eg $\frac{60-21}{60}$ oe or $1-\frac{21}{60}$ oe or $\frac{60}{60}-\frac{21}{60}$ oe or $\frac{39}{60}$ or 0.65 or $\frac{7}{20}$ |                 | 2 | M1                   |
|       | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                   | $\frac{13}{20}$ |   | A1                   |
|       |                                                                                                                                   |                 |   | <b>Total 4 marks</b> |

|           |                                                                                    |                   |   |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------|------------------------------------------------------------------------------------|-------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>4*</b> |  | Correct bar chart | 3 | <p>B2 for all bars at the correct height (B1 for 2 or 3 or 4 bars of the correct height)</p> <p>or</p> <p>B1 for all heights marked eg points joined with lines but no bars drawn)</p> <p>NB Condone gaps or no gaps between bars and also bars of different widths – allow a vertical (dashed) line instead of a bar)</p> <p>B1 for all 5 bars labelled – use of initials eg B, G, P, R, Y</p> <p>or</p> <p>a key is acceptable</p> |
|           |                                                                                    |                   |   | <b>Total 3 marks</b>                                                                                                                                                                                                                                                                                                                                                                                                                 |

|          |     |                                                                                    |                                                                          |   |                                                                                                                                                                                                                                                                      |
|----------|-----|------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>5</b> | (a) |                                                                                    | $(-1, 2)$                                                                | 1 | B1                                                                                                                                                                                                                                                                   |
|          | (b) |  | <p><math>(-1, 2)</math></p> <p>Cross marked at <math>(-4, -3)</math></p> | 1 | B1 need not be labelled if meaning is clear                                                                                                                                                                                                                          |
|          | (c) |                                                                                    | $(1, 0)$                                                                 | 2 | <p>B2 for <math>(1, 0)</math></p> <p>(B1 for <math>(1, Y)</math> or <math>(X, 0)</math> or <math>(0, 1)</math> or the midpoint unambiguously marked in the correct place on the diagram)</p> <p>NB Do not allow a blank space for 0 for the <math>y</math> value</p> |
|          |     |                                                                                    |                                                                          |   | <b>Total 4 marks</b>                                                                                                                                                                                                                                                 |

|           |                                                                                 |    |   |                                                     |
|-----------|---------------------------------------------------------------------------------|----|---|-----------------------------------------------------|
| <b>6*</b> |                                                                                 |    | 4 | B1 for 24<br>May be seen on the diagram             |
|           | 80 – “24” (= 56) or<br>80 ÷ 4 (= 20) oe or<br>“24” ÷ 4 (= 6) oe                 |    |   | M1ft their scale reading                            |
|           | “56” ÷ 4 or<br>“20” – “6”                                                       |    |   | M1ft their scale reading for a fully correct method |
|           | <i>Correct answer scores full marks (unless from obvious incorrect working)</i> | 14 |   | A1                                                  |
|           |                                                                                 |    |   | <b>Total 4 marks</b>                                |

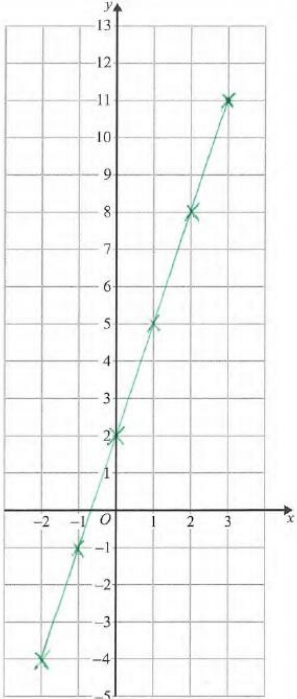
|          |     |                                                                                                                             |                       |   |                                                                                                                                                          |
|----------|-----|-----------------------------------------------------------------------------------------------------------------------------|-----------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>7</b> | (a) |                                                                                                                             | 20ch                  | 1 | B1                                                                                                                                                       |
|          | (b) |                                                                                                                             | $-3x + 11y$           | 2 | B2 for $-3x + 11y$ or $11y - 3x$<br>(B1 for $-3x$ or $(+)11y$ )                                                                                          |
|          | (c) |                                                                                                                             | $a^2 - 4a$            | 1 | B1 accept $-4a + a^2$                                                                                                                                    |
|          | (d) |                                                                                                                             | $5(2k + 7)$           | 1 | B1 accept $5(7 + 2k)$                                                                                                                                    |
|          | (e) | $m + 2 = 7t$ oe or $-7t = -2 - m$ oe or<br>$\frac{m}{7} = t - \frac{2}{7}$ oe or $\frac{m + 2}{7}$ oe or $t = m + 2 \div 7$ |                       | 2 | M1                                                                                                                                                       |
|          |     | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                             | $t = \frac{m + 2}{7}$ |   | A1 oe eg $y = \frac{-m - 2}{-7}$ or $t = \frac{m}{7} + \frac{2}{7}$ oe or<br>$t = (m + 2) \div 7$<br>(must see $t = \dots$ on answer line or in working) |
|          |     |                                                                                                                             |                       |   | <b>Total 4 marks</b>                                                                                                                                     |

