

GCSE MARKING SCHEME

APPLICATIONS OF MATHEMATICS (LINKED PAIR PILOT)

JANUARY 2015

INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2015 examination in GCSE APPLICATIONS OF MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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| |

APPLICATIONS UNIT 1 FOUNDATION TIER

| Applications Unit 1 Foundation Tier | Mark | Comment |
|--|------------|--|
| 1.(a) 6000 | B1 | |
| (b) 1600 | B1 | |
| (c) $4/9 \times 4500$ | M1 | |
| 2000 | A1 | |
| (d) (i) Correct reason given why statement is incorrect. | E1 | A correct statement that indicates more home supporters. Eg. "Because more tickets were sold to home supporters than away supporters." "Only 2538 tickets were sold to away supporters." "Not the same amount of tickets sold to home supporters and away supporters." "3200 home and 2538 away." "More home than away" |
| (ii) 3200/5738 | B1 | tituli away. |
| | 6 | |
| 2. (a) (Spends) $(\pounds)26 + 2 \times (\pounds)15.99$ | M1 | |
| (£)57.98 | A1 | |
| (Extra needed) (£)57.98 – (£)20 - (£)25 | M1 | FT 'their 57.98' |
| (£)12.98 | Al | Alternative method |
| | | Uses one voucher to pay for the jeans so pays either £1 or £6 |
| Look for | Q | BI |
| • spelling | W | Method for using other voucher for paying for the 2 tops |
| • clarity of labels | C | $2 \times (\pounds) 15.99 - 20 (or 25) OR 20 (or 25) - 2 \times (\pounds) 15.99 MI$ |
| • the use of notation (watch for the use '=' "£" being | 2 | (pays)(t)11.98 or (t)6.98 A1 |
| appropriate) | | (spends) (£)12.98 B1 |
| | | OWC2 Descents relevant material in a schement and la sizel |
| QWC2: Candidates will be expected to | | QwC2 Presents relevant material in a concrete and logical |
| present work clearly, with words explaining process or | | manner, using acceptable mathematical form, and with few fi |
| steps | | any errors in spelling, punctuation and grammar. |
| AND | | OWC1 Descents relevant material in a schement and la sizel |
| make few if any mistakes in mathematical form, | | were het with some arrors in vas of mothematical form |
| spelling, punctuation and grammar in their answer | | mainer but with some errors in use of mathematical form, |
| | | OP |
| QWC1: Candidates will be expected to | | oxident weaknesses in organisation of material but using |
| present work clearly, with words explaining process or | | acceptable mathematical form, with few if any errors in |
| steps | | spelling, punctuation and grammar |
| OR | | spennig, punctuation and grammar. |
| • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer | | QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. |
| (h) (i) Picht angle | | |
| (b) (1) Kight angle $(ii) 260 - (00 + 00 + 107) cm 180 - 107 cm against$ | B1 | Do not accept 90 |
| (11) $360 - (90 + 90 + 107)$ or $180 - 107$ or equivalent | M1 | For the intention of subtracting 3 given angles from 360 or for |
| 72(°) | | subtracting 107 from 180 |
| 73() | Al | |
| 3 | 9 | For both parts accept use of appropriate desired or fractional |
| J. | | values |
| (a) Two numbers less than or equal to 4 AND two numbers | B1 | $F_{g} = 1 + 2 + 5 + 6 + 0 + 2 + 5 + 6 + 0 + 4 + 7 + 7 + 6 + 6 + 7 + 7 + 6 + 6 + 7 + 7$ |
| (a) I wo numbers less than of equal to 4 AND two numbers | DI | Lg 1, 2, 5, 0 OK 5, 4, 5, 0 OK 4, 4, 7, 7 Ctc |
| (b) Four numbers less than 3 | B1 | Eg 0, 0, 0, 0 OR 2, 1, 0, -1 etc |
| | | |
| | 2 | |
| 4. Our information | | |
| Given information Quadrilateral | D 2 | Armed D2 for 2 or 2 or 4 |
| sides equal in length | В3 | Award B2 for 2 or 5 correct. |
| This quadrilateral has Parallelogram | | Award D1 for 1 confect. |
| opposite sides equal in | | |
| length | | |
| This quadrilateral only has Trapezium | | |
| one pair of parallel sides | | |
| I nis quadrilateral does not Kite | | |
| nave any parallel sides | | |
| | 3 | |

| Applications Unit 1 Foundation Tier | Mark | Comment |
|--|----------|---|
| January 2015 | M1 | $(A_{mag} A - 14 P - 16 C - 5 P - 16)$ |
| Shapes B AND D | | (Area A=14, B=10, C=3, D=10) |
| (ii) Evidence of calculating perimeter of at least 2 shapes or the | M1 | Evidence may be seen on diagram |
| correct perimeter of one shape evaluated | | (Perimeter $A=22$, $B=20$, $C=12$, $D=12$) |
| Shape A | A1 | Award SC1 for answer of A with no workings |
| (b) Evidence of counting squares | M1 | Award M1 for 6×4 |
| Answer in range 22 - 26 | A1 | Award A1 for 24 |
| cm ² | U1 | Independent mark |
| (c) Correct triangle drawn with line of 9cm (\pm 2mm) and 2 angles | B3 | Award B3 for a complete correct triangle |
| of $55^{\circ}(\pm 2^{\circ})$. | | triangle OR all 3 correct but a triangle not completed |
| | | Award B1 for 1 of the 3 measurements correct. |
| | 10 | |
| 6. (a) Adding numbers (= 410) | M1 | Attempt to add numbers. Award M1 for sight of a value |
| | | between 362 and 458 or sight of an answer from 35 – 48 as |
| | | evidence of attempting to add |
| $410 \div 10$ | ml | FT 'their $410^2 \div 10$ |
| Mean = 41 (b) Dut in order 24, 27, 28, 20, 41, 42, 42, 44, 45, 48 | AI M1 | CAO Sight of 41 and 42 only would goin M1 |
| (b) Fut III older $54, 57, 58, 59, 41, 42, 42, 44, 45, 48$ Median -41.5 | | Sight of 41 and 42 only would gain M1 |
| (c) Mode = 42 | B1 | |
| (d) Explanation given eg 'Yes because the mean is 41' or | E1 | FT "their values". The explanation given must mention or |
| 'because all of the averages - mean, median and mode are about | | imply the comparison of their averages or mean or median or |
| 41 or 42' | | mode. |
| | 7 | |
| 6. (e) $40 \div 2.5$ or equivalent | M1 | |
| 16 (inches) | Al | |
| (I) 360 (grams) | BI | |
| 6 (9)(i) Correctly labelled axes | B1 | |
| Uniform scales used | B1 | |
| All points plotted correctly | P1 | |
| Points joined with straight lines | L1 | FT "their points". Accept solid or dotted lines. |
| (ii) Explanation of graph given | E1 | The explanation must imply that the temperature increase AND |
| | | then decreases. Eg. "The temperature increases through the day |
| | | and decreases through the evening." "It gets hotter during the middle of the day until the evening then goes down " |
| | | Award E0 for explanations such as "The temperature at |
| | | davtime rises." |
| (iii) 18 – 3 | M1 | |
| 15(°) | A1 | |
| | 7 | |
| 7.(a)(i) Plotting at least two correct points | P1 | Accept (0,0) as one of the points plotted. |
| Correct straight line through points | LI | CAO. If no clear evidence of points plotted but line is correct award P1 I 1 |
| (ii) Full explanation given using the graph | F1 | For the could find what £350 is and then double it? |
| Approximately 6300 (DKK) | B1 | FT their graph |
| | | Accept answers in the range 6200 – 6400 (DKK) |
| (b) 90 | B1 | May be seen or implied |
| 90 ÷ 18 | M1 | FT 'their 115 – 25' |
| 5 days Total of 6 days | Al | |
| Total of 6 days | BI | Unsupported answer of 5 gets no marks |
| | 8 | Chaupportee answer of 5 gets no marks. |
| 8.(a) Considering multiples of 12 and 14, e.g. sight of 12, 24, 36, | S1 | At least 3 correct multiples for both |
| AND 14, 28, 42,, OR | | |
| Looking at factors of 12 and 14, e.g. sight of 2×6 AND 2×7 | | |
| | | |
| Correct list of multiples of 12 to at least 72, or multiple 72 AND | MI | 12, 24, 36, 48, 60, 72, 84 |
| Sight of 2×6×7 | | 14, 28, 42, 30, 70, 84 |
| Signe of 20007 | | |
| Sight of 84 (as common multiple or number of minutes) | A1 | OR 1 hour 24 minutes |
| Time 11:24 | A1 | FT time from 10:00 for their number of minutes provided S1 |
| | | and M1 awarded |
| | | If no marks SC2 for an answer of 12(:)48, OR SC1 for sight of |
| | | 2nours 48minutes No marks for sight of 168(minutes) along |
| | | ino marks for signi of 100(minutes) atone. |
| (b) 12/50 or equivalent (ISW) | B2 | B1 for sight of 12, or |
| | | 'their attempt to sum number of trains'/50 |
| | 6 | |

