



GCSE

Mathematics

Paper 1 43651F

Mark scheme

43651F

November 2016

Version/Stage: 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. e.g. 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 e.g. 3.14, 3.142, 3.1416 |
| Q | Marks awarded for quality of written communication |
| 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 candidate has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised.

Questions which ask candidates to show working

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

Questions which do not ask candidates to show working

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

Misread or miscopy

Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate 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 candidate intended it to be a decimal point.

Paper 1 Foundation Tier

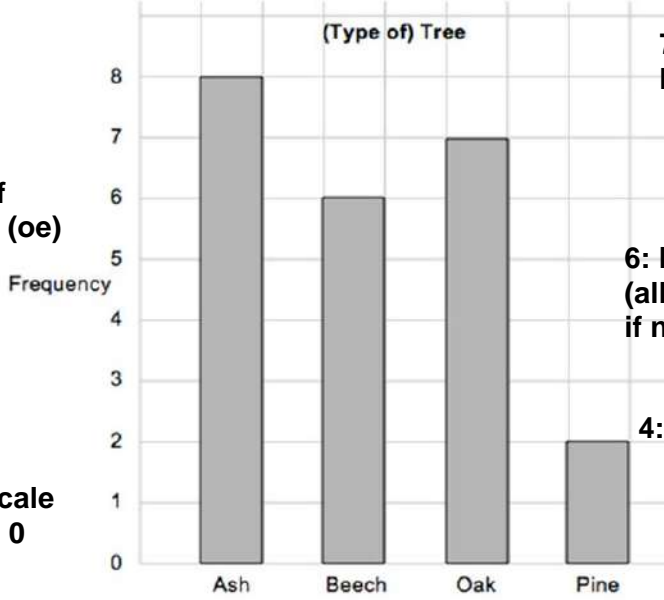
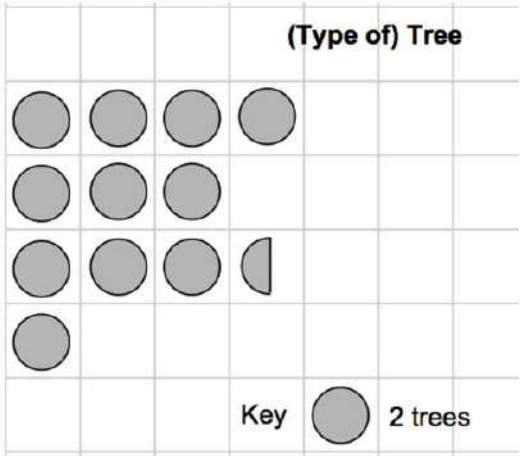
| Q | Answer | Mark | Comments |
|-------------|---------------|-------------|-----------------|
| 1(a) | 72 | B1 | |
| 1(b) | 36 | B1 | |
| 1(c) | 46 | B1 | |
| 1(d) | $\frac{2}{5}$ | B1 | |
| 2(a) | 436 | B1 | |
| 2(b) | 168 | B1 | |
| 2(c) | 42 | B1 | Allow 042 |

| Q | Answer | Mark | Comments |
|---|--------|------|----------|
|---|--------|------|----------|

| | | | |
|---|---|----|--|
| 3 | Alternative method 1 Bar chart or vertical line graph (could be horizontal) | | |
| | Linear scale starting at 0 increasing in 1s or 2s Vertical axis labelled as 'frequency' (or clear reference such as f or freq) Bars/ lines labelled (allow A, B, O, P) Equal width for bars/ lines Equal spacing between bars/ lines All heights correct Title (accept this as a label of horizontal axis) | B3 | B2 5 or 6 conditions met B1 3 or 4 conditions met |
| | Alternative method 2 Pictogram (vertical or horizontal) | | |
| | Pictogram key Consistent symbols for at least 2 rows Labels for trees (allow A, B, O, P) Equal spacing of rows Equal alignment of columns Correct number of symbols eg 8, 6, 7, 2 if 1 symbol for 1 tree or 4, 3, 3.5, 1 if 1 symbol for 2 trees Title (accept this as a label of side or bottom 'axis') | B3 | B2 5 or 6 conditions met B1 3 or 4 conditions met |