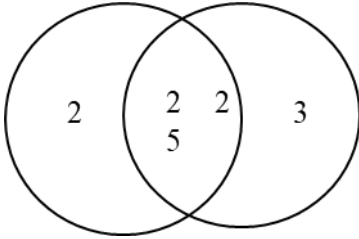
|         |          |                                                                                                                                                                                                                                                                                                |                                              |          |                                                                                                                                                |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
|---------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|--------|----|--|--|----|---------|--|----|----|--|-------|----|--|----|--|---------------|---|------------------------------------------------------------------------------------------------------|
| 8       | (a)      |                                                                                                                                                                                                                                                                                                | $CF\ CH\ CW$<br>$KF\ KH\ KW$<br>$RF\ RH\ RW$ | 2        | B2 for all 9 combinations with no extras or repeats<br><br>If not B2 then B1 for at least 4 correct combinations (ignoring extras and repeats) |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
|         | (b)      | <table><tr><td></td><td>Football</td><td>Hockey</td><td>Tennis</td><td>Total</td></tr><tr><td>Indoor</td><td>36</td><td></td><td></td><td>96</td></tr><tr><td>Outdoor</td><td></td><td>32</td><td>14</td><td></td></tr><tr><td>Total</td><td>94</td><td></td><td>59</td><td></td></tr></table> |                                              | Football | Hockey                                                                                                                                         | Tennis | Total | Indoor | 36 |  |  | 96 | Outdoor |  | 32 | 14 |  | Total | 94 |  | 59 |  | Correct table | 3 | B3 for all 6 correct entries<br><br>(B2 for 4 or 5 correct entries<br>B1 for 2 or 3 correct entries) |
|         | Football | Hockey                                                                                                                                                                                                                                                                                         | Tennis                                       | Total    |                                                                                                                                                |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
| Indoor  | 36       |                                                                                                                                                                                                                                                                                                |                                              | 96       |                                                                                                                                                |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
| Outdoor |          | 32                                                                                                                                                                                                                                                                                             | 14                                           |          |                                                                                                                                                |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
| Total   | 94       |                                                                                                                                                                                                                                                                                                | 59                                           |          |                                                                                                                                                |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
|         | (c)      |                                                                                                                                                                                                                                                                                                |                                              | 2        | M1 for $\frac{58}{n}$ where $n > 58$ or<br><br>$\frac{m}{200}$ where $m < 200$                                                                 |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
|         |          | Correct answer scores full marks (unless from obvious incorrect working)                                                                                                                                                                                                                       | $\frac{58}{200}$                             |          | A1 oe eg $\frac{29}{100}$ or 0.29 or 29%                                                                                                       |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |
|         |          |                                                                                                                                                                                                                                                                                                |                                              |          | Total 7 marks                                                                                                                                  |        |       |        |    |  |  |    |         |  |    |    |  |       |    |  |    |  |               |   |                                                                                                      |

|           |                                                                                                                                                       |     |   |                                                                           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|---------------------------------------------------------------------------|
| <b>9*</b> | $3 \times 60 (= 180)$ oe or $15 \times 5 (= 75)$ oe or<br>$15 \times \frac{5}{60} \left( = \frac{75}{60} = 1.25 \right)$ oe or 1(hour) 15(minutes) oe |     | 3 | M1                                                                        |
|           | “180” – “75” oe or<br>$3 - 1.25 (= 1.75)$ oe or<br>$3 - 1(\text{hour}) 15(\text{minutes}) (= 1(\text{hour}) 45(\text{minutes}))$                      |     |   | M1ft their conversion of 3 hours                                          |
|           | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                                       | 105 |   | A1<br>NB Ignore subsequent conversion of 105 minutes to hours and minutes |
|           |                                                                                                                                                       |     |   | <b>Total 3 marks</b>                                                      |