| Applications Unit 1 Foundation Tier | Mark | Comment |
|--|------|---|
| January 2015 | | |
| 9. (a) Appropriate arc(s) (dashes) shown on both lines, AND | M1 | $\pm 2 \text{ mm}$ M0 if no arcs seen |
| intersection arcs shown, using first set of arcs | | <u>+</u> 2mm |
| | | |
| Angle bisector drawn | A1 | |
| | | SC1 if steps of process seen but slightly outside tolerance, OR |
| | | SC1 if no arcs seen on the sides of the triangle but a correct set |
| | | of arcs for the bisector shown |
| | | |
| (b)(i) $3 \times 3.75 + 3 \times (4 \times 16.25 + 2 \times 18.5(0))$ | M2 | M1 for sight of the terms 3×3.75 and $4 \times 16.25 + 2 \times 18.5(0)$ |
| | | (11.25) $(65+37=102)$ |
| | | OR |
| | | M1 for sight of the terms $3 \times 4 \times 16.25$ and $3 \times 2 \times 18.5(0)$) |
| | | (195) (111) |
| | | OR M1 for $3.75 + 4 \times 16.25 + 2 \times 18.5(0) (= 105.75)$ |
| (Sian's pay is $11.25 + 195 + 111 = $ £) 317.25 | A1 | FT from M1 |
| | | |
| (ii) $4 \times 3.75 (= 15)$ | B1 | May be seen in stages of working |
| $(4 \times) 2y \times 18.5(0) + (4 \times) y \times 16.25$ | B2 | Must be as an expression or formula of at least 2 terms which |
| | | may have been simplified, OR |
| | | B1 for either term correct in an expression of at least 2 terms |
| | | L L |
| P = 15 + 213y | B1 | CAO. Must be a formula ISW |
| | | If no marks allow SC1 for $P = 12y(+15)$ |
| | | |
| | 9 | |
| 9. (c) $\pi \times 6^2$ | M1 | |
| Between 113.04 to $113.1(43m^2)$ inclusive, or $113(m^2)$ | A1 | Ignore incorrect rounding or truncation if a correct response is |
| | | seen. |
| | | Accept 36π (m ²) as the final answer |
| | 2 | |
| 10. (a) 1 share seen or implied 2380 ÷10 or 238 | B1 | |
| (Connelly Boats pay) $2380 \times 2 \div 10$ OR | | |
| (Water Watch pay) $2380 \times 5 \div 10$ | M1 | B1 implied if both appropriate calculations seen |
| (Connelly Boats pay £) 476 | A1 | If these answers are unlabelled they must be in the correct |
| (Water Watch pay £) 1190 | A1 | order |
| (The 7 friends altogether have to pay \pounds) 714 | B1 | FT 2380 minus the sum of their Connelly Boats and Water |
| | | Watch payments, i.e. 2380 – 'their 476' – 'their 1190' correctly |
| | | evaluated |
| (Each of the seven friends has to pay $714 \div 7$) (= £) 102 | B1 | CAO depends on the award of all previous marks |
| | | |
| | | |
| (b) Sight of 7×4.40 (= £ 30.80) OR clear description e.g. "They | B1 | Allow $30.80 \div 7 = 4.4(0) \text{ or } 30.80 \div 4.4(0) = 7$ |
| have rounded the length to 7m and charged them for that" | | Do not allow they were charged $4.4(0)$ per metre |
| | | |
| Suggestion how the charges could be displayed more clearly, e.g. | E1 | <i>Need to show appreciation of the rounding for E1 e.g. "Give</i> |
| 'sign should include 'to the nearest metre' or 'boats between 6.5 | | the total costs on the display so ± 30.80 for a 7m boat" is |
| and 7.5 charged | | insufficient |
| | | Accept $6-5 - 7.5(m)$ charged £4.40 per (whole) m or |
| | | equivalent. |
| | | Accept only suggestions that keep the cost for 7.1m as £30.80 |
| | | e.g. 'boats between 6 and 8 m long are charged £4.40 per m' |
| | | Do not allow suggestions that lead to changes in the costs |
| | | displayed for example: 'boats 7 to 8 (m) are charged' is E0 |
| | | Ignore suggestions that do not relate to the costs for 7.1m |
| | 8 | |

APPLICATIONS UNIT 1 HIGHER TIER

| Applications Unit 1 Higher Tier January 2015 | Mark | Comment |
|--|----------------|---|
| 1(a) Considering multiples of 12 and 14, e.g. sight of 12, 24, 36, AND 14, 28, 42,, OR Looking at factors of 12 and 14, e.g. sight of 2×6 AND 2×7 | S1 | At least 3 correct multiples for both |
| Correct list of multiples of 12 to at least 72, or multiple 72 AND Correct list of multiples of 14 to at least 70, or multiple 70, OR Sight of $2 \times 6 \times 7$ | M1 | 12, 24, 36, 48, 60, 72, 84 14, 28, 42, 56, 70, 84 |
| Sight of 84 (as common multiple or number of minutes) Time 11:24 | A1 A1 | OR 1 hour 24 minutes FT time from 10:00 for their number of minutes provided S1 and M1 awarded If no marks SC2 for an answer of 12(:)48, OR SC1 for sight of 2hours 48minutes No marks for sight of 168(minutes) alone. |
| (b) 12/50 or equivalent (ISW) | B2 6 | B1 for sight of 12, or 'their attempt to sum number of trains'/50 |
| 2(a) Appropriate arc(s) (dashes) shown on both lines, AND intersection arcs shown, using first set of arcs | M1 | $\begin{array}{c} \pm 2 \text{ mm} \\ \pm 2 \text{ mm} \end{array} \qquad \qquad \text{M0 if no arcs seen} \\ \end{array}$ |
| Angle bisector drawn | A1 | SC1 if steps of process seen but slightly outside tolerance, OR SC1 if no arcs seen on the sides of the triangle but a correct set of arcs for the bisector shown |
| (b)(i) $3 \times 3.75 + 3 \times (4 \times 16.25 + 2 \times 18.5(0))$ | M2 | M1 for sight of the terms 3×3.75 and $4 \times 16.25 + 2 \times 18.5(0)$ (11.25) (65+37 = 102) OR M1 for sight of the terms $3 \times 4 \times 16.25$ and $3 \times 2 \times 18.5(0)$) (195) (111) OR M1 for $3.75 + 4 \times 16.25 + 2 \times 18.5(0)$ (= 105.75) |
| (Sian's pay is $11.25 + 195 + 111 = \pounds$) 317.25 | A1 | FT from M1 |
| (ii) $4 \times 3.75 (= 15)$ (4 ×) $2y \times 18.5(0) + (4 \times) y \times 16.25$ | B1 B2 | May be seen in stages of working Must be as an expression or formula of at least 2 terms which may have been simplified, OR B1 for either term correct in an expression of at least 2 terms |
| P = 15 + 213y | B1 9 | CAO. Must be a formula ISW If no marks allow SC1 for $P = 12y (+15)$ |
| $2(c) \pi \times 6^2$ | M1 | |
| Between 113.04 to 113.1(43m ²) inclusive, or 113(m ²) | A1 | Ignore incorrect rounding or truncation if a correct response is seen. Accept 36π (m ²) as the final answer |
| (d) (1 revolution measures) $2 \times \pi \times 0.24$ × 32 or × 14 (West field) 48.2 to 48.3(2m), or 48(m) AND | M1 m1 A1 | May be embedded in working ($C = 1.507m$) |
| (Storage building) 21.(1m) | 5 | |

