
GCSE Mathematics

Paper 3 Higher Tier

Mark scheme

8300
November 2017

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

| | |
|------------------------|--|
| M | Method marks are awarded for a correct method which could lead to a correct answer. |
| A | Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied. |
| B | Marks awarded independent of method. |
| ft | Follow through marks. Marks awarded for correct working following a mistake in an earlier step. |
| SC | Special case. Marks awarded for a common misinterpretation which has some mathematical worth. |
| M dep | A method mark dependent on a previous method mark being awarded. |
| B dep | A mark that can only be awarded if a previous independent mark has been awarded. |
| oe | Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$ |
| [a, b] | Accept values between a and b inclusive. |
| [a, b) | Accept values $a \leq \text{value} < b$ |
| 3.14 ... | Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416 |
| Use of brackets | It is not necessary to see the bracketed work to award the marks. |

Examiners should consistently apply the following principles

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

Questions which ask students to show working

Instructions on marking will be given but usually marks are not awarded to students who show no working.

Questions which do not ask students to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

| Question | Answer | Mark | Comments |
|-------------------------|-----------------------------------|------|---|
| 1 | $-4 < x \leq 5$ | B1 | |
| | Additional Guidance | | |
| | | | |
| 2 | 1 : 2 | B1 | |
| | Additional Guidance | | |
| | | | |
| 3 | $2n - 12$ | B1 | |
| | Additional Guidance | | |
| | | | |
| 4 | $y = -5$ | B1 | |
| | Additional Guidance | | |
| | | | |
| 5 | $x^2 - 8x - 8x + 64$ | M1 | allow one error or omission terms may be seen in a grid |
| | $x^2 - 16x + 64$ | A1 | Ignore fw eg if attempting to solve Do not ignore fw if attempting to simplify |
| | Additional Guidance | | |
| | $x^2 - 16x (+ k) \quad k \neq 64$ | | M1A0 |
| | $x^2 - 8x + 64$ | | M1A0 |
| | $x^2 - 16x + 64 = -15x^3 + 64$ | | M1A0 |
| | $x^2 - 8x + 8x + 64$ (one error) | | M1A0 |
| | $x^2 + 8x + 8x + 64$ (one error) | | M1A0 |
| | $x^2 - 6x + 8x + 64$ (two errors) | | M0A0 |
| $x^2 + 64$ (two errors) | | M0A0 | |

| Question | Answer | Mark | Comments |
|----------|--|------|---|
| 6 | Lists three from 3, 9, 27, 81, 243, 729 or lists three from 1, 4, 9, 16, ..., 225, 256, 289 or correctly evaluating a power of 3 + a square number or correctly evaluating 268 – a power of 3 or correctly evaluating 268 – a square number | M1 | eg $27 + 25 = 52$ or $3^3 + 5^2 = 52$ eg $268 - 27 = 241$ eg $268 - 49 = 219$ |
| | $243 + 25$ or $3^5 + 5^2$ | A1 | oe Addition sign must be seen in working or on answer line |
| | Additional Guidance | | |
| | $3^5, 5^2$ or 3^5 and 5^2 on answer line | | M1A0 |
| | $268 - 243 = 25$ | | M1A0 |
| | 243, 25 or 243 and 25 on answer line | | M1A0 |
| | Beware of $5^3 + 5^2$ | | |
| 7 | $10 < t \leq 15$ | B1 | |
| | Additional Guidance | | |
| | | | |

| Question | Answer | Mark | Comments |
|-------------------------------|--|-------|---|
| 8 Alt 1 of 2 | Alternative method 1 | | |
| | $PAB = 51$ or $PAD = 51$ or $APC = 180 - 51$ or $APC = 129$ | M1 | |
| | $ABP = 180 - 51 - \text{their } 51$ or $ABP = 180 - 102$ or $ABP = 78$ or $ADC = 180 - \text{their } 51 - \text{their } 51$ $ADC = 180 - 102$ $ADC = 78$ | M1dep | $PAB = 51$ and $PAD = 51$ or $BAD = 102$ |
| | $BCD = 180 - \text{their } 78$ or $BCD = 360 - \text{their } 129 - \text{their } 51 - \text{their } 78$ or $BCD = 360 - 258$ or $BCD = 102$ or $4x = 180 - \text{their } 78$ or $4x = 360 - \text{their } 129 - \text{their } 51 - \text{their } 78$ or $4x = 360 - 258$ or $4x = 102$ or $102 \div 4$ | M1dep | oe eg $BCD = (360 - 2 \times \text{their } 78) \div 2$ or $4x = (360 - 2 \times \text{their } 78) \div 2$ |
| | 25.5 | A1 | |