Additional Guidance is on the next page

| Q | Answer | Mark | Comments |
|---|--------|------|----------|
|---|--------|------|----------|

| Additional Guidance | | | |
|---------------------|---|--|--------|
| 3 cont | <p>Bar graph (or line graph) – could be horizontal</p>  <p>2: Label of frequency (oe)</p> <p>1: Linear scale starting at 0</p> <p>3: Bars/ lines labelled (oe) – allow in bars</p> <p>6: Heights correct (allow 8, 6, 7, 2 or 4, 3, 3.5, 1 if no axis scale)</p> <p>4: Equal widths for bars/lines</p> <p>5: Equal spacing between bars/ lines</p> <p>7: Title (could be label of horizontal axis)</p> | | |
| | <p>Pictogram – could be vertical</p>  <p>3: Labels (oe)</p> <p>4: Equal spacing of rows</p> <p>5: Equal alignment of columns</p> <p>6: Correct number of symbols (allow 8, 6, 7, 2 or 4, 3, 3.5, 1 if no key)</p> <p>2: Symbols consistent with key for at least 2 rows (If no key, symbols consistent with each other)</p> <p>1: Key</p> <p>7: Title (could be label of vertical axis)</p> | | |
| | Points only can score the marks for conditions 1, 2, 3, 6 and 7 | | B2 max |
| | Only check spacing between bars not before the first bar | | |
| | All values not needed for axis scale eg 0 can be implied | | |
| | Frequency may be Number or How many oe | | |
| | Title must include the word Tree | | |

| Q | Answer | Mark | Comments |
|------------------------------------|---|------|------------|
| 4(a) | 96 or 96.00(p) | B1 | 96.0 is B0 |
| 4(b) | 21 | B1 | |
| 4(c) | 37 does not divide (exactly) by 6 or 36 is 6 people and 42 is 7 people or 37 is not in the 6 times table | B1 | oe |
| | Additional Guidance | | |
| | 37 is odd / is prime | | B1 |
| | It is not (or it should be) even / multiples of 6 are even | | B1 |
| | (It is) not in 6 times table / not a multiple of 6 / must be a multiple of 6 | | B1 |
| | It ends in a 7 | | B1 |
| | $6 \times 6 = 36$ and £1 | | B1 |
| | $37 \div 6 = 6$ with remainder £1 | | B1 |
| | $6 \times 6 = 36$, $7 \times 6 = 42$ | | B1 |
| | 6, 12, 18, 24, 30, 36, 42 | | B1 |
| | $37 \div 6 = 6.1$ (Allow 6.1 or 6.2 or 6r1) | | B1 |
| | No matter how many times you add 6 it doesn't end in 7 | | B1 |
| | Only allow 37 doesn't go into 6 if a correct reason is also given eg 37 doesn't go into 6, $37 \div 6 = 6.1$ 37 doesn't go into 6, so it is not in the 6 times table | | B1 B1 |
| | Do not allow if an incorrect calculation seen eg $37 \div 6 = 6.5$ so 37 is not a multiple of 6 | | B0 |
| | £1 too many | | B0 |
| | $6 \times 6 = 36$ | | B0 |
| | 37 doesn't go into 6 | | B0 |
| Not a whole number | | B0 | |
| 6, 12, 18, 24, 30, 36 (no further) | | B0 | |