| Applications Unit 1 Higher Tier | Mark | Comment |
|--|----------------------|---|
| January 2015 | D1 | |
| $3(a)$ 1 share seen or implied 2380 \div 10 or 238 (Connelly Boats pay) 2380 \times 2 \div 10 OP | BI | |
| (Water Watch pay) $2380 \times 2 \div 10$ OK $2380 \times 5 \div 10$ | M1 | B1 implied if both appropriate calculations seen |
| (Connelly Boats pay £) 476 | A1 | If these answers are unlabelled they must be in the correct order |
| (Water Watch pay £) 1190 | A1 | |
| (The 7 friends altogether have to pay \pounds) 714 | B1 | FT 2380 minus the sum of their Connelly Boats and Water Watch payments, i.e. 2380 – 'their 476' – 'their 1190' correctly |
| | | evaluated |
| (Each of the seven friends has to pay $714 \div 7$) (= £) 102 | B1 | CAO depends on the award of all previous marks |
| OWC2: Candidates will be expected to | OWC | OWC2 Presents relevant material in a coherent and logical |
| present work clearly, with words explaining process or | $\frac{\sqrt{2}}{2}$ | manner, using acceptable mathematical form, and with few if |
| steps. | | any errors in spelling, punctuation and grammar. |
| AND | | |
| • make few if any mistakes in mathematical form, | | QWC1 Presents relevant material in a coherent and logical |
| spelling, punctuation and grammar and include units in their final answer | | spelling, punctuation or grammar |
| OWC1: Candidates will be expected to | | OK evident weaknesses in organisation of material but using |
| • present work clearly, with words explaining process or | | acceptable mathematical form, with few if any errors in |
| steps. | | spelling, punctuation and grammar. |
| OR make few if any mistakes in mathematical form | | OWC0 Evident weaknesses in organisation of material, and |
| spelling, punctuation and grammar and include units in | | errors in use of mathematical form, spelling, punctuation or |
| their final answer | | grammar. |
| (b) Sight of 7×4.40 (= f. 30.80) OR clear description e.g. "They | B1 | Allow $30.80 \div 7 = 4.4(0) \text{ or } 30.80 \div 4.4(0) = 7$ |
| have rounded the length to 7m and charged them for that" | | Do not allow they were charged $4.4(0)$ per metre |
| Suggestion how the charges could be displayed more clearly, e.g. | E1 | Need to show appreciation of the rounding for E1 e.g. "Give |
| 'sign should include 'to the nearest metre' or 'boats between 6.5 | | the total costs on the display so $\pounds 30.80$ for a 7m boat" is |
| and 7.5 charged | | insufficient Accept 6.5 $7.5(m)$ charged f4.40 per (whole) m or equivalent |
| | | Accept only suggestions that keep the cost for 7.1m as £30.80 |
| | | e.g. 'boats between 6 and 8 m long are charged £4.40 per m' |
| | | Do not allow suggestions that lead to changes in the costs |
| | | displayed for example: 'boats 7 to 8 (m) are charged' is E0 Janore suggestions that do not relate to the costs for 7 1m |
| | 10 | Ignore suggestions that do not retaile to the costs for 7.1m |
| 3(c) | | Accept 'their North' provided $\pm 2^{\circ}$ from the North given. |
| (i) | | Penalise 'their North' outside of this tolerance once only |
| 110° drawn from harbour | B1 | $\pm 2^{\circ}$ |
| 320° drawn from the position of buoy 1 | BI | $\pm 2^{\circ}$ |
| Line 10cm OR 6cm OR 2.5cm for the appropriate stage | B1 | ± 2 +2mm |
| Accurate chart with lengths and angles correct | B1 | Within tolerances allowed |
| (ii) 290° | B1 | $\pm 2^{\circ}$. FT from their diagram $\pm 2^{\circ}$ |
| (iii) Distance (+2mm) from the position of buoy 3 to the harbour | B1 | ET from their diagram |
| Bearing $(+2^{\circ})$ from the position of buoy 3 to the harbour | DI | (Actual is approximately $8 \times 60 = 480$ m) |
| | B1 | FT from their diagram |
| | | (Actual is approximately 250°) |
| (d) Lines following the shape of coast line at 5km | B1 | $1 \text{cm} \pm 2 \text{ mm}$ |
| An arc of radius 20km from Funchal | B1 | 4 cm ± 2 mm |
| Perpendicular bisector (Ribeira Brava and Santa Cruz) | Bl | $\pm 2^{\circ}$ |
| Appropriate region indicated | DI | attempt at all three conditions |
| | 12 | - |
| $3(e)(i) 33 \times 12 + 4 $ (=400 inches) | M1 | Allow M1 if 33×12 and an additional 4 seen in the working |
| -0.5957 (or $\times 2.54$) 1016(.002cm) or 1020(cm) | A1 | Do not accept ×2.5 |
| (III) | | |
| (ii) $10160 - 1(016) + 10^4$ | D1 | Laft entry $10160(02)$ or 10200 or ET $10x$ (4) in (-)(i) |
| 10100 I(.016) × 10 | B1 R1 | Right entry $1(016) \times 10^4$ FT from use of 'their 10160' |
| | 5 | |

