



# **GCSE MARKING SCHEME**

**MATHEMATICS - UNITISED**

**SUMMER 2012**

## **INTRODUCTION**

The marking schemes which follow were those used by WJEC for the Summer 2012 examination in GCSE MATHEMATICS - UNITISED. 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.

### UNIT 1 (FOUNDATION TIER)

JUNE 2012 UNIT 1 Foundation	Mark	FINAL MARK SCHEME Comments
1. (a) (i) Twenty thousand six hundred and eight. 13 079.  (ii) 33 700	B1 B1  B2	Ignore incorrect spelling.  F.T. their votes in figures for F. Dodd. B1 for sight of 33687 (or an accurate F.T. total)
1. (b) (Football pitch) metre (Thickness of letter) millimetre	B1 B1	Accept any unambiguous indication of correct choice.
2. (a) 72 90  (b) Laura's by 18(cm)	B1 B1  B1	F.T. their measurements.
3. Indicates that 3 games are won. (2 × 0 +) 5 × ½ + 3 × 1  = 5½ ISW	B1 M1  A1	This may be implied. Two out of 0, 2½ and 3 AND added gains an M1. F.T. their number of winning games if > 0.
4. (a) Tue Sat - 2(°C) - 5(°C)  (b) 7(°C)	B2  B1	B1 for each.  F.T. from their table. Do not accept -7(°C).
5. 55 × (£)1.24 OR 55 × 124(p) (£)68.2(0) OR 6820(p)  181 × (£)0.08 OR 181 × 8(p) (£)14.48 OR 1448(p)  (Water Charge =) (£)82.68 OR 8268(p)	M1 A1  M1 A1  A1	F.T. their amounts only if using consistent units.

JUNE 2012 UNIT 1 Foundation	Mark	FINAL MARK SCHEME Comments
<p>6. (Hire of hall) <math>4 \times (\pounds)20</math> = <math>(\pounds)80</math></p> <p>(Total cost =) <math>(\pounds)230</math> <math>128 \times (\pounds)5</math></p> <p>(Income =) <math>(\pounds)640</math></p> <p>(Profit =) <math>(\pounds)640 - (\pounds)230</math> = Profit of <math>(\pounds)410</math></p> <p>Look for</p> <ul style="list-style-type: none"> <li>• spelling</li> <li>• clarity of text explanations,</li> <li>• the use of notation (watch for the use of '=', £ being appropriate)</li> </ul> <p>QWC2: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul> <p>QWC1: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul>	<p>M1 A1 A1 M1 A1</p> <p>M1 A1</p> <p>QWC 2</p>	<p>F.T. 150 + 'their 80'.</p> <p>F.T. their values. Must indicate 'Profit' ( or 'Loss' if so on F.T.).</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 weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.</p> <p>QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar</p>
<p>7. (a) Plotting all three points correctly. Line drawn through their points.</p> <p>(b) 32.</p> <p>(c) 18(°C) AND a clear reason given.</p>	<p>P2 L1</p> <p>B1</p> <p>B1</p>	<p>P1 for 2 correct plots. A correct line implies P2. F.T. their <b>three</b> plots. Allow curve or 'dog leg' only if P2 not gained.</p> <p>F.T. their line. Allow <math>\pm \frac{1}{2}</math> 'small square'.</p> <p>Some <b>correct</b> use of their graph required. For an accurate graph (or no graph) 18°C needs to be equated to 64°F to 65°F OR 60°F needs to be equated to 15°C to 16°C. Do not accept 'its higher on the line' unless their line has been clearly marked at 60°F and 18°C.</p>
<p>8. (a) (Area =) <math>1.4 \times 0.8</math> = <math>1.12 \text{ (km}^2\text{)}</math></p>	<p>M1 A1</p>	
<p>8. (b)</p> <p>Position of point B due east of point A. AB = 10cm, AC = 6cm and BC = 7.5 cm.</p>	<p>B1 B3</p>	<p><i>Use overlay.</i> <i>Do not penalise those who use their own point A.</i> Allow <math>\pm 2^\circ</math>. B1 for each correct length. Allow <math>\pm 2\text{mm}</math>. There is no requirement to join the points together. <i>Treat a <u>consistent</u> use of a different scale as a misread.</i></p>
<p>9. (a) <math>800 \times 1.57</math> = <math>(\\$)1256</math></p>	<p>M1 A1</p>	
<p>9. (b) (Cost of coat =) <math>199 \div 1.57</math> = <math>(\pounds)126.7(5\dots)</math> (To nearest pound =) <math>(\pounds)127</math></p>	<p>M1 A1 A1</p>	<p>F.T. their amount.</p>