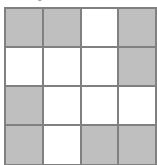
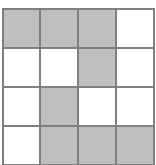
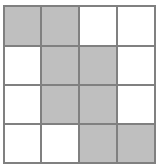
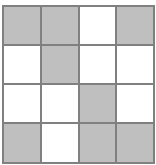
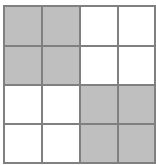
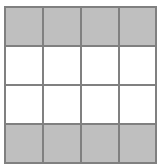
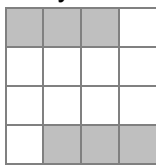
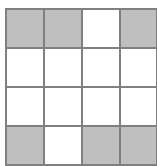
| Q | Answer | Mark | Comments |
|-------------|---|-------|------------------------------|
| 4(d) | Alternative method 1 | | |
| | 13×6 or 78 or 11×6 or 66 or 16×6 or 96 or their 96 from (a) or $13 + 11 + 16$ or 40 | M1 | |
| | their 78 + their 66 + their 96 or their 40×6 or 240 | M1dep | Must be three products |
| | their 240×0.9 or their $240 - \text{their } 240 \times 0.1$ | M1dep | oe |
| | 216 | A1ft | ft their 96 from (a) if used |
| | Alternative method 2 | | |
| | $13 + 11 + 16$ or 40 | M1 | |
| | 6×0.9 or 5.4(0) or 6×0.1 or 0.6(0) | M1 | oe |
| | their $40 \times \text{their } 5.4$ or their $40 \times (6 - \text{their } 0.6)$ | M1dep | oe dep on M2 |
| | 216 | A1 | |

Alternative methods continued on the next page

| Q | Answer | Mark | Comments |
|------------------|---|-------|------------------------------|
| 4(d) cont | Alternative method 3 | | |
| | 13 + 11 + 16 or 40 | M1 | |
| | their 40 × 0.9 or 36 or their 40 × 0.1 or 4 | M1dep | oe |
| | their 36 × 6 or (their 40 – their 4) × 6 | M1dep | oe |
| | 216 | A1 | |
| | Alternative method 4 | | |
| | 13 × 6 or 78 or 11 × 6 or 66 or 16 × 6 or 96 or their 96 from (a) | M1 | |
| | their 78 × 0.9 or 70.2(0) or their 66 × 0.9 or 59.4(0) or their 96 × 0.9 or 86.4(0) or their 78 × 0.1 or 7.8(0) or their 66 × 0.1 or 6.6(0) or their 96 × 0.1 or 9.6(0) | M1dep | oe |
| | their 70.2 + their 59.4 + their 86.4 or their 78 + their 66 + their 96 – their 7.8 – their 6.6 – their 9.6 | M1dep | oe |
| | 216 | A1ft | ft their 96 from (a) if used |

Alternative methods and Additional Guidance continued on the next page

| Q | Answer | Mark | Comments |
|-----------|--|-------|--------------------------|
| 4(d) cont | Alternative method 5 | | |
| | 13×0.9 or 11.7 or 11×0.9 or 9.9 or 16×0.9 or 14.4 or 13×0.1 or 1.3 or 11×0.1 or 1.1 or 16×0.1 or 1.6 | M1 | oe |
| | their 11.7 + their 9.9 + their 14.4 or 36 or their 1.3 + their 1.1 + their 1.6 or 4 | M1dep | oe |
| | their 36×6 or $(13 + 11 + 16 - \text{their } 4) \times 6$ | M1dep | oe |
| | 216 | A1 | |
| | Additional Guidance | | |
| | Calculation for 10% seen as part of build-up to percentage other than 90 does not score the method mark for percentage | | |
| | Build-up for percentages must be correct or show full method However allow rounding or truncation eg (for Alt 1) $78 + 66 + 96 = 235$ $10\% = 23$ Answer 212 | | M1 M1dep M1dep A0 |

| Q | Answer | Mark | Comments | |
|------|---|------|--|--|
| 5(a) | Any two from (3, A), (3, B), (3, E) or (3, F) | B2 | Accept coordinates transposed B1 one correct | |
| | Additional Guidance | | | |
| | Accept (3A, 3B), (3E, 3F) | | B2 | |
| 5(b) | No line of 4 (whites) possible | B1 | oe | |
| | Additional Guidance | | | |
| | Accept row, path or reference to Connect 4 to imply line | | | |
| | Accept maximum of 3 to imply not 4 | | | |
| 5(c) | (4, E) | B1 | Allow (E, 4) | |
| 6(a) | Any rotationally symmetrical pattern with 8 squares shaded and no line symmetry eg <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div> | B2 | B1 for any rotationally symmetrical pattern with 8 squares shaded and line symmetry eg <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div> B1 for any rotationally symmetrical pattern with 6 – 10 squares shaded and no line symmetry eg <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div> | |
| | Additional Guidance | | | |
| | If answer pattern blank, mark practice pattern | | | |