| 4(a)(i) Implie or state: 1a0: 1a0: 1a0: 1a0: 1a0: 1a0: 1a0: 1a0 | Applications Unit 1 Higher Tier | Mark | Comment |
|---|--|----------|--|
| minutes is less than 15 hours' Any calculations shown must be correct (ii) Midpoins 43, 135, 225, 390, 630 435(10 - 135, 225, 390, 630) (450 + 5130 + 4260 + 228 | 4(a)(i) Implies or states 'no' with a valid reason, e.g. 'No as 810 | B1 | (For information 810mins = 13.5 hrs. 900mins = 15hrs) |
| (ii) Mid-points 45, 135, 225, 340, 630 81 (35) + 5130 + 4500 + 2800 + 2500 - 15480) 10 (30) 135, 225, 20 + 3600 + 2600 + 2600 (iii) 10 48 (10) 48 68 (iii) 10 48 (iv) Correct cumulative frequency diagram, points plotted at upper bands and joined by a curve or straight line 10 (iv) Correct cumulative frequency diagram, points plotted at upper bands and joined by a curve or straight line 11 (v) Median 160 11 F1 from cumulative (iii). Must show initial plot at the origin. B1 if on points curve diagram. Statement of sufficience or straight line 11 (v) Median 160 11 11 F1 from their cumulative (iii). Must show initial plot at the origin. B1 if on points or sufficience or straight line in plotting but joints (JK B1 diagram). Statement is advocant to sufficience or straight line in the origin. B1 if on priority indicates to sufficience or sufficience | minutes is less than 15 hours' | | Any calculations shown must be correct |
| (1) (1) (1) (1) (4) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (| (ii) Mid points 45, 135, 225, 360, 630 | R1 | |
| (450 + "5130 + 4500 + 2280 + 2280 + 12480) -80 -10 -2280 + 2280 + 12480) -80 -10 | $45 \times 10 + 135 \times 38 + 225 \times 20 + 360 \times 8 + 630 \times 4$ | M1 | FT their mid-points including bounds. Allow 1 slip in their |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | (450 + 5130 + 4500 + 2880 + 2520 = 15480) | | mid-points outside boundaries if otherwise correct method |
| (ii) 19.5 (A) Accept 19.5 or 19.4 if correct working is seen (iii) 10 48 68 76 80 (iv) Correct cumulative frequency diagram, points plotted at upper bounds and joined by a curve or straight line P1 FT from turnulative (ii), Must show initial plot at the origin. HI or points correct but not joined, OR HI if one error in plotting but joined correctly (i) Median 160 Bit FT from their cumulative diagram. Not cumulative on PT FT from their cumulative diagram. Not cumulative on PT FT from their cumulative diagram. (iii) Addition for mage from diagram All (iii) Addition for the correctly indicated with 'whiskers' Within a box. Bit (iii) Suitable comparison statement for medians Bit Suitable comparison statement for IQR MI Conclusion, e.g. 'Don't agree because' MI (i) Suitable comparison statement for IQR MI (iii) 4.27, 4.30, 4.34, 4.40, 4.33 (million) EI (iii) 4.27, 4.30, 4.34, 4.40, 4.33 (million) Bit (ii) 4.27, 4.30, 4.34, 4.40, 4.33 (million) Pit from their during it as averded dor the week state | ÷80 | m1 | FT their $\Sigma f x/80$ |
| ID 48 68 76 80 (iv) Correct cumulative frequency diagram, points plotted at upper bounds and joined by a curve or straight line PT Frum cumulative (ii), Must show initial plot at the origin. B1 for points correct but not joined, OR B1 if one error in plotting but joined correctly (v) Median 160 Intention to subtract readings from horizontal axis for vertical 60 & 20 Interquartile range from diagram PT Frum their cumulative diagram. Mc cumulative no PT FT from their cumulative diagram. Mc cumulative no PT FT from their cumulative diagram. 4(b)() Range ends 50 and 800 correctly indicated UQ correctly indicated PT Frum their cumulative diagram. Mc cumulative no PT FT from their cumulative diagram. 10 10 Pression from their cumulative diagram. PT 11 There must be a box drawn for these three marks, not vertical lines only. PT 10 10 Pression from Mit A1 There must be a box drawn for these three marks, not vertical lines only. 11 Pression from Mit A1 Pression from Mit A2 Pression from Mit A1 10 Pression from Mit A2 Pression from Mit A2 Pression from A1 11 Pression from from A1 Pression from Mit Accept Yabarda and Typical "Pression from (a)(Y) IQR Accept Topical Thready and a typical "Pression from (a)(Y) IQR Accept Topical Thready and a typical "Pression from (a)(Y) IQR Accept Topical Thready and a typical "Pression from (a)(Y) IQR Accept Topical Thready and a typical "Pression from (a) Accept Thecase there are 1 days in a | (iii) 193.5 | A1 | Accept 193 or 194 if correct working is seen |
| (v) Correct cumulative frequency diagram, points plotted at upper bounds and joined by a curve or straight line PT from cumulative (ii). Must show, initial plot at the origin. B1 correct apart from 0.5 translation, 0.8 B1 if one error in plotting but joined correctly (v) Median 160 Intention to subtract readings from horizontal axis for vertical 60 & 20 Intergrand learnes for an 800 correctly indicated with 'whiskers' Within a hox or 11 B1 Intention to subtract readings from horizontal axis for vertical 60 B1 Intention to subtract readings from horizontal axis for vertical 60 B1 Intention to subtract readings from horizontal axis for vertical 60 B1 Intergrand B20 correctly indicated UQ correctly indicated Will provide an average Thursday indiced Su correct Query indicated Will provide an average for the week (i) 4.27, 4.30, 4.34, 4.40, 4.33 (million) M1 E1 B1 (i) 4.27, 4.30, 4.34, 4.40, 4.33 (million) B2 (i) (i) 4.27, 4.30, 4.34, 4.40, 4.33 (million) B3 (i) (i) | 10 48 68 76 80 | B1 | |
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| (c)(i) Reason that implies 'like with like' comparison, i.e. always includes the full set of days or because a 7 point moving average will provide an average for the weekEIDo not accept 'because there are 7 days in a week' or 'using the whole week's data' without further explanation Accept statements such as "the results then show the viewing figures for a week"(ii) 4.27, 4.30, 4.34, 4.40, 4.33 (million)B4'0 'representing hundredths must be shown as appropriate B3 for 4.27,, 4.3, 4.34,, 4.4, 4.32857 (million) rounded or truncated, B2 for any three correct moving averages, rounded or truncated, B1 for a correct method seen, or 1 correct moving average (29.97, 30.1/7, 30.47, 30.87, 30.37)4(d)(i) Correct histogramB3Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36(ii) Median (76 + 1)/2 or 76/2 Attempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1 Allow, in the answer space or indicated on the histogram the calculated value of 188.888OR 190.2777 (people) truncated or rounded.(e)(i) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)M2 A1 A1M1 for any 3 correct area calculations (20+40+60+60) FT for a summation of their 4 values provided M1 awarded | | | know if these are a typical Thursday and a typical Wednesday'. |
| includes the full set of days or because a 7 point moving average will provide an average for the weekthe whole week's data' without further explanation Accept statements such as "the results then show the viewing figures for a week"(ii) 4.27, 4.30, 4.34, 4.40, 4.33 (million)B4'0' representing hundredths must be shown as appropriate B3 for 4.27, 4.3, 4.34, 4.4, 4.32857 (million) rounded or truncated, B2 for any three correct moving averages, rounded or truncated, B1 for a correct method seen, or 1 correct moving average (29/7, 30.1/7, 30.4/7, 30.8/7, 30.3/7)4(d)(i) Correct histogramB3Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, 0R B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36(ii) Median (76 + 1)/2 or 76/2 Attempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1 B1 B1 B1 Could also be 32.5/36 or 3.5/36(e)(i) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)M2 A1 A1(ii) 200×0.1 + ½× 100×0.4 40 (people)M1 A1 A1 | (c)(i) Reason that implies 'like with like' comparison, i.e. always | E1 | Do not accept 'because there are 7 days in a week' or 'using |
| will provide an average for the week Accept statements such as the results then show the viewing figures for a week" (ii) 4.27, 4.30, 4.34, 4.40, 4.33 (million) B4 '0' representing hundredths must be shown as appropriate B3 for 4.27, 4.3, 4.34, 4.4, 4.32857 (million) rounded or truncated, B2 for any three correct moving averages, rounded or truncated, B1 for a correct method seen, or 1 correct moving average (29.9/7, 30.1/7, 30.4/7, 30.8/7, 30.3/7) 4(d)(i) Correct histogram B3 Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for histogram with at least 3 bars correct, OR B1 for histogram with at least 3 bars correct, or for a suitable frequency density scale, uniform to a least 0.36 (ii) Median (76 + 1)/2 or 76/2 B1 FT from their histogram if possible (iii) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people) M2 M1 for any 3 correct area calculations (20+40+60+60) FT for a summation of their 4 values provided M1 awarded (ii) 200×0.1 + ½× 100×0.4 40 (people) M1 FT their values from (i) | includes the full set of days or because a 7 point moving average | | the whole week's data' without further explanation |
| (ii) 4.27, 4.30, 4.34, 4.40, 4.33 (million)B4'0' representing hundredths must be shown as appropriate B3 for 4.27, 4.3, 4.34, 4.4, 4.32857 (million) rounded or truncated, B2 for any three correct moving averages, rounded or truncated, B1 for a correct method seen, or 1 correct moving average (29.9/7, 30.1/7, 30.4/7, 30.8/7, 30.3/7)4(d)(i) Correct histogramB3Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for a least 0.36(ii) Median (76 + 1)/2 or 76/2 Attempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1(i) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)M2 A1 A1 A1(ii) 200×0.1 + ½× 100×0.4 40 (people)M1 A1 A1 | will provide an average for the week | | figures for a week" |
| B4 10° representing hundredths must be shown as appropriate B3 for 4.27, 4.3, 4.34, 4.40, 4.33 (million)(ii) 4.27, 4.30, 4.34, 4.40, 4.33 (million)B4 10° representing hundredths must be shown as appropriate B3 for 4.27, 4.3, 4.34, 4.4, 4.32857 (million) rounded or truncated, B1 for a correct moving averages, rounded or truncated, B1 for a correct method seen, or 1 correct moving average (29.9/7, 30.1/7, 30.4/7, 30.8/7, 30.3/7)4(d)(i) Correct histogramB3Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36(ii) Median (76 + 1)/2 or 76/2 Attempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1FT from their histogram if possible Could also be 32.5/36 or 3.5/36(ii) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)M2 A1M1 for any 3 correct area calculations (20+40+60+60) FT for a summation of their 4 values provided M1 awarded(ii) 200×0.1 + ½× 100×0.4 40 (people)M1 A1FT their values from (i) | | | |
| (ii) 4.27, 4.30, 4.34, 4.40, 4.33 (infinition)Infinition1113 101 4.27, 4.30, 4.34, 4.30, 4.35, (infinition)1113 101 4.27, 4.30, 4.34, 4.323 (infinition)12141213 10 1.27, 30.47, 30.87, 30.37)1212121213 10 1.20, 12, 12, 12, 12, 12, 12, 12, 12, 12, 12 | (ii) 4.27 4.30 4.34 4.40 4.33 (million) | B4 | '0' representing hundredths must be shown as appropriate B3 for 4.27 4.3 4.34 4.4 4.32857 (million) rounded |
| B2 for any three correct moving averages, rounded or truncated, B1 for a correct method seen, or 1 correct moving average (29.9/7, 30.1/7, 30.8/7, 30.3/7)4(d)(i) Correct histogramB3Accept missing labels for B2 or B1 | (1) 4.27, 4.50, 4.54, 4.40, 4.55 (minor) | | or truncated, |
| truncated, B1 for a correct method seen, or 1 correct moving average (29.9/7, 30.1/7, 30.4/7, 30.8/7, 30.3/7)4(d)(i) Correct histogram124(d)(i) Correct histogramB3Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36(ii) Median (76 + 1)/2 or 76/2 Attempt to identify 1/9 or 8/9 of the second barB1Correct identification of the medianB1(e)(i) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)M2(ii) 200×0.1 + $\frac{1}{2}\times 100×0.4$ 40 (people)M1(ii) 200×0.1 + $\frac{1}{2}\times 100×0.4$ 41M1(ii) 200×0.1 + $\frac{1}{2}\times 100×0.4$ 40 (people)M1FT their values from (i) | | | B2 for any three correct moving averages, rounded or |
| 4(d)(i) Correct histogramB3Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36(ii) Median (76 + 1)/2 or 76/2 Attempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1FT from their histogram if possible Could also be 32.5/36 or 3.5/36(ii) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)M2 A1M1 for any 3 correct area calculations (20+40+60+60) FT for a summation of their 4 values provided M1 awarded(ii) 200×0.1 + ½× 100×0.4 40 (people)M1 A1FT their values from (i) | | | truncated, B1 for a correct method seen or 1 correct moving average |
| 12 $4(d)(i)$ Correct histogramB3Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for histogram with any 1 bar correct, or for a suitable | | | (29.9/7, 30.1/7, 30.4/7, 30.8/7, 30.3/7) |
| 4(0)(1) correct instogramB5Accept missing labels for B2 or B1 B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram with at least 3 bars correct, OR B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36(ii) Median (76 + 1)/2 or 76/2 Attempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1FT from their histogram if possible Could also be 32.5/36 or 3.5/36(ii) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)M2M1 for any 3 correct area calculations (20+40+60+60) FT for a summation of their 4 values provided M1 awarded(ii) 200×0.1 + ½× 100×0.4 40 (people)M1FT their values from (i) | (d)(i) Correct histogram | 12 P2 | Account missing labels for P1 or P1 |
| with at least 3 bars correct, OR(ii) Median $(76 + 1)/2$ or $76/2$ Attempt to identify 1/9 or 8/9 of the second barCorrect identification of the median(ii) $200 \times 0.1 + 100 \times 0.4 + 1$ | +(u)(i) Correct mstogram | В3 | B2 for sight of 0.06, 0.36, 0.24, 0.02 and 0.02 or histogram |
| B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36(ii) Median $(76 + 1)/2$ or 76/2B1FT from their histogram if possible Could also be 32.5/36 or 3.5/36Attempt to identify 1/9 or 8/9 of the second barB1FT from their histogram if possible Could also be 32.5/36 or 3.5/36Correct identification of the medianB1Allow, in the answer space or indicated on the histogram the | | | with at least 3 bars correct, OR |
| (ii) Median $(76 + 1)/2$ or $76/2$ Attempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1 B1 B1 B1FT from their histogram if possible Could also be $32.5/36$ or $3.5/36$ Allow, in the answer space or indicated on the histogram the calculated value of $188.888OR$ 190.2777 (people) truncated or rounded.(e)(i) $200 \times 0.1 + 100 \times 0.4 + 100 \times 0.6 + 400 \times 0.15$ 180 (people)M2 A1M1 for any 3 correct area calculations ($20+40+60+60$) FT for a summation of their 4 values provided M1 awarded(ii) $200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4$ 40 (people)M1 A1 11 FT their values from (i) | | | B1 for histogram with any 1 bar correct, or for a suitable frequency density scale, uniform to a least 0.36 |
| (1) Median $(76 + 1)/2$ or $76/2$ B1F1 from their histogram if possibleAttempt to identify 1/9 or 8/9 of the second bar Correct identification of the medianB1Could also be $32.5/36$ or $3.5/36$ (e)(i) 200×0.1 + 100×0.4 + 100×0.6 + 400 × 0.15 180 (people)B1M1 for any 3 correct area calculations (20+40+60+60) FT for a summation of their 4 values provided M1 awarded(ii) 200×0.1 + $\frac{1}{2} \times 100 \times 0.4$ 40 (people)M1FT their values from (i) | (::) Multimer $(76 + 1)/2 = 76/2$ | D1 | |
| Correct identification of the medianB1Allow, in the answer space or indicated on the histogram the calculated value of 188.888OR 190.2777 (people) truncated or rounded.(e)(i) $200 \times 0.1 + 100 \times 0.4 + 100 \times 0.6 + 400 \times 0.15$ M2M1 for any 3 correct area calculations (20+40+60+60) FT for a summation of their 4 values provided M1 awarded(ii) $200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4$ M1FT their values from (i)40 (people)A1 | (11) Median $(76 + 1)/2$ or $76/2$ Attempt to identify 1/9 or 8/9 of the second bar | B1 B1 | Could also be 32.5/36 or 3.5/36 |
| $\begin{array}{c} calculated value of 188.888OR 190.2777 (people) truncated or rounded. \\ (e)(i) 200 \times 0.1 + 100 \times 0.4 + 100 \times 0.6 + 400 \times 0.15 \\ 180 (people) \end{array} \qquad \qquad \begin{array}{c} M2 \\ A1 \end{array} \qquad \begin{array}{c} M1 \text{ for any 3 correct area calculations (20+40+60+60)} \\ FT \text{ for a summation of their 4 values provided M1 awarded} \\ (ii) 200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4 \\ 40 (people) \end{array} \qquad \begin{array}{c} M1 \\ A1 \\ 11 \end{array} \qquad \begin{array}{c} FT \text{ their values from (i)} \\ A1 \\ 11 \end{array}$ | Correct identification of the median | B1 | Allow, in the answer space or indicated on the histogram the |
| $(e)(i) 200 \times 0.1 + 100 \times 0.4 + 100 \times 0.6 + 400 \times 0.15$ $(i) 200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4$ $(ii) 200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4$ 40 (people) $M1$ $H1$ $H1$ $FT \text{ their values from (i)}$ $H1$ | | | calculated value of 188.888OR 190.2777 (people) truncated or rounded. |
| $\begin{array}{c} (e)(i) \ 200 \times 0.1 + 100 \times 0.4 + 100 \times 0.6 + 400 \times 0.15 \\ 180 \ (people) \end{array} \qquad \begin{array}{c} M2 \\ A1 \\ (ii) \ 200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4 \\ 40 \ (people) \end{array} \qquad \begin{array}{c} M2 \\ A1 \\ 40 \ (people) \end{array} \qquad \begin{array}{c} M1 \ for any 3 \ correct area calculations \ (20+40+60+60) \\ FT \ for a \ summation \ of \ their \ 4 \ values \ provided \ M1 \ awarded \end{array} \qquad \begin{array}{c} FT \ their \ values \ from \ (i) \\ A1 \\ 11 \end{array} \qquad \begin{array}{c} FT \ their \ values \ from \ (i) \end{array}$ | | | |
| (ii) $200\times0.1 + \frac{1}{2}\times100\times0.4$ 40 (people) (iii) 40 (people) (iii) 11 | (e)(i) $200 \times 0.1 + 100 \times 0.4 + 100 \times 0.6 + 400 \times 0.15$ | M2 | M1 for any 3 correct area calculations (20+40+60+60) |
| (ii) $200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4$ 40 (people) A1 11 | 180 (people) | AI | 1 1 101 a summation of them 4 values provided M1 awarded |
| 40 (people) A1 11 | (ii) $200 \times 0.1 + \frac{1}{2} \times 100 \times 0.4$ | M1 | FT their values from (i) |
| | 40 (people) | Al 11 | |