| Question | Answer | Mark | Comments | |
|-------------------------------|--|-------|----------|--|
| 8 Alt 2 of 2 | Alternative method 2 | | | |
| | $ABC = 180 - 3x - x$ or $ABC = 180 - 4x$ or $APC = 180 - 51$ or $APC = 129$ | M1 | | |
| | $PAB = 2x$ or $APB = 2x$ or $2x = 51$ | M1dep | | |
| | $51 \div 2$ | M1dep | | |
| | 25.5 | A1 | | |
| | Additional Guidance | | | |
| | Angles must be labelled or shown on diagram | | | |

| Question | Answer | Mark | Comments |
|----------|--------|------|----------|
|----------|--------|------|----------|

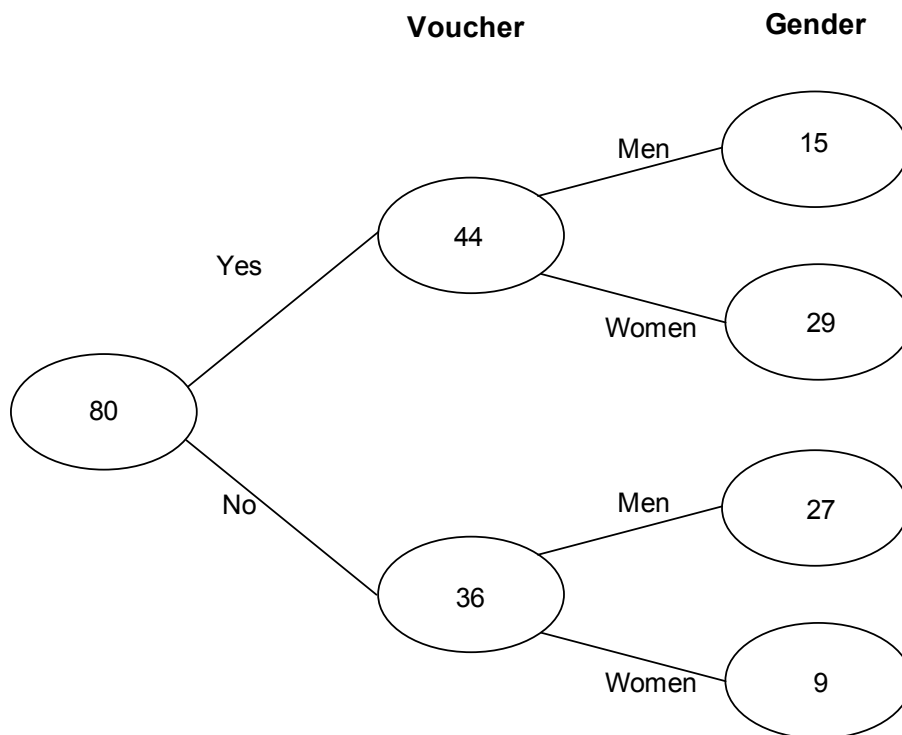
| | | | | |
|-------------|--|----------------------|----|------|
| 9(a) | Alternative method 1 | | | |
| | $v - u = at$ | $-at = u - v$ | M1 | |
| | $t = \frac{v-u}{a}$ | $t = \frac{u-v}{-a}$ | A1 | oe |
| | Alternative method 2 | | | |
| | $\frac{v}{a} = \frac{u}{a} + t$ | | M1 | |
| | $t = \frac{v}{a} - \frac{u}{a}$ | | A1 | oe |
| | Additional Guidance | | | |
| | $t = (v - u) \div a$ | | | M1A1 |
| | $v - u = at$ and $t = v - u \div a$ | | | M1A0 |
| | $\frac{v-u}{a}$ or $\frac{u-v}{-a}$ or $\frac{v}{a} - \frac{u}{a}$ | | | M1A0 |
| | $a = \frac{v-u}{t}$ with or without working | | | M1A0 |
| | $t = v - u \div a$ | | | M0A0 |
| | $t = \frac{v+u}{a}$ | | | M0A0 |

