



GCSE MARKING SCHEME

SUMMER 2016

**GCSE MATHEMATICS LINKED PAIR APPLICATIONS
UNIT 2 FOUNDATION
4362-01**

INTRODUCTION

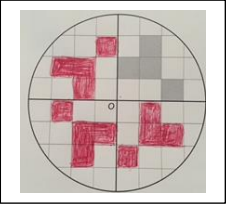
This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was 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' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

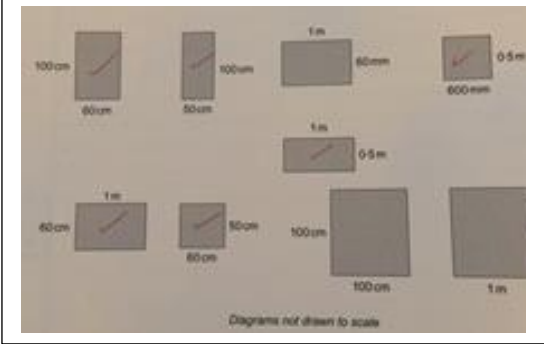
**APPLICATIONS OF MATHEMATICS
UNIT 2 (FOUNDATION TIER) SUMMER 2016**

Applications of Mathematics Unit 2 Foundation Tier	Mark	Comments
1. (a) Suitable explanation given making reference to the use of a non-uniform scale.	E1	Eg “the bars look as though one is twice the other but the frequencies do not say that”, “because twice 60 is 120 and the graph shows 170”, “the scale is wrong, doesn't go up by the same amount”, “missed out some numbers from the 5 times table”, “not in times table”, “has switched intervals of numbers”, “go up in a mix of numbers, they are not in order”. Award E0 for statement such as “graph is misleading” only.
(b) Romance 6, Thriller 9, Horror 8, Action 5, Comedy 12	B2	May be inferred from their bar chart. B1 for any 3/4 correct frequencies.
Both axes labelled.	B1	Eg 'frequency' OR ‘number of people’ along one axis and Romance, Thriller, Horror, Action, Comedy along the other axis (or on the bars), anywhere within the base of the corresponding bar
Uniform scale starting from zero	B1	If frequency scale starts with 1 at the top of the first square the starting at 0 will be implied for this axis. <u>Condone frequency numbers alongside square instead of at the top of the squares.</u>
All bars correct heights and same widths. The five bars can be in any order.	B2	FT their frequencies throughout. FT if no scale on vertical axis but an implied uniform scale has been applied. If no scale allow one square to represent 1. B1 for any 3 or 4 correct bars OR B1 for correct heights with inconsistent widths OR B1 for correct heights but bars not complete or a correct vertical line graph drawn. If no frequencies given in their working, penalise -1 for each incorrect frequency for their bars up to -4 (First and last B2 marks) If no marks for 1 st & last B2 marks, award SC1 for all correct tallies shown.
(c) Comedy AND Romance	B1	Must be in the correct order. FT “their frequencies” provided 1 mark has been gained from the initial B2 in (b).
	8	