|           |     |                                 |                               |   |                                               |
|-----------|-----|---------------------------------|-------------------------------|---|-----------------------------------------------|
| <b>10</b> | (a) |                                 | 9261                          | 1 | B1 cao                                        |
|           | (b) |                                 | 5                             | 1 | B1 allow $3^5$                                |
|           | (c) |                                 | 2.8                           | 1 | B1 accept $\frac{14}{5}$ or $2\frac{4}{5}$ oe |
|           | (d) | $20 \div (7 - 3) \times 2 = 10$ | Brackets<br>around<br>(7 - 3) | 1 | B1                                            |
|           |     |                                 |                               |   | <b>Total 4 marks</b>                          |

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |   |                                                                                                                                                                        |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>11</b> | $\frac{7}{28}$ and $\frac{12}{28}$ or $\frac{7n}{28n}$ and $\frac{12n}{28n}$ eg $\frac{14}{56}$ and $\frac{24}{56}$ or<br>$(1 \times) 7$ <b>and</b> $3 \times 4 (= 12)$ <b>and</b> $4 \times 7 (= 28)$ or<br>$\frac{(1 \times) 7}{4 \times 7}$ and $\frac{3 \times 4}{7 \times 4}$                                                                                                                                                                |       | 2 | M1 for finding a common denominator<br>with at least one fraction correct<br><br>or<br><br>for calculations that would lead to <b>7</b> and<br><b>12</b> and <b>28</b> |
|           | $\frac{7}{28} + \frac{12}{28} = \frac{19}{28}$ or $\frac{7n}{28n} + \frac{12n}{28n} = \frac{19n}{28n} = \frac{19}{28}$ or<br>$7 + 12 = 19$ and $\frac{19}{28}$ or<br>$(1 \times) 7$ <b>and</b> $3 \times 4 (= 12)$ <b>and</b> $4 \times 7 (= 28)$ <b>and</b> $\frac{19}{28}$ or<br>$\frac{(1 \times) 7 + 3 \times 4}{4 \times 7} = \frac{19}{28}$ or $\frac{(1 \times) 7}{4 \times 7} + \frac{3 \times 4}{7 \times 4}$<br><i>Working required</i> | Shown |   | A1 dep on M1 for a correct method<br>leading to $\frac{19}{28}$                                                                                                        |
|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |   | <b>Total 2 marks</b>                                                                                                                                                   |