| Question | Answer | Mark | Comments |
|-------------|---|------|---|
| 9(b) | (Speed) m/s or ms^{-1} (Acceleration) m/s^2 or ms^{-2} or $m/s/s$ | B2 | B1 for one correct or two mutually consistent units eg km/h and km/h^2 Accept mps for m/s and mps^2 for m/s^2 |
| | Additional Guidance | | |
| | Allow units given in words eg metres per second metres per second squared or metres per second per second | | |
| | m/s^{-1} (speed) | | B0 |
| | m/s^{-2} (acceleration) | | B0 |
| 10 | Two pairs of intersecting arcs with equal radii $> 0.5 AB$ | M1 | tolerance ± 0.1 cm |
| | Perpendicular bisector drawn with correct method seen | A1 | tolerance ± 0.1 cm |
| | Additional Guidance | | |
| | | | |

| Question | Answer | Mark | Comments |
|----------|--------|------|----------|
|----------|--------|------|----------|

| | | | |
|-------|-----------|------|---|
| 11(a) | 80 | B1 | |
| | 44 and 36 | B1ft | ft their $80 - 44$ |
| | 27 and 9 | B1ft | ft their $36 \div 4 \times 3$ and ft their $36 \div 4$ |
| | 15 and 29 | B1ft | ft $42 - \text{their } 27$ and ft $38 - \text{their } 9$ Total on ft must be 44 |

Additional Guidance



B1B1B1B1

Mark diagram only, do not allow misread

Values may be rounded up or down to whole numbers provided the total is correct

Penalise the use of relative frequencies on the first occurrence only

If relative frequencies are shown the denominator must be 80 and not simplified eg $\frac{3}{4}$ and $\frac{1}{4}$ is B0

| | | |
|--|---|--|
| | <p style="text-align: center;">Voucher Gender</p> <pre>graph LR; 80((80)) -- Yes --> 44((44)); 80 -- No --> 36((36)); 44 -- Men --> 33((33)); 44 -- Women --> 11((11)); 36 -- Men --> 9((9)); 36 -- Women --> 27((27));</pre> <p style="text-align: right;">B1B1B0B1ft</p> | |
| | <p style="text-align: center;">Voucher Gender</p> <pre>graph LR; 80((80)) -- Yes --> 44((44)); 80 -- No --> 36((36)); 44 -- Men --> 30((30)); 44 -- Women --> 14((14)); 36 -- Men --> 12((12)); 36 -- Women --> 24((24));</pre> <p style="text-align: right;">B1B1B0B1ft</p> | |

| Question | Answer | Mark | Comments |
|--|---|-------|--|
| 11(b) | 85% or 0.85 | M1 | |
| | $27.2 \div 0.85$ or $27.2 \div 85 (\times 100)$ or 0.32 | M1dep | |
| | 32(.00) | A1 | Correct money notation Allow £32.00p |
| | Additional Guidance | | |
| | 32.0 | | M1M1A0 |
| 12(a) | $140 \div 50$ or 2.8 or $140 \div 50 \times 60$ or 168 | M1 | oe |
| | 2 (hours) 48 (minutes) | A1 | 258 (minutes) (after midday) implies M1A1 |
| | 4.18 (pm) | A1ft | oe ft their time in hours and minutes with M1 awarded |
| | Additional Guidance | | |
| | $140 \div 50$ or $2.8 = 2$ hours 80 minutes = 3 hours 20 minutes, Answer 4.50 | | M1A0A1ft |
| | $140 \div 50$ or $2.8 = 2$ hours 8 minutes, Answer 3.38 | | M1A0A1ft |
| | $140 \div 50$ or $2.8 = 2$ hours 80 minutes = 3 hours 20 minutes, Answer 4.5 | | M1A0A0 |
| | $140 \div 50$ or 2.8, Answer 4.10 | | M1A0A0 |
| 2 hours 8 minutes implies attempt at $140 \div 50$ | | M1 | |

| Question | Answer | Mark | Comments |
|--------------|--|------|---|
| 12(b) | Valid statement | B1ft | eg the arrival time will be later it will be later time will be more ft their time in (a) eg it will be after 4.18pm |
| | Additional Guidance | | |
| | It will be delayed | | B1 |
| | The arrival time will be increased | | B1 |
| | He will reach there late | | B1 |
| | The time will go up | | B1 |
| | It will go up | | B1 |
| | The journey will take longer so the arrival time is later | | B1 |
| | Take longer | | B0 |
| | Longer | | B0 |
| | Slower (restating question) | | B0 |
| | You won't get there as quick | | B0 |
| | Time will be longer | | B0 |
| | Journey will be longer | | B0 |
| | 'Longer' is referring to a time period rather than an arrival time | | |