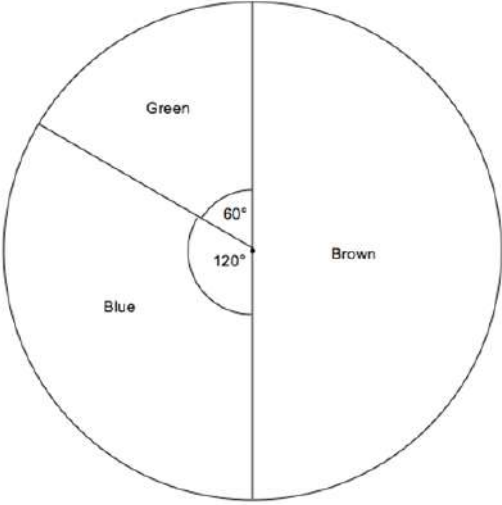
| Q | Answer | Mark | Comments |
|------|--|------|---|
| 6(b) | $\frac{1}{16}$ or $\frac{1}{8}$ seen or $1\frac{1}{2}$ or diagram divided into 16 squares or 16 seen | M1 | oe |
| | $\frac{6}{16}$ | A1 | oe fraction eg $\frac{3}{8}$ |
| | Additional Guidance | | |
| | Ignore any incorrect cancelling (except $\frac{3}{7}$) once correct fraction seen | | |
| | 0.375 or $\frac{37.5}{100}$ | | M1 A0 |
| 7(a) | 4×190 or 760 or $4 \times 1.9(0)$ or 7.6(0) or 240 or 2.4(0) | M1 | oe £240p or £2.40p |
| | (£)2.40 | Q1 | Strand (i) |
| | Additional Guidance | | |
| | If building up or down must be correct or show full method | | |
| 7(b) | £2, 20p, 20p | B1ft | ft smallest number of coins for their (a) Allow coins or notes used for £5 or more |
| | Additional Guidance | | |
| | Units needed | | |
| | Correct coins in working lines followed by answer 3 | | B1 |
| | (a) £8.10 (b) (£5) £2 £1 10p or £2 £2 £2 £2 10p | | B1ft |
| 8(a) | 81 | B1 | |
| 8(b) | 3.7499 | B1 | |

| Q | Answer | Mark | Comments |
|----------|---|-------|---|
| 9 | Alternative method 1 | | |
| | (Red) $30 \div 3$ or 10 | M1 | oe |
| | (Silver) 0.2×30 or $30 \div 5$ or 6 | M1 | oe |
| | (Black) $30 - (\text{their } 10 + \text{their } 6)$ or 14 | M1dep | dep on at least M1 scored |
| | $\frac{14}{30}$ or $\frac{7}{15}$ | A1 | oe |
| | Alternative method 2 | | |
| | $(20\% =) \frac{1}{5}$ | B1 | oe fraction |
| | Correctly converts $\frac{1}{3}$ and their $\frac{1}{5}$ to fractions with a common denominator eg $\frac{5}{15}$ and $\frac{3}{15}$ or $\frac{8}{15}$ | M1 | |
| | $1 - (\text{their } \frac{5}{15} + \text{their } \frac{3}{15})$ | M1dep | |
| | $\frac{7}{15}$ | A1 | oe |
| | Alternative method 3 | | |
| | $(\frac{1}{3} =) 0.33(3)$ or $33.(3)\%$ | B1 | At least 2 sf |
| | $0.2 + \text{their } 0.33$ or $0.53(3)$ or $20\% + \text{their } 33\%$ or $53.(3)\%$ | M1 | |
| | $1 - \text{their } 0.53$ or 0.47 or $100\% - \text{their } 53\%$ or 47% | M1dep | At least 2 sf dep on B1M1 |
| | $0.4\dot{6}$ or $46.\dot{6}\%$ | A1 | If exact value seen allow subsequent rounding or truncation |