| Applications Unit 1 Higher Tier | Mark | Comment |
|--|------------|--|
| January 2015 | | |
| 5(a) Strategy, e.g. to draw a tangent at 7.5 seconds | S1 | |
| Use of difference v / difference t | M1 | Must be differences, not readings from axes. Ignore signs |
| = 0.4 to 0.6 | A1 | Reasonable from their graph. |
| m/s^2 or m per s^2 | T11 | Allow a fraction for example 4/7 |
| | 01 | Maybe shown on their graph |
| (b) Identifying the required area | S 1 | |
| Splitting area into areas that can be approximated | M1 | Must include at least 1 calculation for an appropriate area, or correct statement of the trapezium rule |
| Complete calculation for the area required | M1 | OR correct substitution into the trapezium rule, allow 1 slip |
| Accurately calculated area | A 1 | (Possible answers around 195 to 215 metres) |
| | 8 | (1 ossible answers around 195 to 215 filedes) |

| t | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 6.4 | 7 | 8 | 9 | 10 |
|---|---|---|-----|------|------|------|-------|-------|------|-------|-------|-------|-----|
| Η | | 0 | 4.9 | 19.6 | 44.1 | 78.4 | 122.5 | 176.4 | 200 | 240.1 | 313.6 | 396.9 | 490 |
| | | | | | | | | | | | | | |
| | t | | 0 | | 10 | 20 | | 30 | 40 | | 50 | 60 | |
| - | Н | | 0 | | 490 | 1960 |) | 4410 | 7840 |) | 12250 | 1764 | 0 |

| 6(a) Suitable uniform scales on labelled axes | B2 | Scale for H does not extend beyond 400(m) B1 on labelled scale for H extends beyond 400(m) Award B1 for correct scales and one label missing. |
|--|----------|--|
| At least 6 correct values calculated (or plotted) which could produce an appropriate curve. | B2 | For example including values of H for $t = 3, 4, 5, 6, (7)$ OR values of t for $H = 175$ and 200 B1 for 2, 3, 4 or 5 correct values calculated |
| At least 6 correct values plotted AND joined with a curve that includes $H = 200$ | C1 | No incorrect values plotted |
| (b) Check reading for their graph: | | MUST FT their graph, not for calculation (Calculated values are 30.625 and 132.496) FT only from derived points or values. |
| from graph ≈ 28 to 33 e.g 3×10^{-2} , 3.1×10^{-2} from graph ≈ 130 to 135 e.g 1.32×10^{-1} , 1.33×10^{-1} | B1 B1 | For both readings correct for their graph FT expressed in km in standard form If no marks, SC1 for one correct reading from their graph, as km and correctly given in standard form |
| (c) Suggests error due to river level changing or other suitable reason, or that the time taken was not accurately measured, or not drop from consistent level on the bridge, or rivers were not all horizontal, or different river levels, or windy, or air resistance neglected , or | E1 | Allow comparison that implies the stones are different |
| (d) $496 = \frac{1}{2} \times 9.8 \times t^2$ $t^2 = 101.2244898$ | M1 A1 | Accept (t between) 10 and 10.1 from use of trial and |
| t = 10(.06seconds) | A1 11 | Improvement CAO |