<p style="text-align: center;"><b>JUNE 2012</b> <b>UNIT 1 Foundation</b></p>	<p style="text-align: center;"><b>Mark</b></p>	<p style="text-align: center;"><b>FINAL MARK SCHEME</b> <b>Comments</b></p>
<p>10. (a) (Mode =) 1 (day absent)</p> <p>(b) <math>(0 \times 3) + 1 \times 4 + 2 \times 2 + 20 \times 1</math> (28)</p> $\div 10$ $= 2.8$ <p>(c) A valid reason given e.g. ‘Only one worker was absent for more than 2.8 days’. ‘Most workers were absent for 0,1 or 2 days’. ‘Applies to the majority’. ‘Most common one’. (The) Mode</p>	<p>B1</p> <p>M1</p> <p>m1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Allow B1 for 1 day and 4 workers. B0 for 4 workers.</p> <p>For the intent to multiply values by their frequencies and then add.</p> <p>Do not accept e.g. ‘2.8 is not a full day’ or ‘It is simpler’ or ‘It is more accurate’ or ‘It is clearer’, <u>unless</u> accompanied by a valid and acceptable response. ‘The Mode’ chosen with no valid reason is M0A0. If ‘Mean’ chosen then M0A0 whatever reason given.</p>
<p>11. Sight (time taken) 2hrs 30min or 2.5(hrs) (Speed km.ph) <math>172 / 2.5</math></p> $= 68.8 \text{ (k.p.h)}$ $68.8 \times \frac{5}{8}$ $= 43 \text{ (mph)}$	<p>B1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Allow 2:30, 2.30, 2 30 and 2.3(0). Also allow 150(min). F.T. ‘their time taken’ <u>in hours</u>. Use of 2.3 is M1A0 (but does imply previous B1). Ignore incorrect units at this stage.</p> <p>F.T. their speed in km.ph. Allow M3 for <math>172 / 2.5 \times 5/8</math>. F.T. answers should be accurate to at least 1d.p. <i>Alternative method.</i> Sight (time taken) 2hrs 30min. B1 <math>172 \times 5/8</math> M1 <math>= 107.5</math> A1 <math>107.5 / 2.5</math> M1 F.T. ‘their 107.5’ <math>= 43(\text{mph})</math> A1 and ‘their time’.</p>
<p>12. Three different valid comments.</p> <p>e.g. ‘Not representative of population’</p> <p>‘A leading question’, ‘What is meant by too much?’ ‘Not relevant to the hypothesis being tested’ ‘Asking an opinion (not fact)’</p> <p>‘Does not specify over what period of time’, ‘Does not specify at what time (night or day)’ ‘Better with tick boxes’.</p> <p>‘Might get a poor response’</p>	<p>B3</p>	<p><i>Ignore irrelevant statements.</i> B1 for each different valid comment. Accept equivalent statements e.g. ‘biased’ (by age, gender or interest group). Do not give more than one mark for similar criticism(s). Reference to location should only be credited once.</p> <p>( criticisms of question (i))</p> <p>‘is it per night or per week?’ (a criticism of question (ii))</p> <p>‘people will forget or not bother (to post or complete them)’</p>
<p>13. 17.7</p>	<p>B2</p>	<p>B1 for 17.73(22.....) B1 for 17.70</p>
<p>14. Sight of (£)30 (15 individual balls) OR Sight of (£)1.60 (single ball in the box)</p> <p>(Difference in price =) (£)6 OR 40(p)</p> <p>Use of <math>\frac{6}{30} \times 100</math> OR <math>\frac{40}{200} \times 100</math></p> $= 20(\%)$	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>F.T. their amounts.</p> <p>F.T. their price difference.</p>