Additional Guidance is on the next page

| Q | Answer | Mark | Comments |
|---|--------|------|----------|
|---|--------|------|----------|

| Additional Guidance | | | |
|---------------------|--|--|-------------------------|
| 9 cont | red = 10 silver = $0.2 \times (30 - 10) = 4$ $30 - (10 + 4) = 16$ $\frac{16}{30}$ | | M1 M0 M1dep A0 |
| | $0.3 + 0.2 = 0.5$ $1 - 0.5$ Answer 0.5 | | B0 M1 M0dep A0 |
| | $0.33 + 0.2 = 0.53$ Answer 0.47 | | B1M1 M1dep A0 |
| | Ignore any incorrect cancelling or change of form once correct answer seen | | |
| | Ignore any probability words once correct answer seen | | |

| 10 | Correct, labelled pie chart  | B3 | Sizes of angles do not need to be labelled Mark intention for angles B2 Correct, unlabelled pie chart or labelled, 3-sector pie chart with one sector correct and Brown > Blue > Green B1 Pie chart (any number of sectors) with one correct sector (labelled or unlabelled) or 60° , 120° and 180° seen or $\frac{1}{6}$, $\frac{1}{3}$ and $\frac{1}{2}$ oe seen |
|--|--|----|--|
| | Additional Guidance | | |
| | Correct angles seen in table | B1 | |
| | Labels must be words or eg Br, Bl, Gr not just numbers or angles | | |
| Allow sectors to be split if the split sectors remain adjacent | | | |

| Q | Answer | Mark | Comments |
|--|---|------|---|
| 11(a) | 21 | B1 | |
| | Additional Guidance | | |
| | Embedded answer only of $21 \div 3 = 7$ or $\frac{21}{3} = 7$ | | B0 |
| 11(b) | 23 | B1 | |
| | Additional Guidance | | |
| | Embedded answer only of $23 - 11 = 12$ | | B0 |
| 11(c) | $\pm 2w$ or ± 18 or $5w - 3w = 15 + 3$ | M1 | Terms in w or constant terms collected |
| | $2w = 18$ or $-2w = -18$ or $\frac{18}{2}$ | A1 | |
| | 9 | A1ft | ft on $2w = a$ where $a \neq 3$ or 15 or $bw = 18$ where $b \neq 5$ or 3 |
| | Additional Guidance | | |
| | $2w = 12$ 6 | | M1 A0 A1ft |
| | $8w = 18$ 2.25 or $\frac{18}{8}$ oe | | M1 A0 A1ft |
| | $3w = 12$ 4 | | M0 |
| | $3w = 18$ 6 | | M1 A0 A0ft |
| | Embedded answer of 9 | | M1 A1 A0 |
| If only decimal answer given must be accurate to at least 2 dp | | | |