|    |                                                                                                                                       |                                                    |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | $(-2, -4) (-1, -1) (0, 2) (1, 5) (2, 8) (3, 11)$<br> | Correct straight line between $x = -2$ and $x = 3$ | 3 | <p>B3 for a correct line between <math>x = -2</math> and <math>x = 3</math></p> <p>B2 for a correct straight line segment through at least 3 of <math>(-2, -4) (-1, -1) (0, 2) (1, 5) (2, 8) (3, 11)</math><br/> <b>or</b><br/> for all of <math>(-2, -4) (-1, -1) (0, 2) (1, 5) (2, 8) (3, 11)</math> plotted but not joined</p> <p>B1 for at least 2 correct points stated (may be in a table) or plotted<br/> <b>or</b><br/> for a line drawn with a positive gradient through <math>(0, 2)</math><br/> <b>or</b><br/> for a line with a gradient of 3</p> |
|    |                                                                                                                                       |                                                    |   | Total 3 marks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |    |                                      |    |    |    |  |   |   |  |   |                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|--------------------------------------|----|----|----|--|---|---|--|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13* | <p>eg<br/>40, 80, ... <b>and</b> 60, 120, ...</p> <p><b>or</b><br/><math>2 \times 2 \times 2 \times 5</math></p> <p><b>or</b><br/><math>2 \times 2 \times 3 \times 5</math></p> <p><b>or</b></p>  <p><b>or</b><br/>eg</p> <table border="1"><tr><td>2</td><td>40</td><td>60</td></tr><tr><td>10</td><td>20</td><td>30</td></tr><tr><td></td><td>2</td><td>3</td></tr></table> <p><b>or</b><br/>2, 2, 2, 3, 5 oe</p> <p><b>or</b><br/><math>\frac{40 \times 60}{20}</math></p> | 2   | 40 | 60                                   | 10 | 20 | 30 |  | 2 | 3 |  | 2 | <p>M1 for any correct valid method and no errors eg</p> <p>for starting to list at least two multiples of each number</p> <p><b>or</b><br/>2, 2, 2, 5 seen</p> <p><b>or</b><br/>2, 2, 3, 5 seen<br/>(may be in a factor tree or ladder diagram, ignore 1)</p> <p><b>or</b><br/>a fully correct Venn diagram</p> <p><b>or</b><br/>other clear method eg table, may not be written as a product</p> |
| 2   | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 60  |    |                                      |    |    |    |  |   |   |  |   |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 10  | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30  |    |                                      |    |    |    |  |   |   |  |   |                                                                                                                                                                                                                                                                                                                                                                                                   |
|     | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3   |    |                                      |    |    |    |  |   |   |  |   |                                                                                                                                                                                                                                                                                                                                                                                                   |
|     | Correct answer scores full marks (unless from obvious incorrect working)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 120 |    | A1 accept $2^3 \times 3 \times 5$ oe |    |    |    |  |   |   |  |   |                                                                                                                                                                                                                                                                                                                                                                                                   |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |    | Total 2 marks                        |    |    |    |  |   |   |  |   |                                                                                                                                                                                                                                                                                                                                                                                                   |

|            |                                                                                 |    |   |                      |
|------------|---------------------------------------------------------------------------------|----|---|----------------------|
| <b>14*</b> | $360 \div 24$ oe or<br>$\frac{(n-2) \times 180}{n} = 180 - 24$ oe               |    | 2 | M1                   |
|            | <i>Correct answer scores full marks (unless from obvious incorrect working)</i> | 15 |   | A1                   |
|            |                                                                                 |    |   | <b>Total 2 marks</b> |

|                |             |                     |   |                                                                                                                                                                                                                               |
|----------------|-------------|---------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>15*</b> (a) |             | 062                 | 1 | B1 Allow accept 061 – 063<br>Allow 62 accept 61 – 63                                                                                                                                                                          |
| (b)            | Use overlay | Correctly indicated | 2 | B2 for correctly indicating on the diagram<br>(B1 for line drawn or $\times$ from $A$ , with a bearing of $100^\circ$<br><b>or</b><br>stating 5.5 cm oe<br><b>or</b><br>an arc or line drawn with centre $A$ , radius 5.5 cm) |
|                |             |                     |   | <b>Total 3 marks</b>                                                                                                                                                                                                          |