Applications of Mathematics Unit 2 Foundation Tier	Mark	Comments																															
<p>2. (a) Man 1.5m – 2.2m or 5ft – 7ft (to allow for tall rugby players)</p> <p>(Man 3(cm) rugby posts 10.5(cm) (± 2mm)) Multiplying factor = 3.5</p> <p>Height of rugby posts = man’s estimate \times their SF (3 to 4) = correct answer for their figures</p> <p>If B0 (for 2nd B mark), M0, A0 Award SC1 for answers which:</p> <ul style="list-style-type: none"> only give man’s height as 3cm (± 2mm) and height of rugby posts between 10 and 11 cm OR give a proper attempt at ‘dividing’ the height of the rugby posts into equal parts. <p>Possible 1st B1 awarded too.</p> <p>(b)</p> <table border="1" data-bbox="220 902 679 1160"> <tr> <td>30 cm</td> <td>30 m</td> <td>30 km</td> <td>30 mm</td> </tr> <tr> <td>440 kg</td> <td>440 mg</td> <td>440 tonnes</td> <td>440 g</td> </tr> <tr> <td>70 km</td> <td>70 mm</td> <td>70 m</td> <td>70 cm</td> </tr> <tr> <td>8400 cm²</td> <td>8400 m²</td> <td>8400 mm²</td> <td>8400 km²</td> </tr> </table>	30 cm	30 m	30 km	30 mm	440 kg	440 mg	440 tonnes	440 g	70 km	70 mm	70 m	70 cm	8400 cm ²	8400 m ²	8400 mm ²	8400 km ²	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>8</p>	<p>Units must be seen</p> <p>3.5 may be implied by working eg 3 lots of 3cm plus 1.5cm</p> <p>FT their man’s estimate AND scale factors 3 to 4 inc</p> <p>For this A1 we need correct units (feet or metres) either explicitly shown or implied by their figures.</p> <p>Unsupported answers mark as follows:</p> <table border="1" data-bbox="874 622 1353 752"> <tr> <td>Feet</td> <td>15</td> <td>17.5</td> <td>22.75</td> <td>28</td> </tr> <tr> <td></td> <td>SC1</td> <td></td> <td>M1 A1</td> <td>SC1</td> </tr> <tr> <td>Metres</td> <td>4.5</td> <td>5.25</td> <td>7</td> <td>8.8</td> </tr> </table> <p>Possible 1st B1 awarded too.</p>	Feet	15	17.5	22.75	28		SC1		M1 A1	SC1	Metres	4.5	5.25	7	8.8
30 cm	30 m	30 km	30 mm																														
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	SC1		M1 A1	SC1																													
Metres	4.5	5.25	7	8.8																													
<p>3. (a) Congruent shape drawn Correct explanation given</p> <p>(b) Similar shape drawn Correct explanation given</p>	<p>B1</p> <p>E1</p> <p>B1</p> <p>E1</p> <p>4</p>	<p>Shape can be drawn in any orientation. Eg “Congruent shapes are exactly the same (shape and size).”</p> <p>Shape can be drawn in any orientation. A correct enlargement is required. Eg “Similar shapes are (the same shape but) a different size”, “looks the same but would be bigger”, “(same shape but) smaller (or bigger) than the original one”, “same shape but different size” Do not accept “similar shapes have a slight difference from the original”.</p> <p>If B0 for similar shape drawn, award E1 if a full correct explanation given with reference to the same shape but different size.</p>																															
<p>4 (a)</p> <table border="1" data-bbox="220 1727 584 1800"> <tr> <td>Wheel 1</td> <td>Wheel 2</td> <td>Wheel 3</td> </tr> <tr> <td>4</td> <td>6</td> <td>3</td> </tr> </table> <p>(b) Correct diagram drawn</p> 	Wheel 1	Wheel 2	Wheel 3	4	6	3	<p>B3</p> <p>B3</p> <p>6</p>	<p>Award B1 for each.</p> <p>Award B2 for 2 sections drawn correctly OR for all 3 correct L shapes. Award B1 for 1 section correctly drawn OR for 2 correct L shapes OR for all 3 single squares drawn correctly.</p>																									
Wheel 1	Wheel 2	Wheel 3																															
4	6	3																															

Applications of Mathematics Unit 2 Foundation Tier	Mark	Comments
<p>(c)(i) $12/100 \times (\pounds)95$ OR $0.15 \times (\pounds)95$</p> <p>$(\pounds)11.4(0)$ ISW AND $= (\pounds)14.25$ ISW</p> <p>$(\pounds)9.5(0)$ ISW</p> <p>(ii) Choose Signs & Symbols as it offers the biggest discount</p>	<p>M1</p> <p>A2</p> <p>B1</p> <p>E1</p> <p>5</p>	<p>Or equivalent e.g. reduced price is 88% or 0.85 of $(\pounds)95$.</p> <p>Award A1 for each.</p> <p>If no A or B marks, award SC1 for all 3 answers (= $(\pounds)83.6(0)$, $(\pounds)85.5(0)$, $(\pounds)80.75$). The 1st or last of these implies M1.</p> <p>Accept choose signs & symbols as it will be the cheapest to buy. FT correct interpretation of their discount provided 3 values are given.</p>
<p>5. $1100 - 12 \times 60$ or $11 - 12 \times 0.6$ 380 (cm) or 3.8 (m)</p>	<p>M2</p> <p>A1</p> <p>3</p>	<p>Award M1 for 12×60 or 12×0.6 or 720 or 7.2 If units are given they must be with the correct answer.</p> <p><i>If no marks awarded, award SC2 for $1100 - 18 \times 60 = 20$ (cm)</i> OR $1100 - 15 \times 60 = 900$ (cm) = 200 (cm) OR equivalent in metres.</p> <p><i>If no marks awarded, award SC1 for sight of $1100 - 18 \times 60$</i> OR $1100 - 15 \times 60$ OR equivalent in metres OR $(18 \times 60 =) 1080$ (cm) OR $(15 \times 60 =) 900$ (cm)</p>