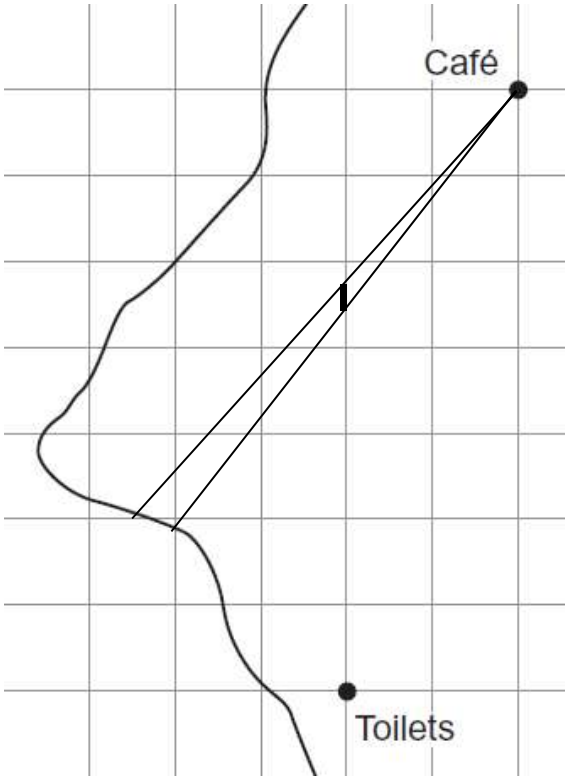
| Q | Answer | Mark | Comments |
|----|---|---|--|
| | 2, 3, 4, 6, 7, 8 | B3 | B2 Six numbers, median 5, total 30 Allow one of decimals, numbers < 2 or repeated numbers eg 2, 2, 2, 8, 8, 8 or 2, 2.5, 4, 6, 7.5, 8 or 1, 2, 4, 6, 7, 10 B1 Any six numbers with median 5 Allow cards to be in any order |
| 12 | Additional Guidance | | |
| | Combinations for B2 that have repeats 2, 2, 2, 8, 8, 8 2, 2, 3, 7, 7, 9 2, 2, 3, 7, 8, 8 2, 2, 4, 6, 6, 10 2, 2, 4, 6, 7, 9 2, 2, 4, 6, 8, 8 2, 2, 5, 5, 5, 11 2, 2, 5, 5, 6, 10 2, 2, 5, 5, 7, 9 2, 2, 5, 5, 8, 8 | 2, 3, 3, 7, 7, 8 2, 3, 4, 6, 6, 9 2, 3, 5, 5, 5, 10 2, 3, 5, 5, 6, 9 2, 3, 5, 5, 7, 8 | 2, 4, 4, 6, 6, 8 2, 4, 4, 6, 7, 7 2, 4, 5, 5, 5, 9 2, 4, 5, 5, 6, 8 2, 4, 5, 5, 7, 7 2, 5, 5, 5, 5, 8 2, 5, 5, 5, 6, 7 |
| | If answer line blank, mark working and apply usual rules for choice | | |

| Q | Answer | Mark | Comments |
|---|--------|------|----------|
|---|--------|------|----------|

| | | | | |
|--|--|---|-----------|--|
| 13 | $1 - (0.2 + 0.3 + 0.15)$ or 0.65 | M1 | oe eg 65% | |
| | 0.35 | A1 | oe eg 35% | |
| | Additional Guidance | | | |
| | $0.2 + 0.3 + 0.15 = 0.2$ 0.8 | Answer follows through | M1 A0 | |
| | $0.2 + 0.3 + 0.15 = 0.55$ $1 - 0.55 = 0.25$ | Method even though answer wrong | M1 A0 | |
| | $0.2 + 0.3 + 0.15 = 0.55$ 0.35 | No method seen and answer does not follow through | M0 A0 | |
| | 0.65 0.45 | | M1 A0 | |
| | Answer only of 0.65 | | M1 A0 | |
| | 0.2 0.8 | No addition seen | M0 | |
| | Embedded answer $0.2 + 0.3 + 0.15 + 0.35 = 1$ | | M1 A0 | |
| $0.2 + 0.3 + 0.15 + 0.8 = 1$ Answer 0.8 | | M1 A0 | | |

| Q | Answer | Mark | Comments | |
|-------|--|------|---|--|
| 14 | Side of square = 5 or $5 \times 5 = 25$ oe | B1 | May be on diagram | |
| | $400 \div 25$ | M1 | | |
| | 16 | A1 | May be on diagram $16 \times 25 = 400$ oe is M1 A1 | |
| | Yes and 5 and their 16 | Q1ft | Strand (iii) Conclusion must be based on length not volume ft their 16 if B1 M1 awarded and correct conclusion | |
| | Additional Guidance | | | |
| | Ignore any volume calculations | | | |
| | Square = 5 cm $25 \times 21 = 400$ No | | B1 M1 A0 Q1ft | |
| 15(a) | Café | B1 | | |
| 15(b) | [336, 340] | B2 | B1 for [334, 342] but not [336, 340] which scores B2 or for [156, 160] | |
| | Additional Guidance | | | |
| | 340 | | B2 | |
| | 335 | | B1 | |
| | 342 | | B1 | |
| | 157 | | B1 | |
| | Ignore extra compass directions eg 338 NW | | B2 | |