|            |                                                                                                                                             |                                                                                                                                                             |        |   |                      |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|----------------------|
| <b>16*</b> | $\frac{15}{100} \times 300 (= 45)$ oe or<br>$30 + 15 (= 45)$ oe or<br>$300 \times (1 - 0.15) (= 255)$ or<br>$300 \times (1 + 0.15) (= 345)$ | $300 \times 105 (= 31\,500)$ oe                                                                                                                             |        | 3 | M1                   |
|            | “45” $\times 105 (= 4725)$ oe or<br>$(300 - \text{“45”}) \times 105$<br>“255” $\times 105$ oe or<br>“345” $\times 105 (= 36\,225)$ oe       | $\frac{15}{100} \times 31\,500 (= 4725)$ oe or<br>$3150 + 1575 (= 4725)$ oe or<br>$31\,500 \times (1 - 0.15)$ or<br>$31\,500 \times (1 + 0.15) (= 36\,225)$ |        |   | M1                   |
|            | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                             |                                                                                                                                                             | 26 775 |   | A1                   |
|            |                                                                                                                                             |                                                                                                                                                             |        |   | <b>Total 3 marks</b> |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |   |                                                                            |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----------------------------------------------------------------------------|
| 17 | $(x^2 =) 48^2 + 20^2 (= 2704)$ oe or<br>$\tan^{-1}\left(\frac{20}{48}\right) (= 22.6(198\dots))$ <b>and</b> $\cos 22.6^\circ = \frac{48}{x}$ oe or<br>$\tan^{-1}\left(\frac{48}{20}\right) (= 67.3(801\dots))$ <b>and</b> $\sin 67.3^\circ = \frac{48}{x}$ oe or<br>$\tan^{-1}\left(\frac{20}{48}\right) (= 22.6(198\dots))$ <b>and</b> $\frac{x}{\sin 90^\circ} = \frac{20}{\sin 22.6^\circ}$ oe or<br>$\tan^{-1}\left(\frac{48}{20}\right) (= 67.3(801\dots))$ <b>and</b> $\frac{x}{\sin 90^\circ} = \frac{48}{\sin 67.3^\circ}$ oe or<br>$(x^2 =) 48^2 + 20^2 - (2 \times 48 \times 20 \times \cos 90^\circ) (= 2704)$ oe |    | 3 | M1<br><br>Allow the use of different trigonometrical techniques to find 52 |
|    | $(x =) \sqrt{48^2 + 20^2} (= \sqrt{2704})$ oe or<br>$(x =) \frac{48}{\cos 22.6^\circ}$ oe or $(x =) \frac{48}{\sin 67.3^\circ}$ oe or<br>$(x =) \frac{20}{\sin 22.6^\circ} (\times \sin 90^\circ)$ oe or $(x =) \frac{48}{\sin 67.3^\circ} (\times \sin 90^\circ)$ oe or<br>$(x =) \sqrt{2304 + 400} (= \sqrt{2704})$                                                                                                                                                                                                                                                                                                        |    |   | M1                                                                         |
|    | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 52 |   | A1 cao                                                                     |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |   | <b>Total 3 marks</b>                                                       |

|                   |                                                                                                |    |   |                                         |
|-------------------|------------------------------------------------------------------------------------------------|----|---|-----------------------------------------|
| <b>17<br/>ALT</b> | $(x^2 =) \sqrt{5^2 + 12^2} (= \sqrt{169} = 13) \text{ oe}$                                     |    | 3 | M1 for recognising a Pythagorean triple |
|                   | $(x =) "13" \times \frac{20}{5} \text{ oe or}$<br>$(x =) "13" \times \frac{48}{12} \text{ oe}$ |    |   | M1                                      |
|                   | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                | 52 |   | A1 cao                                  |
|                   |                                                                                                |    |   | <b>Total 3 marks</b>                    |

|    |                                                                                 |            |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|---------------------------------------------------------------------------------|------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18 |                                                                                 |            | 2 | M1 for $-6n + k$ ( $k \neq 20$ ) or $k - 6n$ or<br>$-6 \times n + k$ ( $k \neq 20$ ) or<br>$n \times -6 + k$ ( $k \neq 20$ )<br><br>( $k$ may be zero or absent)                                                                                                                                                                                                                                                                                                                                                          |
|    |                                                                                 | $-6n + 20$ |   | A1 oe e.g. $20 - 6n$ or<br>$14 - 6(n - 1)$ oe or<br>$14 - 6n + 6$ oe or<br>$14 + (n - 1) \times -6$ oe or<br>$-6 \times n + 20$ oe or<br>$n \times -6 + 20$ oe<br><br>NB: award full marks for eg<br><br>“ $x =$ ” $-6n + 20$ oe or<br>“ $x =$ ” $n \times -6 + 20$ oe or<br>“ $x =$ ” $-6 \times n + 20$ oe or<br>$n$ th term = $-6n + 20$ oe or<br>$n$ th term = $-6 \times n + 20$ oe or<br>$n$ th term = $n \times -6 + 20$ oe<br>“ $x$ ” can be $U_n$ or $T_n$ or $a_n$ etc<br><br>but only M1 for $n = -6n + 20$ oe |
|    | <i>Correct answer scores full marks (unless from obvious incorrect working)</i> |            |   | <b>Total 2 marks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|    |  |               |   |                                              |
|----|--|---------------|---|----------------------------------------------|
| 19 |  | 5 7 8 9 10 11 | 1 | B1 in any order and no repeats and no extras |
|    |  |               |   | <b>Total 1 mark</b>                          |