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<p>6. Offer 1 (Mobile phone provider cost): $24 \times (\pounds)39$ $(\pounds)936$</p> <p>Offer 2: Identifying equivalent mins/texts/memory deal of £15</p> <p>Buying handset cost and SIM only deal: $(\pounds)539 + 24 \times (\pounds)15$</p> <p>$(\pounds)899$</p> <p>Explanation given based on their figures</p> <p>QWC2: Candidates will be expected to</p> <ul style="list-style-type: none"> present work clearly, with words explaining process or steps <p>AND</p> <ul style="list-style-type: none"> make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer <p>QWC1: Candidates will be expected to</p> <ul style="list-style-type: none"> present work clearly, with words explaining process or steps <p>OR</p> <ul style="list-style-type: none"> make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 	<p>M1 A1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>E1</p> <p>QWC2 2</p> <p>8</p>	<p>May be clearly implied in working.</p> <p>May be seen in stages. Ignore any other sim-only deals calculated.</p> <p>If M0 gained, award SC1 for any other ‘sim-only deal + handset’ correctly evaluated.</p> <p>CAO</p> <p>Eg “Overall cheaper for Liz to buy offer 2”, “not much difference but rather than spend a lot of money in one go, is easier to do offer 1 and pay monthly”, “ offer 2 as it’s cheaper and she gets more minutes”, “offer 2 gets more minutes” FT ‘their $(\pounds)936$’ and ‘their $(\pounds)899$’ provided both M1s awarded or M1 SC1 awarded.</p> <p>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.</p> <p>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.</p> <p>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.</p>
<p>7. 2 correct equations that have a solution of $x = 5$</p>	<p>B2</p> <p>2</p>	<p>Award B1 for each correct equation with a solution of $x = 5$ Allow $2 + 3 = x$ or $x = 10/2$ i.e. any numerical operation that equates to 5. Do not accept $5 = x$ or $1x = 5$</p>
<p>8. 1st offer: $(\pounds)1.50 + (\pounds) 0.75) \times 3$ $(\pounds)6.75$</p> <p>2nd offer: $[(\pounds)1.50 + (\pounds)1.50 + \text{free pot}] \times 2$ $(\pounds)6$</p> <p>Better buy is the 2nd offer</p>	<p>M1 A1</p> <p>M1 A1 E1</p> <p>5</p>	<p><i>Alternative</i> $(1 + \frac{1}{2}) \times 3$ 4 ½ pots</p> <p>$(1 + 1 + 0) \times 2$ 4 pots</p> <p>FT “their derived $(\pounds)6.75$” AND “their derived $(\pounds)6$” provided at least M1 has been awarded.</p> <p>Be aware of other methods of comparison. If no marks awarded, award SC1 for engaging correctly with both offers e.g. through use of diagrams or lists of costs.</p>