APPLICATIONS UNIT 2 FOUNDATION TIER

| Applications Unit 2 Foundation Tier | Mark | Comment |
|---|----------------------|--|
| 1. Accept the pairs in any order | B4 | For 4 marks, no cards should be repeated |
| Ahmed's cards are 8 and 17 Bethan's cards are 6 and 9 Caroline's cards are 18 and 2 | | |
| Doug's cards are 16 and 5 | | Ignore repeats if B4 not awarded. If all four marks not awarded then award B1 for each correct pair of cards, up to a maximum of 3 pairs of cards (B3) OR award B1 for each alternative correct pair. eg A: 20 & 5 or 16 & 9 C: 9 & 1 |
| | 4 | D: 20 & 9 or 17 & 6 |
| 2.(a)(i) 7 (ii) $9 + 7 + 2 + 4 + 1$ 23 (iii) Dog | B1 M1 A1 B1 | Attempt to add at least 3 frequencies |
| (iv) Labels of animals key provided All correct using their key | B1 B1 B2 | If no key given, award B0 here only FT their intended key. Award B1 for 3 or 4 correct using their key |
| 2 (b) 47 (minutes) | 8 B1 | Do not accept 47 hours |
| (c) $3.7 + 4.2$ OR $5.8 + 2.9$ (=8.7) Shortest distance 7.9 (km) | M1 A1 | bo not accept 47 nouis |
| (shortest route is) from surgery via Old Road then Red Hill to Pets R Us | E1 | FT provided M1 awarded Intention of the route must be clear e.g. via Old Road or Old Road then Red Hill. May be indicated on the diagram. |
| (d)(i) | 4 | |
| GoodsQuantityCostDog Basket1£29.99Flea Spray3£17.97Dog Treats5£12.45 | B1 B1 B1 | CAO CAO CAO |
| Large Dog Bowl I £7.00 Total £67.41 Cost | B1 | FT if at least one B1 awarded. Award B4 for only an answer of $\pounds 67.41$ |
| (ii) 5/100 × (£)67.41 (£)3.3705 (£)3.37 ISW (e) Suitable explanation given implying 40 metres for a dog collar is far too big or the units should be cm. | M1 A1 B1 E1 | FT 'their £67.41' FT 'their 3.3705' if unrounded answer is seen. Do not accept explanations that may be based on a lead. |
| 3. (a)(i) A B C D 1 2 4 1 | B3 | Award B3 for all correct, B2 for 3 correct, B1 for 2 correct. Condone consistent use of 0 or none instead of 1. (I.e. both must be 0 or none for the mark to be awarded.) |
| (ii) No and explanation given that shape A and/or B does not have any lines of symmetry. | E1 | Accept "No" being implied |
| (b) Correct reflection drawn | B1 B2 | B1 for straight edges correct, B1 for curve |
| (c) A and G or E and C E and C A and G | B1 B1 | Accept letters in either order in (c) |
| B and D | B1 10 | If the 2 previous B1 marks have not been awarded, award SC1 for an answer of A & G OR E & C in the last part instead of B & D |

| Applications Unit 2 Foundation Tier | Mark | Comment |
|--|----------|--|
| January 2015 | | |
| 4. | | If no equation shown but answers given award BO |
| (a) $4n - 28$ | B1 | B in each part. Accept $28 - 4n$ or $n + n + n + n - 28$ or $n - 28/4$ or |
| (u) + n - 20 | DI | equivalent $n = 20$ of $n = 20$ of $n = 20$ of $n = 20$ of $n = 20$ |
| (<i>n</i> =) 7 | B1 | Accept embedded answers for this B1. |
| (b) $m/6 = 12$ | B1 | Accept $m \div 6 = 12$ or $12 = m/6$ or $m = 12 \times 6$ or |
| | DI | equivalent |
| (m =) / 2 | | Accept embedded answers for this B1 |
| $5(a)$ (Cost of bike) $1100 - 1/10 \times 1100$ | 4 M1 | |
| $OR 9/10 \times 1100$ | | |
| (£)990 | A1 | |
| (b) (Save each month) $20/100 \times 600$ | M1 | |
| $(\pounds)120$ | A1 | |
| (Number of weeks) $(925 - 470) \div 120$ | MI | F1 'their 120'. Award M1 for repeatedly adding |
| | | Award A1 for sight of 830 and/or 950 |
| 3.(79) | A1 | riward rif for sight of 650 and/of 750 |
| Conclusion given that it will take 4 weeks | A1 | |
| | | |
| | Q | QWC2 Presents relevant material in a coherent and |
| Look for | W | logical manner, using acceptable mathematical |
| • spelling | | punctuation and grammar |
| clarity of labels the use of notation (watch for the use "- + | 2 | punctuation and grammar. |
| - $\times \div$ f" being appropriate) | | QWC1 Presents relevant material in a coherent and |
| , , , , , , , , , , , , , , , , , , , | | logical manner but with some errors in use of |
| QWC2: Candidates will be expected to | | mathematical form, spelling, punctuation or |
| • present work clearly, with words explaining | | grammar |
| process or steps | | OR avident weeknesses in encenication of material but |
| AND | | using acceptable mathematical form, with few if |
| • make few if any mistakes in mathematical | | any errors in spelling, punctuation and grammar. |
| their answer | | |
| | | QWC0 Evident weaknesses in organisation of |
| QWC1: Candidates will be expected to | | material, and errors in use |
| • present work clearly, with words explaining | | |
| process or steps | | |
| OR | | |
| • make few if any mistakes in mathematical | | |
| their final answer | | |
| | | |
| ((5 till - midt)) (0 (-m)) | 9 D1 | I and fan dimensions in annansiste alasse an the |
| 0. (3 mes widin =) 00 (cm) (1 tile length $60 \div 4 = -15$ (cm) | BI R1 | diagram for the first 2 B1 marks |
| (1 the length $00.4 - 15$ (cm) | DI | Award B marks then Alternative method: |
| (Area of 1 tile =) 12×15 | M1 | Award B1 Width = $12 + 2 \times 15$ (= 42) |
| $\times 14$ | m1 | Award M1 for area = 60×42 (FT their 42 for M1 |
| 2 | | if B1 awarded) |
| (Area of hallway) 2520 (cm ²) | A1 | Award A1 for $2520 (cm^2)$ |
| | 5 | |
| $7(a) 50 \times 30 \times 40$ | | |
| 60000 (cm ³) | A1 | |
| $(2 \times 60000 =) 120000 \text{ (cm}^3)$ | B1 | FT 2 × 'their 60000' provided M1 awarded |
| | | Alternative method |
| | | $50 \times 30 \times 40$ M1 |
| | | $\times 2 ml$ |
| (b) $140000 \div 1000$ | M1 | 120000 (cm ²) AI |
| 140 (litres) | A1 | |
| · ··· (mues) | 5 | |