| Q | Answer | Mark | Comments |
|---|--------|------|----------|
|---|--------|------|----------|

| | | | |
|--|---|----|---|
| 15(c) | Point within tolerance (on bold line) | B2 | B1 Point [4, 5] squares on the line North of the Toilets or Point between 'rays' |
| |  | | |
| | Additional Guidance | | |
| | Mark intention (point should be [0.2, 0.6] of a square down from top grid line) | | |
| | Correct bearing drawn that stops at bold line | B2 | |
| Correct bearing drawn that stops inside park | B1 | | |

| Q | Answer | Mark | Comments |
|---|---|-------------------------|--|
| 16 | Alternative method 1 | | |
| | $BCD = 105$ | B1 | |
| | $DCE = 180 - \text{their } 105 \text{ or } 75$ | M1 | Calculation must be shown or correct angle marked on diagram |
| | $CDE = 180 - (\text{their } 75 + 30) \text{ or } 75$ | M1dep | Calculation must be shown or correct angle marked on diagram |
| | $DCE = 75$ and $CDE = 75$ and 'two angles equal' | Q1 | Strand (ii) Must score B1M2 and have no incorrect angles or calculations seen |
| | Additional Guidance | | |
| | $C = 105$ $C = 180 - 105 = 65$ $D = 180 - (65 + 30) = 85$ | | B1 M1 M1dep Q0 |
| | $BCD = 75$ $DCE = 180 - 75 = 105$ $CDE = 180 - (105 + 30) = 45$ | | |
| $BCD = 105$ $DCE = 65$ $CDE = 85$ (no method shown) | | B1 M0 M0dep Q0 | |

Alternative methods continued on the next page

| Q | Answer | Mark | Comments |
|--|--|----------------------------|--|
| 16 cont | Alternative method 2 | | |
| | $ABC = 180 - 105$ or 75 or $ADC = 180 - 105$ or 75 | M1 | Calculation must be shown or correct angle marked on diagram |
| | $DCE =$ their 75 | M1dep | their 75 must be the same as their ABC or their ADC |
| | $CDE = 180 - (\text{their } 75 + 30)$ or 75 | M1dep | Calculation must be shown or correct angle marked on diagram |
| | $DCE = 75$ and $CDE = 75$ and 'two angles equal' | Q1 | Strand (ii) Must score M3 and have no incorrect angles or calculations seen |
| | Additional Guidance | | |
| | $B = 180 - 105 = 75$ $C = 105$ $D = 180 - (105 + 30) = 45$ | M1 M0dep M0dep Q0 | |
| | ABC (or ADC) = $180 - 105 = 65$ $DCE = 65$ $CDE = 85$ (no method shown) | M1 M1dep M0dep Q0 | |
| ABC (or ADC) = $180 - 105 = 75$ $DCE = 75$ $CDE = 180 - (75 + 30) = 65$ | M1 M1dep M1dep Q0 | | |

Alternative methods continued on the next page

| Q | Answer | Mark | Comments |
|---------|---|-------|--|
| 16 cont | Alternative method 3 | | |
| | $BCD = 105$ | B1 | |
| | $CDE = \text{their } 105 - 30 \text{ or } 75$ | M1 | Calculation must be shown or correct angle marked on diagram |
| | $DCE = 180 - (\text{their } 75 + 30) \text{ or } 75$ | M1dep | Calculation must be shown or correct angle marked on diagram |
| | $DCE = 75$ and $CDE = 75$ and 'two angles equal' | Q1 | Strand (ii) Must score B1M2 and have no incorrect angles or calculations seen |
| | Additional Guidance | | |
| | $C = 105$ $D = 105 - 30 = 65$ $C = 180 - (65 + 30) = 85$ | | B1 M1 M1dep Q0 |
| | $BCD = 75$ $CDE = 75 - 30 = 45$ $DCE = 180 - (45 + 30) = 105$ | | B0 M1 M1dep Q0 |
| | $BCD = 105$ $CDE = 65$ $DCE = 85$ (no method shown) | | B1 M0 M0dep Q0 |