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<p>9. (a) $60 \times 100 \times 50$ 300 000 ISW cm^3</p> <p>(b) All 6 correct wooden panels identified with no incorrect ones.</p> 	<p>M1 A1 U1</p> <p>B3</p> <p>6</p>	<p>Alternative method $0.6 \times 1 \times 0.5$ 0.3 m^3</p> <p>Penalise -1 for incorrect subsequent working after awarding M1 A1 U1 eg $300000 \text{ cm}^3 = 3000 \text{ m}^3$</p> <p>Award B2 for : 6 panels correct and 1 incorrect OR 5 panels correct and 0 or 1 incorrect OR 4 panels correct and 0 incorrect</p> <p>Award B1 for : 4 panels correct and 1 or 2 incorrect OR 3 panels correct and 0 or 1 incorrect OR 2 panels correct and 0 incorrect</p>
<p>10. 0.09×349 or equivalent (£)31.41 AND any choice of 1 D & 1 flexible lock</p> <p>Lock 1 AND lock 6 selected</p>	<p>M1 A1 A1 3</p>	<p>Needs to show attempt to price 1 D and 1 flexible lock</p> <p>Accept 'Lock 1 and 2(nd) flexible lock' provided it is clear that 2(nd) refers to a flexible lock</p>
<p>11. (a) $126 (\text{m}^2)$</p> <p>(b) Wilf's scatter graph selected with a reason, e.g. 'Wilf, the points are closer together', 'Wilf, points not spread as much', 'Wilf's graph as most points show as area increases so does the energy cost', 'Wilf's as Rowena's is more random'</p> <p>(c) Straight line of best fit on Rowena's scatter diagram following the trend with some points above and below the line</p> <p>(d)(i) Wilf's scatter diagram selected with a reason, e.g. 'Wilf's as costs are lower', 'Wilf's as no high costs', 'Wilf's because (for the same area) the heating costs (per annum) are much lower'</p> <p>(ii) States or implies that headline is (possibly) not true with a reason, e.g. 'not true, larger flats save more', 'no, costs fall more for the larger flats', 'not necessarily true as the smallest flat in both have roughly the same costs'</p>	<p>B1</p> <p>E1</p> <p>B1</p> <p>E1</p> <p>E1</p> <p>5</p>	<p>Do not accept 'Wilf as it has the strongest (positive) correlation' Allow 'Wilf's is a more obvious correlation', 'Wilf's is a better correlation'</p> <p>Do not accept a line passing through (80, 400), the line of best fit must intersect the vertical $>£400$ and ≤ 800 when area = 80m^2</p> <p>Accept reference to 'costs fallen', 'Wilf's shows lower results (for energy bills)', 'Wilf's costs are put lower' Allow 'Wilf's as the highest costs are greater on Rowena's scatter diagram'</p> <p>Do not accept 'true' unless unambiguously contradicted by the reason given Accept 'they may be the same' with a valid reason Accept answers based on the gradient of the line</p>

Applications of Mathematics Unit 2 Foundation Tier	Mark	Comments
<p>12(a)(i) Lowri: perimeter $(2.3+2.3+4.6+4.6 =) 13.8$ (m) Tom: length $13.8 \div 4$ 3.45 (m)</p> <p>(ii) Dewi: area $\pi \times 1.8^2$ Answer in the range 10.17 to 10.183 or 10.2 (m²)</p> <p>(b)</p> <p>Age: Use of non-overlapping groups (at least 3) and no gaps in groups for ages</p> <p>Tent owner: 'Yes' and 'No' options</p> <p>Number of holidays: Use of non-overlapping groups (at least 3) and no gaps in groups given, or list of numbers to indicate (if not starting at 0, it should start at 1)</p> <p>(ii) Reason, e.g. 'helps summarise', or 'smaller number of categories to manage', or 'can't list them all', or 'easier to see trends', or 'easier to read'</p>	<p>B1 M1 A1</p> <p>M1 A1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>E1</p> <p>9</p>	<p>FT 'their sum of 4 measurements' $\div 4$</p> <p>If no marks, award SC1 for sight of 4.6(m) or 6.9(m) <i>Alternative:</i> $(2.3 + 4.6) \div 2$ M2 3.45 (m) AI</p> <p>If inequalities are used they must be correct.</p> <p>Need not start at 0 or 1, e.g. first group 15 – 25 etc. Do not accept e.g. 'Under 16, 17 to 25, 26 to 34, 35 or over' (because there is no 16), or '0 - 16, 17 – 25, 26 – 34, 34+' (as 34 has two options)</p> <p>Ignore including 'other' or 'renting' or similar</p> <p>Accept 'easier to compare', 'narrows the data options'</p>
<p>13. (a) Example, 'conversion of dollars', 'exchange dollars to € (and/or £)'</p> <p>(b) Parallelogram symbol Statement, e.g. 'Output in euros', 'amount in €'</p> <p>(c) Rectangle followed by a parallelogram</p> <p>1st statement, e.g. 'Evaluate $d \times 0.62$'</p> <p>2nd statement, e.g. 'Output in pounds', 'amount in £'</p> <p>(d) $280 \div 0.8$ 350 (US\$)</p>	<p>E1</p> <p>B1 B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>M1 A1 8</p>	<p>Accept statement converting \$ to £ or converting \$ to € Allow 'converting money', or converting \$ to \$, or 'converting to £ or €'</p> <p>Accept 'euros' or '€' alone provided inside a parallelogram</p> <p>For B2:</p> <div data-bbox="906 1361 1206 1458" style="text-align: center;"> </div> <p>For B3:</p> <div data-bbox="906 1765 1174 1989" style="text-align: center;"> </div> <p>Accept 'pounds' or '£' alone provided inside a parallelogram</p>