| Applications Unit 2 Foundation Tier | Mark | Comment |
|--|----------|--|
| January 2015 | | |
| 8. (a) 325 (euros) | B1 | |
| (b) 300 (euros) | B1 | |
| (c) Idea of scatter not showing which apartment is | E1 | Must show uncertainty in the response |
| which so there is uncertainty, e.g. 'Suggest perhaps the | | |
| apartment costing 300€, ≈3.2km from the centre may | | |
| be the luxury apartment but there is not information to | | |
| tell us this on the scatter diagram' | | |
| | | |
| (d) Suitable line of best fit, in appropriate direction | B1 | Intention of straight line |
| with points above and below the straight line drawn | | |
| (e) Accurate reading from their line of best fit | BI | Tolerance within a small square |
| | 5 | |
| 9 (a) $74/254.75/2.54$ or $49 \ge 254$ | M1 | |
| All 3 correct answers in the table | A2 | A1 for correct unrounded answers |
| 29 (inches) | 112 | (29 13 	29 52 	124 46) |
| 30 (inches) | | OR for 29 and 30 OR for 124 (or allow 125 from |
| 124 (cm) | | converting backwards) |
| | | converting backwards) |
| (b) All 3 correct entries, | B2 | B1 for any 1 or 2 correct entries |
| (buy) small | | |
| (buy) medium | | |
| (buy) large | | |
| | 5 | |
| 10. (a) (Change into CYN) 460×9.28 | M1 | |
| (No coins, so can buy only) 4268 (CYN) | A2 | A1 for an answer of 4268.8 (CYN) or 4269(CYN) |
| | | If no marks, then SC1 for an answer of 4333 (using |
| | | incorrect rate & rounding down) |
| (Cost to Dewi for 4268 CYN is) 4268 ÷ 9.28 | M1 | FT their whole number of CYN |
| (£) 459.91 | A1 | An answer of 459.91379 implies M1, A0 |
| | | |
| | 141 | |
| (b) $928 \div 9.42$ | MI | |
| (t)98.51(38) | AI D1 | |
| (Loss) (£) 1.49 | BI | F1 100 – their 98.51° provided M1 awarded |
| | 8 | |
| 11 (G2 -) C2 + D2 + E2 + E2 OP (G2-) $\operatorname{sum}(C2:E2)$ | D1 | |
| 11. $(02 -) C2 + D2 + E2 + F2 OK (02 -) sum(C2.F2)$ | DI | |
| | | |
| (H2=) 100*G2 / (4*B2) | B4 | Award B3 for the fraction, i.e.*100 omitted but |
| OR 100* (C2 + D2 + E2 + F2) / (4*B2) | | otherwise correct, or if 1 minor slip in the formula |
| | | (not for omitted *4), e.g. missing bracket(s) or a |
| | | missing term, (condone \times for * and \div for /) |
| | | Award B2 for 2 errors, e.g. |
| | | 100* G2 / 4*20 |
| | | (missing () and use of 20 not B2), or |
| | | 100*(C2 + D2 + E2 + F2) / B2 |
| | | (missing 4* and ()) |
| | | Award B1 for 3 errors e.g. G2 / 4*20 |
| | | or (C2+D2+E2+F2) / 4*20 or |
| | | G2 / 80 or (C2+D2+E2+F2) / 80 |
| | 5 | |

APPLICATIONS UNIT 2 HIGHER TIER

| Applications Unit 2 Higher Tier January 2015 | Mark | Comment |
|--|----------------|--|
| 1(a) 325 (euros) (b) 300 (euros) (c) Idea of scatter not showing which apartment is which so there is uncertainty, e.g. 'Suggest perhaps the apartment costing 300€, ≈3.2km from the centre may be the luxury apartment but there is not information to tell us this on the scatter diagram' | B1 B1 E1 | Must show uncertainty in the response |
| (d) Suitable line of best fit, in appropriate direction with points above and below the straight line drawn | B1 | Intention of straight line |
| (e) Accurate reading from their line of best fit | B1 5 | Tolerance within a small square |
| 2(a) 74 / 2.54 75 / 2. 54 or 49 x 2.54 All 3 correct answers in the table 29 (inches) 30 (inches) 124 (cm) | M1 A2 | A1 for correct unrounded answers, (29.13 29.52 124.46) OR for 29 and 30 OR for 124 (allow 125 from converting backwards) |
| (b) All 3 correct entries, (buy) small (buy) medium (buy) large | B2 | B1 for any 1 or 2 correct entries Allow use of the appropriate range of measurements as the indication of size |
| 3(a) (Change into CYN) 460×9.28 | M1 | |
| (No coins, so can buy only) 4268 (CYN) (Cost to Dewi for 4268 CYN is) 4268 ÷ 9.28 (£) 459.91 | A2 M1 A1 | A1 for an answer of 4268.8 (CYN) or 4269(CYN) <i>If no marks, then SC1 for an answer of 4333 (using incorrect rate & rounding down)</i> FT their whole number of CYN An answer of 459.91379 implies M1, A0 |
| QWC2: Candidates will be expected to present work clearly, with words explaining process or steps AND make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer | QWC 2 | QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or |
| QWC1: Candidates will be expected to present work clearly, with words explaining process or steps OR make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer | | grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, |
| (b) 928 ÷ 9.42 (£) 98.51(38) (Loss) (£) 1.49 | M1 A1 B1 | FT '100 – their 98.51' provided M1 awarded For B1 the answer must be to the nearest penny. |

| Applications Unit 2 Higher Tier | Mark | Comment |
|--|----------------|---|
| $\frac{\text{January 2015}}{4(2) \text{ Values } = - \times 22^2 \times 125}$ | M1 | Lemons place only a changes for (22) and (125) |
| 4(a) volume = $\pi \times 23 \times 125$ Answers in the range 207.6 to 207.8() or 208 (litres) | | Ignore place value changes for 23 and 125 Accept 66 125 π |
| 7 miswers in the range 207.0 to 207.0() of 200 (httes) | 112 | Al for answers in the range 207600 to 207822 or 208000(cm ³) or 207 (litres) or 66125 π If no marks, award SC1 for use of 46 for radius giving) approximately 831 litres |
| | B1 | Ignore errors for their 1.2 million providing |
| (b) $150 \times 4500 \times \dots = 1.2$ million | | unambiguous. |
| Cost per litre 1 200 000 \div (150 \times 4500) | M1 | Calculation that could lead to a correct answer, |
| (£)1.78 | A1 | may be shown in stages Do not accept 1.2 million \div (150 × 4500) for M1 unless answer of 1.7(777) Accept 1.77(77). If units are given they must be correct. |
| (c) Either (100 ×) 1000/1700 | B1 | |
| or $1000 \times 159 \div 1700$ or equivalent | | |
| 58.8(%) or 59(%) | B1 | |
| Answers in the range 93.5(litres) to 94(litres) | B1 | FT their % provided initial B1 awarded Accept unsupported answer or an answer provided no inappropriate working is seen for B3 |
| 5(a) (G3 =) C3 + D3 + E3 + F3 OR (G3=) sum(C3:F3) | 9 B1 | |
| | 21 | |
| (H3=) 100*G3 / (4*B3) OR 100* (C3 + D3 + E3 + F3) / (4*B3) | B4 | Condone × for * and \div for / Award B3 for the fraction, i.e.*100 omitted but otherwise correct, or if 1 minor slip in the formula (not for omitted *4), e.g. missing bracket(s) or a missing term. Award B2 for 2 errors, e.g. 100* G3 / 4*30 (missing () and use of 30 not B3), or 100* (C3 + D3 + E3 + F3) / B3 (missing 4* and ()) Award B1 for 3 errors e.g. G3 / 4*30 or (C3+D3+E3+F3) / 4*30 or G3 / 120 or (C3+D3+E3+F3) / 120 |
| (b) G3 27 AND | B1 | |
| $\begin{array}{cccc} G4 & 23 \\ (7+6+3+11)/(4\times 30) & (\times 100) \\ H3 & 22.5 \end{array}$ | M1 A1 | |
| H4 57.5 F5 4 AND G5 8 | B1 B1 10 | FT their G4×100÷40 correct to 1dp CAO |
| $ \begin{array}{c} 6(a) 11 \\ (b) (\pounds)62 \\ (c) \end{array} $ | B1 B1 | |
| (c)Median in £Range in £Mode in £Jenkins46.5(0)3532Hollow Electric473448 | B4 | All entries correct OR B3 for 5 correct entries B2 for 3 or 4 correct entries B1 for 1 or 2 correct entries |
| (d) Shows understanding that median (and range) similar, mode for Hollow Electric indicates more expensive, accept conclusion Jenkins cheaper or that the two makes are quite similar | B1 7 | FT their table provided at least B2 previously awarded B0 if range considered as an average. Allow conclusion from their correct calculation of means: Jenkins $511 \div 12 = 42.5833$ Hollow Electric $482 \div 11 = 43.8181$ |