|        |                                                                                                                                                                                                                                                       |                |   |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20 (a) | $3x + 6 = 1 - 5x$ oe or $x + 2 = \frac{1}{3} - \frac{5}{3}x$ oe or $x + 2 = \frac{1 - 5x}{3}$ oe                                                                                                                                                      |                | 3 | M1 for expansion of the bracket on the LHS in a correct equation <b>or</b> dividing the RHS by 3 in a correct equation                                                                                                                                                                                                                                                                                                |
|        | $3x + 5x = 1 - 6$ oe or $8x = -5$ oe or<br>$6 - 1 = -5x - 3x$ oe or $5 = -8x$ oe or<br>$x + \frac{5}{3}x = \frac{1}{3} - 2$ oe or $\frac{8}{3}x = -\frac{5}{3}$ oe or<br>$2 - \frac{1}{3} = -\frac{5}{3}x - x$ oe or $\frac{5}{3} = -\frac{8}{3}x$ oe |                |   | M1 ft (dep on 4 terms) for terms in $x$ on one side of the equation and numerical terms on the other side                                                                                                                                                                                                                                                                                                             |
|        | <i>Working required</i>                                                                                                                                                                                                                               | $-\frac{5}{8}$ |   | A1 (dep on M1) oe eg $-0.625$                                                                                                                                                                                                                                                                                                                                                                                         |
| (b)    | $49 \pm \dots$ or<br>$\dots - 15$ or<br>$(-7)^2 - 5 \times 3$ oe or $(-7)^2 - 5(3)$ oe or<br>$-7 \times -7 - 5 \times 3$ oe or $-7 \times -7 - 5(3)$ oe                                                                                               |                | 2 | M1 for either 49 or $-15$ shown in the correct place or the correct substitution shown with brackets around $-7$<br>Allow $7^2$ for $(-7)^2$                                                                                                                                                                                                                                                                          |
|        | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                                                                                                                                       | 34             |   | A1<br>SC B1 for $-64$                                                                                                                                                                                                                                                                                                                                                                                                 |
| (c)    |                                                                                                                                                                                                                                                       | 1              | 1 | B1 cao                                                                                                                                                                                                                                                                                                                                                                                                                |
| (d)    |                                                                                                                                                                                                                                                       | $64r^6t^3$     | 2 | B2 for $64r^6t^3$<br>(B1 a single product with 2 of 64, $r^6$ , $t^3$ correct<br>eg<br>$64r^6t^n$ where $n \neq 3$ <b>or</b><br>$64r^m y^3$ where $m \neq 6$ <b>or</b><br>$pr^6t^3$ where $p \neq 64$ .<br><br>One term can be missing with 2 correct for B1<br>eg<br>$64r^6$ <b>or</b> $64t^3$ <b>or</b> $(4)r^6t^3$ <b>or</b> $a r^6 b t^3$ where $a$ and $b$ are integers as long as not added to any other terms) |
|        |                                                                                                                                                                                                                                                       |                |   | <b>Total 8 marks</b>                                                                                                                                                                                                                                                                                                                                                                                                  |

|     |                                                                                 |                                              |    |   |                                                                         |
|-----|---------------------------------------------------------------------------------|----------------------------------------------|----|---|-------------------------------------------------------------------------|
| 21* | 400 ÷ (2 + 3) (= 80) oe or<br>$400 \times \frac{2}{2+3}$ (= 160) oe             | M2 for<br>$400 \times \frac{3}{2+3}$ (= 240) |    | 5 | M1                                                                      |
|     | 3 × “80” (= 240) oe or<br>400 – (2 × “80”) (= 240) oe or<br>400 – “160” (= 240) |                                              |    |   | M1 for a complete method for the amount Sarah gives to Charity <b>B</b> |
|     | 375 ÷ (1 + 2) (= 125) oe                                                        | M2 for $375 \times \frac{2}{3}$ (= 250)      |    |   | M1                                                                      |
|     | 2 × “125” (= 250) oe or<br>375 – “125” (= 250)                                  |                                              |    |   | M1 for a complete method for the amount Dej gives to Charity <b>B</b>   |
|     | Correct answer scores full marks (unless from obvious incorrect working)        |                                              | 10 |   | A1                                                                      |
|     |                                                                                 |                                              |    |   | Total 5 marks                                                           |