| Question | Answer | Mark | Comments |
|----------|--------|------|----------|
|----------|--------|------|----------|

| | | | |
|---|---|----|--|
| 13 | Fully correct box plot Minimum = 0.5 LQ = 2 Median = 4 UQ = 5 Maximum = 12 | B3 | B2 for box plot with 3 or 4 correct plots or 1 omission B1 for at least 3 correct plots tolerance $\pm \frac{1}{2}$ square |
| | Additional Guidance | | |
| | | | |
| | Any indication of correct plots | | |
| | Whiskers may be omitted | | |
| | Not a box plot scores a maximum of B1 | | |
| | $\frac{1}{2}$, 2, 3, 4, 12 plotted correctly in a box plot | | B2 |
| $\frac{1}{2}$, 2, 3, 4, 12 plotted correctly in a box plot with one point out of tolerance | | B1 | |
| $\frac{1}{2}$, 2, 3, 4, 12 not in a box plot | | B1 | |

| Question | Answer | Mark | Comments | |
|--------------|---|------|---|----------|
| 14(a) | $6 + 5 + 2x + x + 2 = 31$ or $3x + 13 = 31$ or $3x = 18$ or $\frac{5 + 2x}{31}$ or $\frac{5 + 2x}{3x + 13}$ | M1 | oe equation $6 + 5 + 2(6) + 6 + 2 = 31$ (embedded answer) | |
| | $(x =) 6$ | A1 | | |
| | $\frac{17}{31}$ or 0.548... or 0.55 or 54.8...% or 55% | A1ft | ft $\frac{5 + \text{their } 2x}{31}$ and M1 A0 or ft $\frac{23 - \text{their } x}{31}$ and M1 A0 | |
| | Additional Guidance | | | |
| | $x = 6$, answer $\frac{12}{31}$ or answer $\frac{12}{31}$ alone (implied $x = 6$) | | | M1A1A0 |
| | $3x = 18$, $x = 5$, answer $\frac{15}{31}$ or $\frac{18}{31}$ | | | M1A0A1ft |
| 14(b) | $\frac{5}{11}$ or 0.45... or 45.(...)% | B1 | oe | |
| | Additional Guidance | | | |
| | | | | |
| 15 | $2xy$ | B1 | | |
| | Additional Guidance | | | |
| | | | | |
| 16 | 36 | B1 | | |
| | Additional Guidance | | | |
| | | | | |

| Question | Answer | Mark | Comments |
|-----------|---|-------|--|
| 17 | 13 – 5 → 4152 or 8 → 4152 | M1 | oe eg 4152 ÷ 8 or 519 seen or 8 parts is 4152 |
| | $\frac{x + 4152}{x} = \frac{13}{5}$ or $5x + 20\,760 = 13x$ or $20\,760 = 8x$ or $2595 = x$ or (number of men =) 6747 or (number of women =) 2595 or (total number of people =) 12 926 or $4152 \div 8 \times 7$ or 519×7 | M1dep | oe |
| | 3633 | A1 | |
| | Additional Guidance | | |
| | | | |

| Question | Answer | Mark | Comments |
|-----------|--|--------------------------|--|
| 18 | $-6x^3 + 18x$ or $(-)(6x^3 - 18x)$ | B1 | |
| | $6x^3 + 15x^2 + 4x + 10$ | M1 | Allow one error |
| | $6x^3 + 15x^2 + 4x + 10 - 6x^3 + 18x$ | A1ft | oe ft B0M1 only |
| | $15x^2 + 22x + 10$ | A1ft | ft their 6 terms if at least M1 scored Do not ignore fw |
| | Additional Guidance | | |
| | $-6x^3 - 18x$ $6x^3 + 15x^2 + 4x + 10$ $6x^3 + 15x^2 + 4x + 10 - 6x^3 - 18x$ $15x^2 - 14x + 10$ | B0 M1 A1ft A1ft | |
| | $-6x^2 - 18x$ $6x^2 + 15x^2 + 4x + 10$ $6x^2 + 15x^2 + 4x + 10 - 6x^2 - 18x$ $15x^2 - 14x + 10$ | B0 M1 A1ft A1ft | |
| | $-6x^2 + 18x$ $6x^2 + 15x^2 + 4x + 10$ $6x^2 + 15x^2 + 4x + 10 - 6x^2 + 18x$ $15x^2 + 22x + 10$ | B0 M1 A1ft A1ft | |
| | $-6x^3 + 18x$ $6x^3 + 15x^2 + 4x + 7$ $6x^3 + 15x^2 + 4x + 7 - 6x^3 + 18x$ $15x^2 + 22x + 7$ | B1 M1 A0 A1ft | |