Alternative methods continued on the next page

| Q | Answer | Mark | Comments |
|---------|--|-------|--|
| 16 cont | Alternative method 4 | | |
| | DCE or $CDE = (180 - 30) \div 2$ or 75 | M1 | Calculation must be shown or one correct angle marked on diagram |
| | CDE and $DCE =$ their 75 | M1dep | |
| | $DCB = 180 -$ their 75 or 105 or $ABC =$ their 75 or $ADC =$ their 75 | M1dep | Calculation must be shown or correct angle marked on diagram |
| | $DCE = 75$ and $CDE = 75$ and $DCB = 105$ and 'opposite angles of parallelogram equal' or $DCE = 75$ and $CDE = 75$ and ABC or $ADC = 75$ and 'allied or (co)interior angles of parallelogram' | Q1 | Strand (ii) Must score M3 and have no incorrect angles or calculations seen |
| | Additional Guidance | | |
| | $(180 - 30) \div 2 = 65$ $C = 65$ and $D = 65$ $C = 115$ (no method shown) | | M1 M1dep M0dep Q0 |
| | $(180 - 30) \div 2 = 75$ $DCE = 75$ and $CDE = 75$ $DCB = 180 - 75 = 105$ | | M1 M1dep M1dep Q0 |

| Q | Answer | Mark | Comments | |
|----|---|-------|-------------------------------|--|
| 17 | $2 \times (30 + 70)$ or 200 | M1 | | |
| | their $200 \div 4$ or 50 | M1dep | 100 \div 2 is M2 | |
| | their $50 \times$ their 50 or 2500 or 30×70 or 2100 | M1 | their 50 must follow M1 M1dep | |
| | 400 | A1 | | |
| | Additional Guidance | | | |
| | Perimeter = 100 Side of square = 25 $2100 - 625$ 1475 | | M0 M0dep M1 A0 | |
| | Side of square = $\sqrt{100} = 10$ $2100 - 100$ 2000 | | M0 M0dep M1 A0 | |
| | $30 \times 70 = 2400$ $50 \times 50 = 2500$ $2500 - 2400 = 100$ | | M1 M1dep M1 A0 | |
| | Side of square = 25 $30 \times 70 = 2400$ Answer 625 | | M0 M0dep M1 A0 | |
| | $30 \times 70 = 2100$ $2100 \times 2 = 4200$ | | 3rd M0 | |

| Q | Answer | Mark | Comments |
|----|--|-------|---|
| 18 | Any correct product, or division with answer of 210 that involves a prime number eg 2×105 , 5×42 , $210 \div 3 = 70$, $21 \times 2 \times 5$ or 2, 3, 5, 7 | M1 | |
| | $2 \times 3 \times 5 \times 7$ | A1 | |
| | Additional Guidance | | |
| | Product may be implied for M1 by a prime factor tree, a prime factor ladder or values written as pairs eg (2, 105) | M1 | |
| | $1 \times 2 \times 3 \times 5 \times 7$ | M1 A0 | |
| 19 | $6n + 3$ or $3(2n + 1)$ | B2 | oe B1 for $6n$ Accept $6 \times n$ or $n \times 6$ but not $n6$ B1 for $n6 + 3$ Accept any letter |
| 20 | $360 \div 10$ or 36 or $180 \times (10 - 2)$ or $10 \times 180 - 360$ or 1440 | M1 | oe |
| | 144 | A1 | |
| | Additional Guidance | | |
| | Answer only of 144 | M1 A1 | |