|            |                                                                                                                                                                                             |     |   |                                                                                             |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|---------------------------------------------------------------------------------------------|
| <b>22*</b> | $5^{\text{th}}$ (card/number) = 8 or<br>$1^{\text{st}}$ (card/number) = 1 or<br>$8 - 7 (= 1)$                                                                                               |     | 4 | M1 8 may be written in or by the $5^{\text{th}}$ card or<br>1 for the first card indicated  |
|            | $31 - (1 + 3 + 7 + 8 + 8) (= 4)$ oe or<br>$31 - 27 (= 4)$ oe or<br>$1 + 3 + x + 7 + 8 + 8 = 31$ oe or<br> |     |   | M1 dep on 1 and 8 found                                                                     |
|            | $\frac{[\text{their 4}] + 7}{2}$ oe or $2 + 3.5$ oe or<br>$7 - ((7 - [\text{their 4}]) \div 2)$ oe or $7 - 1.5$ oe or<br>$4 + ((7 - [\text{their 4}]) \div 2)$ oe or $4 + 1.5$ oe           |     |   | M1 indep provided $3 \leq [\text{their 4}] \leq 7$                                          |
|            | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                                                                             | 5.5 |   | A1 cao oe eg $\frac{11}{2}$ or $5\frac{1}{2}$ provided 1, 4 and 8 have been correctly found |
|            |                                                                                                                                                                                             |     |   | <b>Total 4 marks</b>                                                                        |

|            |     |                                                                                                                                                                                  |                       |   |                      |
|------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---|----------------------|
| <b>23*</b> | (a) |                                                                                                                                                                                  | 0.00004               | 1 | B1                   |
|            | (b) | $12 \times 10^{158+72}$ or $2 \times 6 \times 10^{230}$ or<br>$12 \times 10^{230}$ oe eg $120 \times 10^{229}$ or $0.12 \times 10^{232}$<br>$1.2 \times 10^n$ where $n \neq 231$ |                       | 2 | M1                   |
|            |     | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                                                                  | $1.2 \times 10^{231}$ |   | A1                   |
|            |     |                                                                                                                                                                                  |                       |   | <b>Total 3 marks</b> |

|            |  |                                                                                                                                                                                                           |        |   |                                                                     |
|------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|---------------------------------------------------------------------|
| <b>24*</b> |  | $1 + 0.04 (= 1.04)$ oe <b>or</b> $x + 0.04x = 36\,400$ oe <b>or</b><br>$100(\%) + 4(\%) (= 104(\%))$ oe <b>or</b><br>$\frac{36\,400}{104} (= 350)$ oe                                                     |        | 3 | M1<br>Do not accept $(1 + 4\%)$ unless it leads to a correct answer |
|            |  | $36\,400 \div "1.04"$ oe <b>or</b><br>$36\,400 \div \frac{"104"}{100}$ oe <b>or</b><br>$36\,400 \times \frac{100}{"104"}$ oe <b>or</b><br>"350" $\times 100$ <b>or</b><br>$36\,400 - (4 \times "350")$ oe |        |   | M1                                                                  |
|            |  | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                                                                                                                           | 35 000 |   | A1                                                                  |
|            |  |                                                                                                                                                                                                           |        |   | <b>Total 3 marks</b>                                                |

|           |                                                                                                                                                                                                                                                                                                                                   |    |   |                                                                                                                                                         |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>25</b> | $198 \times 1000 (= 198\,000)$ oe or<br>$\frac{198}{60 \times 60} \left( = \frac{198}{3600} = \frac{11}{200} = 0.055 \right)$ or<br>$\frac{60 \times 60}{1000} \left( = \frac{3600}{1000} = \frac{18}{5} = 3.6 \right)$ oe or<br>$\frac{1000}{60 \times 60} \left( = \frac{1000}{3600} = \frac{5}{18} = 0.277(777...) \right)$ oe |    | 3 | M1 for one of $\times 1000$ or $(\div 60 \div 60)$ or $\div 3600$ or $\div (60 \times 60)$<br><br>ie correct conversion of distance units or time units |
|           | $\frac{"198\,000"}{60 \times 60} \left( = \frac{"198\,000"}{3600} = \frac{1980}{36} \right)$ oe or<br>"0.055" $\times 1000$ oe or<br>$198 \div "3.6"$ oe or<br>$198 \times \frac{5}{18}$ oe                                                                                                                                       |    |   | M1 for a complete method                                                                                                                                |
|           | <i>Working required</i>                                                                                                                                                                                                                                                                                                           | 55 |   | A1 cao dep on M1                                                                                                                                        |
|           |                                                                                                                                                                                                                                                                                                                                   |    |   | <b>Total 3 marks</b>                                                                                                                                    |