| Question | Answer | Mark | Comments |
|-----------|---|-------|---|
| 19 | 65 | B1 | |
| | Alternate segment (theorem) | B1dep | |
| | Additional Guidance | | |
| | 65 alternative segment (theorem) | | B1 B0 |
| | 65 alternate angles | | B1 B0 |
| 20 | 3rd box indicated | B1 | |
| | Additional Guidance | | |
| | | | |
| 21 | 3^8 or 3^9 or y^6 or $2 \times 3^4 \times y^3 \times 2 \times 3^4 \times y^3$ or $3 \times 2 \times 3^4 \times y^3 \times 2 \times 3^4 \times y^3$ | M1 | 78 732 or 19 683 |
| | $2^2 \times 3^8 \times y^6$ or $3 \times 2^2 \times 3^8 \times y^6$ or 2^2 and 3^9 and y^6 or $2^a \times 3^b \times y^c$ with two powers correct | M1dep | $2^2 \times 19\,683y^6$ $78\,732y^6$ |
| | $2^2 \times 3^9 \times y^6$ | A1 | Must be in index form Do not ignore fw |
| | Additional Guidance | | |
| | $2^2 \times 3^8 \times y^6$ | | M1 M1 A0 |
| | $2^2 + 3^9 \times y^6$ | | M1 M1 A0 |
| | $2^2 + 3^8 + y^6$ | | M1 M0 A0 |
| | | | |

| Question | Answer | Mark | Comments |
|-----------|--|-------|----------|
| 22 | $6^2 + 9^2 - 2 \times 6 \times 9 \times \cos 120$ or $36 + 81 - 108 \cos 120$ or $36 + 81 + 54$ or 171 | M1 | oe |
| | $\sqrt{6^2 + 9^2 - 2 \times 6 \times 9 \times \cos 120}$ or $\sqrt{36 + 81 - 108 \cos 120}$ or $\sqrt{36 + 81 + 54}$ | M1dep | oe |
| | [13, 13.1] or $\sqrt{171}$ or $3\sqrt{19}$ | A1 | |
| | Additional Guidance | | |
| | $6^2 + 9^2 = 36 + 81$ $= 117$ Answer $\sqrt{117}$ | | M0 |

| Question | Answer | Mark | Comments |
|--------------------|--|------|--|
| 23 | Line $x = 3$ should be dashed or not included | B1 | oe eg vertical line should be dotted |
| | R is in the wrong place | B1 | oe eg region is not correct May be shown on diagram |
| | Additional Guidance | | |
| | x is not equal to 3 | | B1 |
| | R does not include $x = 3$ | | B1 |
| | Straight line should be less than 3 | | B1 |
| | $x = 3$ is not in the region | | B1 |
| | Line at $x = 3$ is closed not open | | B1 |
| | Lines are not drawn correctly (not enough) | | B0 |
| | | | |
| | Should have shaded above the dotted line ($y > 3 - x$) | | B1 |
| | R should be where (2, 2) is | | B1 |
| R should be shaded | | B0 | |

| Question | Answer | Mark | Comments | |
|-----------|--|--------------------------------|---|--------------------------|
| 24 | Alternative method 1 | | | |
| | $4a = 9b$ | M1 | oe $\frac{a}{b} = \frac{9}{4}$ | |
| | $4a = 9 \times \frac{7c}{10}$ or $40a = 63c$ | $40a = 90b$ and $90b = 63c$ | M1dep | oe $9 : \frac{40}{7}$ |
| | $63 : 40$ | A1 | Accept $\frac{63}{40} : 1$ or $1.575 : 1$ or $1 : \frac{40}{63}$ | |
| | Alternative method 2 | | | |
| | $b : c = 7 : 10$ | M1 | | |
| | $a : b = 63 : 90$ and $b : c = 90 : 40$ or $63 : 90 : 40$ | M1dep | oe common value for b | |
| | $63 : 40$ | A1 | Accept $\frac{63}{40} : 1$ or $1.575 : 1$ or $1 : \frac{40}{63}$ | |