| Applications Unit 2 Higher Tier | Mark | Comment |
|---|------------|---|
| January 2015 | DO | |
| 7. $6B + 5C = 116$ AND $4B + 8C = 138$ | B 2 | B1 for either equation |
| Method to solve, e.g. equal coefficients with an | M1 | Allow 1 align in non-aquated variable |
| appropriate attempt to subtract the equations | IVI I | Allow I shp in non equated variable |
| Correct first value | A 1 | |
| Method to find the second variable | AI m1 | ET from their first value |
| Correct second value with indication showing order | A 1 | F1 Hom men mst value |
| such as completing the table $e^{-\alpha}$ | AI | |
| Ben (f) (f) per hr. Ceri (f) (f) (00) per hr | | Unsupported answers gain no marks |
| | 6 | Chsupported answers gain no marks |
| 8(a)(Length) $6.2 \times 2.4/4$ or equivalent | M1 | Ignore any incorrect place value with '2.4' and '6' |
| 3.7(2 cm) | Al | -2 |
| (Area) $8.9(28 \text{ cm}^2)$ | A1 | $(2.4 \times 3.72 = 8.928)$ FT 'their 3.72×2.4 ' correctly |
| | | evaluated provided M1 awarded |
| (b) Explains he is incorrect, e.g. 'Leo is wrong it has | E1 | Must mention the reflection (symmetry) of the new |
| reflection (symmetry)' or 'the original does not have | | OR that the original does not have (rotational) |
| (rotational) symmetry' | | symmetry. |
| | | Allow if incorrect is stated or implied with a |
| | | correct reason provided no more than one incorrect |
| | | statement is given |
| | 4 | |
| $9(a) b)5600 \times 1.85/100 \text{ or } 5600 \times 0.0185 (= 103.60)$ | B1 | May be embedded in further calculation |
| $(1 + 0.0185)^{15}$ 5600 | M1 | OP sight of a full cumulative method for at least |
| (1+0.0183) × 3000 | IVII | 13 years |
| (f) 7372(308954) | A1 | Accept correct evaluation from at least 13 years |
| | | cumulative (e.g. 13years gives (£)7106(.8) to |
| | | (£)7107) |
| | | B1 and SC1 for depreciation 4231.97, but no FT |
| | | |
| Conclusion, e.g. 'Yes (he will have more than he | E1 | FT interpretation provided B1 and M1 awarded |
| needs)' | | If M0 awarded and simple interest used with |
| | | interest shown or implied as over $(\pounds)1400$ for 14 or |
| | | 15 years award SCI or with conclusion 'Yes' |
| | | award SC2. |
| | | If also stated that using compound interest the |
| | | amount will be greater award SC3 |
| (215) ¹² | B 4 | For B4 condone missing brackets in the |
| (b) (AER% =) $100 \left(1 + \frac{210}{100 \times 12}\right) - 100$ | Ът | denominator if the answer correct |
| OR $100(1 + 2.15 \div (100 \times 12))^{12} - 100 = 2.17(\%)$ | | Award B3 for correct formula (including brackets |
| | | in the denominator) but incorrect answer between |
| | | 1 and 5 inclusive. |
| | | Award B2 for correct formula and answer not |
| | | between 1 and 5. |
| | | Award B1 for one error in the formula e.g. missing |
| | | brackets, 2000 not 100, a 12 missing, 0.0215 used. |
| | | |
| Auvise, e.g. Greenash as more interest (at 2.18%p.a.) | E1 | FT their appropriate interpretation provided at least |
| | C | B2 awarded and APR for Greenash is 2.18%. |
| | 9 | |

| Applications Unit 2 Higher Tier | Mark | Comment |
|---|------------|---|
| January 2015 | | |
| 10. Flot 1 Opposite side $= 25 \times \sin 37$ | M2 | M1 for $\sin 37 - opposite side/25$ |
| Opposite side $15(.04537 \text{ metres})$ | Δ1 | 101 sm 7 = opposite side/25 |
| Adjacent side $= 25 \times \cos 37$ | M2 | M1 for $\cos 37$ – adjacent side/25 |
| Adjacent side = 19.9658 metres or 20 (metres) | A1 | Accept rounded or truncated to 19 97 or 19 96 or |
| | 111 | 19 9 or 20 0 |
| | | Alternative 3 marks once opposite or adjacent side |
| | | found are: |
| | | $25^2 - opp^2 = adj^2$ or $25^2 - adj^2 = opp^2$ |
| | | Substitution of 25 and their(FT) appropriate |
| | | measurement M1 |
| | | $opp^2 = 226.36 \text{ or } opp = \sqrt{226.36 \text{ or}}$ |
| | | $adj^2 = 398.6(3)$ or $adj = \sqrt{398.6(3)}$ or FT with |
| | | their appropriate measurement Al |
| | DI | Opposite or adjacent as before or FT AI |
| Perimeter Plot 1 $(25 + 15 + 20 =)$ 60 (metres) | BI | FI provided at least 1 method mark for each stage of |
| D1-+ 2 | | Plot I working has been awarded |
| P101 2 | M1 | |
| unknown length 25 9(036 metres) or 26(metres) | | |
| Perimeter Plot 2 $(25 + 36 + 26 =)$ 87 (metres) | B1 | FT provided at least M1 for Plot 2 awarded |
| | DI | r provided at reast wir for rist 2 awarded |
| Plot 3 | | |
| Strategy, considers fraction of a circle OR | S 1 | OR equivalent to 72π or a fraction (percentage) of |
| sight of $2 \times \pi \times 36$ | | 72π in working |
| $Arc = 2 \times \pi \times 36 \times 22.5/360$ | M1 | |
| Answers between 14 (metres) to 14.14(metres) | Al | An answer of 226.(metres) implies \$1 only |
| Inclusive Designator Plot 2 (26 + 26 + 14 $-$) 86 (matros) | BI | (Allow 9pi/2) |
| 1 entitieter 1 for 5 (50 + 50 + 14 -) 80 (metres) | | FT provided at least S1 awarded for Plot 3 |
| | | Do not penalise not rounding each perimeter to the |
| | | nearest metre more than once, i.e. first B0 then FT to |
| | 14 | allow unrounded for further B marks |
| 11(a) G + B < 4000 | B1 | If no marks, then SC1 for G+B4000 AND |
| 0.3(0)G + 0.2(0)B > 960 | B1 | (0.)3(0)G + (0.)2(0)B960, with the gaps here both |
| | | being inequalities |
| (b) Line $G + B = 4000$ shown | BI | FT from their inequalities if possible |
| Line $0.3G + 0.2B=960$ shown Region between the lines indicated (left hand and only) | BI D1 | A scent FT from either line correct but for a similar |
| Region between the lines indicated (left hand end only) | DI | region |
| | | |
| | | |
| | | MUST be a FT from their (non spurious) graph in (c) |
| (c) Using their graph to show Ifor's point outside the | B1 | Do not accept numerical explanations. Accept |
| region with 'No' in the table | D 1 | unambiguous unlabelled plots provided the table is |
| Using their graph to show Simone's point inside the | BI | completed correctly |
| region with res in the table | 7 | |
| 12. Sight of 297.5 and 302.5 (litres) | B2 | B1 for any 2 of these |
| AND 239 and 241 (seconds) | | |
| | | FT their litres and seconds provided neither 300 nor |
| | | 240 used, and appropriately $>$ or $<$ these values |
| (Least) $\frac{297.5}{241}$ | | |
| 1.25 (nures per second) (Greatest) 302 5/230 | AI M1 | |
| (Utalest) 302.3/239 1 27 (litres per second) | | If neither A mark awarded then SCI for unrounded |
| 1.27 (nues per second) | 111 | or truncated answers (greatest 1 26569 AND least |
| | | 1.2344) |
| | 6 | <i>'</i> |

| Applications Unit 2 Higher Tier | Mark | Comment |
|--|---------|---|
| January 2015 | | |
| 13. (a)(i) Carli index $ \begin{pmatrix} \frac{1.02}{0.92} + \frac{0.93}{0.91} + \frac{0.92}{0.90} + \frac{0.94}{0.94} \\ \frac{4}{4} \end{pmatrix} \times 100 $ | M1 | Ignore irrelevant missing zeros for pence throughout Correct formula and substitution |
| 103.8(2239) | A2 | A1 for 4.15(289)(÷4 ×100) |
| (ii) Dutot index $ \begin{pmatrix} \frac{1.02 + 0.93 + 0.92 + 0.94}{4} \\ \frac{0.92 + 0.91 + 0.90 + 0.94}{4} \end{pmatrix} \times 100 $ | M1 | Correct formula and substitution, both \div 4 may be omitted, however if \div 3 shown in the formula M0 |
| 4 103.8(147) | A2 | A1 for 3.81/ 3.67 (×100) or 0.9525/ 0.9175 (×100) |
| (b) 3.8(%) AND 3.8(%) | B1 | If no marks then for answers from inverting substitution, SC1 for Carli 96.46 or 96.5, and SC1 for Dutot 96.325 for answers from showing ÷3, SC1 for Carli 138.3 or 138.4, and SC1 for Dutot 103.8(or 104 from 1.27÷1.22(33) FT for their difference from 100 provided at least 1 mark awarded in each of (a)(i) and (a)(ii) Accept any indication of this knowledge |
| (c) Indicates that the division by the number of supermarkets on the numerator and the denominator are common and can be cancelled or omitted | E1 8 | (Allow in words) |

GCSE Mathematics - Applications MS January 2015



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