|           |                                                                                                     |     |  |                                                                                                                                                                                                                                        |
|-----------|-----------------------------------------------------------------------------------------------------|-----|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>26</b> | $(V =) \pi \times 4^2 \times 11 (= 176\pi = 552(.920...))$                                          |     |  | M1 Accept $552.6 - 553.2$<br>Allow $3.14....$ or $\frac{22}{7}$ for $\pi$<br>NB the value of the volume may be embedded in $d = \frac{m}{V}$ oe<br>Do not award this mark for using $(V =) \frac{1}{3} \times \pi \times r^2 \times h$ |
|           | $0.6 = \frac{m}{"552"}$ oe or $(m =) 0.6 \times "552"$ oe or $\frac{528\pi}{5}$ oe or $105.6\pi$ oe |     |  | M1                                                                                                                                                                                                                                     |
|           | <i>Correct answer scores full marks (unless from obvious incorrect working)</i>                     | 332 |  | A1 allow 331 – 332                                                                                                                                                                                                                     |
|           |                                                                                                     |     |  | <b>Total 3 marks</b>                                                                                                                                                                                                                   |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |   |                                                                                                                                                                                                                                                                                         |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27 | $\sqrt{36}(=6)$ or $6 \times 6$ or $6^2$                                                                                                                                                                                                                                                                                                                                                                                                |     | 5 | M1                                                                                                                                                                                                                                                                                      |
|    | $\tan 25 = \frac{FG}{"6"}$ oe or $\tan(90-25) = \frac{"6"}{FG}$ oe or<br>$\cos 25 = \frac{"6"}{EF}$ oe or $\sin(90-25) = \frac{"6"}{EF}$ oe or<br>$\frac{FG}{\sin 25} = \frac{6}{\sin(90-25)}$ oe<br>$FG$ or $EF$ can be labelled with any letter                                                                                                                                                                                       |     |   | M1ft [their $EG$ ] for “6”<br>If the first M mark is not awarded<br><br>[their $EG$ ] may be 9 with or without labelling<br>or<br>[their $EG$ ] may be any other length but must be labelled on the diagram or clearly labelled as $EG$<br>eg $\tan 25 = \frac{FG}{[\text{their } EG]}$ |
|    | $(FG =) "6" \times \tan 25 (= 2.79(784...))$ oe or<br>$(FG =) \frac{"6"}{\tan(90-25)} (= 2.79(784...))$ oe or<br>$(EF =) \frac{"6"}{\cos 25} (= 6.6(2026...))$ oe or<br>$(EF =) \frac{"6"}{\sin(90-25)} (= 6.6(2026...))$ oe or<br>$(EF =) \sqrt{"6"{}^2 + "2.79..."{}^2} (= 6.6(2026...))$ oe or<br>$(FG =) \sqrt{6.62..."{}^2 - "6"{}^2} (= 2.79(784...))$ oe or<br>$(FG =) \frac{6}{\sin(90-25)} \times \sin 25 (= 2.79(784...))$ oe |     |   | M1ft [their $EG$ ] for “6”<br><br>eg $(FG =) [\text{their } EG] \times \tan 25$<br><br>Allow 2.8 or better for $FG$                                                                                                                                                                     |
|    | $0.5 \times "6" \times "2.79"$ oe or<br>$0.5 \times "6" \times "2.79" \times \sin 90$ oe or<br>$0.5 \times "6" \times "6.6" \times \sin 25$ oe or<br>$0.5 \times "6.6" \times "2.79" \times \sin(90-25)$ oe                                                                                                                                                                                                                             |     |   | M1ft [their $EG$ ] for “6”                                                                                                                                                                                                                                                              |
|    | Working required                                                                                                                                                                                                                                                                                                                                                                                                                        | 8.4 |   | A1 dep on M2 allow in the range 8.3 – 8.4                                                                                                                                                                                                                                               |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |   | <b>Total 5 marks</b>                                                                                                                                                                                                                                                                    |