| Question | Answer | Mark | Comments |
|------------------------|--|-------|---|
| 24 cont | Alternative method 3 | | |
| | $a = \frac{9b}{4}$ or $c = \frac{10b}{7}$ | M1 | |
| | $\frac{9b}{4} : \frac{10b}{7}$ or $\frac{9}{4} : \frac{10}{7}$ | M1dep | oe |
| | 63 : 40 | A1 | Accept $\frac{63}{40} : 1$ or 1.575 : 1 or $1 : \frac{40}{63}$ |
| | Alternative method 4 | | |
| | $c = \frac{10}{7}b$ | M1 | eg $a : c = a : \frac{10}{7}b$ |
| | $9 : \frac{10}{7} \times 4$ or $9 : \frac{40}{7}$ | M1dep | oe |
| | 63 : 40 | A1 | Accept $\frac{63}{40} : 1$ or 1.575 : 1 or $1 : \frac{40}{63}$ |
| | Additional Guidance | | |
| | 2 nd method mark is for a link between a and c or a correct ratio in an unsimplified form | | |
| 40 : 63 on answer line | | | M1M1A0 |

| Question | Answer | Mark | Comments |
|-----------|--|-------|---|
| 25 | Attempt to draw a tangent | M1 | |
| | Attempt at slope of a tangent drawn at (10, 15) | M1dep | tolerance $\pm \frac{1}{2}$ square Must be an attempt at change in y divided by change in x Accept positive or negative |
| | [0.6, 0.8] from tangent drawn at (10, 15) | A1ft | Condone $-[0.6, 0.8]$ from tangent drawn at (10, 15) ft from their tangent drawn at (10, 15) |
| | Additional Guidance | | |
| | Tangent drawn at incorrect point | | M1M0A0 |
| | No tangent | | M0 |
| | Tangent drawn at (10, 15) $10 \div 15 = 0.6$ | | M1 M0 A0 |
| | Misread of scale for tangent drawn at (10, 15) could score M1M1 | | |
| 26 | Full explanation stating one of $a + b$ or $a - b$ must be 1 and $a + b$ cannot be 1 and $a - b$ must be 1 | B2 | B1 partial explanation ie $a + b$ or $a - b$ must be 1 or $a + b$ cannot be 1 or $a - b$ must be 1 |
| | Additional Guidance | | |
| | | | |

| Question | Answer | Mark | Comments | |
|-----------|---|--|----------|----|
| 27 | $10^2 + 10^2$ or 200 | $5^2 + 5^2$ or 50 | M1 | oe |
| | $\sqrt{\text{their } 200}$ or $10\sqrt{2}$ or [14, 14.2] | $\sqrt{\text{their } 50}$ or $5\sqrt{2}$ or [7, 7.1] | M1dep | oe |
| | $\tan 68 = \frac{h}{\text{their } 7.1}$ | | M1dep | |
| | their 7.1 \times $\tan 68$ or [17.3, 17.6] | | M1dep | |
| | $\frac{1}{3} \times 10 \times 10 \times \text{their } [17.3, 17.6]$ | | M1dep | |
| | [576, 587] or 590 | | A1 | |
| | Additional Guidance | | | |
| | | | | |

| Question | Answer | Mark | Comments |
|-----------|---|-------|--|
| 28 | $p \times q^{1-1} = 10$ or $p \times q^0 = 10$ or $p \times q^{6-1} = 0.3125$ or $p \times q^5 = 0.3125$ | M1 | oe |
| | $p = 10$ or $10 \times q^{6-1} = 0.3125$ or $q^5 = 0.3125 \div \text{their } 10$ or $q^5 = 0.03125$ | M1dep | |
| | $\sqrt[5]{\text{their } 0.03125}$ or 0.5 | M1dep | oe |
| | their $10 \times \text{their } 0.5^2$ or their $10 \times \text{their } (\sqrt[5]{\text{their } 0.03125})^2$ or their $10 \times \text{their } 0.03125^{\frac{2}{5}}$ | M1dep | |
| | 2.5 | A1 | |
| | Additional Guidance | | |
| 29 | -3 -2 -1 0 1 2 | B2 | B1 for 5 correct and 0 incorrect or 6 correct and 1 incorrect |
| | Additional Guidance | | |
| | Do not accept coordinates | | |

| Question | Answer | Mark | Comments |
|-----------|---|------|----------|
| 30 | $\frac{6x^2 + 3}{3}$ or $2x^2 + 1$ or $\frac{6x^2 + 3}{3} + 4$ or $2x^2 + 1 + 4$ | M1 | oe |
| | $2x^2 + 5$ | A1 | |
| | Additional Guidance | | |
| | | | |