### UNIT 1 (HIGHER TIER)

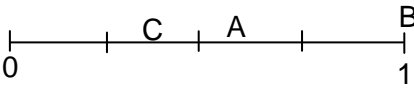
JUNE 2012 UNIT 1 Higher	Mark	FINAL MARK SCHEME Comments
1. (a) Valid reason, e.g. 'only those interested in drama will be leaving the theatre', 'Q3 assumes you won't return'.	B1	Accept reference to location or to Q3 <i>Ignore additional information given by candidates once a correct response has been given credit.</i>
1. (b) (i) / (ii) Any reference to two of the following. '50 appears in two boxes' 'no over 75 box' 'people might object to giving their age', 'too personal'.	B1 B1	<i>Ignore additional information given by candidates once a correct response has been given credit.</i> Do not accept 'not relevant' or 'different age gaps'.
1.(c) Valid reason, e.g. 'asks the same thing twice', 'vague', 'difficult to collect responses', 'people have to write answer', 'better to have tick boxes', 'biased', 'negative', 'leading question', 'taken for granted you won't return	B1	<i>Ignore additional information given by candidates once a correct response has been given credit.</i>
2. Sight of $9745 \times 2.12$ OR $90 \times 12.4$ (£)206.59(4) or 20659(4)(p) <span style="margin-left: 150px;">(£)11.16 or 1116(p)</span> (Cost without VAT) (£)217.75(4) or 21775.4(p)  (Bill =) $217.75 \times 1.05$ or equivalent = (£)228.64 or 22864(p)  Look for <ul style="list-style-type: none"> <li>• spelling</li> <li>• clarity of text explanations,</li> <li>• the use of notation (watch for the use of '=', £, % being appropriate)</li> <li>• final answer in £</li> </ul> QWC2: Candidates will be expected to <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> AND <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul> QWC1: Candidates will be expected to <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> OR <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul>	M1 A1 A1 A1  M1 A1  QWC 2	Accept (£)206.60 or 20660(p) . Do not accept incorrect units but do allow £206.59p and £11.16p. F.T. 'their two amounts'.  F.T. 'their cost' in £s or in pence. Allow $\pm 1p$ but answer must be a whole number of pence.  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 grammar. OR Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.  QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar
3. Sight (time taken) 2hrs 30min or 2.5(hrs) (Speed km.ph) $172 / 2.5$  $= 68.8$ (k.p.h)  $68.8 \times \frac{5}{8}$  $= 43$ (mph)	B1 M1  A1  M1  A1	Allow 2:30, 2.30, 2 30 and 2.3(0). Also allow 150(min). F.T. 'their time taken' <u>in hours</u> . Use of 2.3 is M1A0 (but does imply previous B1). Ignore incorrect units at this stage.  F.T. their speed in km.ph. Allow M3 for $172 / 2.5 \times 5/8$ . F.T. answers should be accurate to at least 1d.p. <i>Alternative method.</i> Sight (time taken) 2hrs 30min. B1 $172 \times 5/8$ M1 $=107.5$ A1 $107.5 / 2.5$ M1 F.T. 'their 107.5' $= 43$ (mph) A1 and 'their time'.

JUNE 2012 UNIT 1 Higher		Mark	FINAL MARK SCHEME Comments
4.	Attempt at $\sum f \times x$ (8200000) Division by $\sum f$ (25000)  (Mean cost =) (£)328	M1 m1  A1	C.A.O.
5.	17.7	B2	B1 for 17.73(22.....) B1 for 17.70
6.	Sight of (£)30 (15 individual balls) OR Sight of (£)1.60 (single ball in the box)  (Difference in price =) £6 OR 40(p)  Use of $\frac{6 \times 100}{30}$ OR $\frac{40 \times 100}{200}$  = 20(%)	B1  B1  M1  A1	F.T. their amounts.  F.T. their price difference.
7.	$100 = 20 \times 4 + \frac{1}{2} \times a \times 4^2$  $a = \frac{100 - 20 \times 4}{4^2} \times 2$  = 2.5 (ms <sup>-2</sup> )	B1  B1  B1	For correct substitution.  Allow for correct intent.  C.A.O. Accept an embedded answer.
8. (a)	Appropriate uniform scale on vertical axis. Line starts at (0, 200). Straight line with correct gradient (150 l/h).	B1 B1 B1	Must allow for all plots up to 6 hours. Need not start at 0. Accept plot at (0,200) if no line drawn.
(b)	620(litres)	B1	F.T. their graph $\pm \frac{1}{2}$ 'small square'.
9.	Sight of 4913. (Volume of metal removed) $\pi \times 4^2 \times 17$ = 854(.5..)(cm <sup>3</sup> )  (volume of part =) 4913 – 854.5 = 4058(.5)	B1 M1 A1  M1 A1	Accept 853 to 856 inclusive OR 272 $\pi$ .  F.T. 'their two derived <u>volumes</u> '.
10. (a)	Least length = 4.45 Greatest length = 4.55	B1 B1	Accept 4.54999...recurring.
(b)	Greatest length = $41 \times 4.55$  = 186.55(cm) Indicates that 'smallest shelf' is 185(cm) A statement that the cubes will not fit	M1  A1 B1 E1	F.T. 'their greatest cube' only if > 4.5. Ignore other multiplications seen.  This mark is dependent on M1 gained. F.T. logical statement. <i>Look out for logical thinking when working with values other than 4.55 and/or 185. Some, or possibly all, of the marks available in part (b) may be gained.</i> Values must remain consistent with the shelf not always being long enough for the award of the E1 mark. <u>Alternative method</u> 'Smallest shelf' = 185(cm) B1 $185 / 4.55$ M1 = 40.6(...) A1 Clear explanation that $40.6 < 41$ and so cubes are not certain to fit E1 <u>Alternative method</u> 'Smallest shelf' = 185(cm) B1 $185 / 41$ M1 = 4.51(...) A1 Clear explanation that $4.51 < 4.55$ and so cubes are not certain to fit E1

JUNE 2012 UNIT 1 Higher	Mark	FINAL MARK SCHEME Comments
11    104% $\equiv$ (£)884 (Original investment) $\frac{884 \times 100}{104}$ $=$ (£)850	B1 M1  A1	Accept any indication.
12. $4 \div 3$ OR $4 \times \frac{1}{3}$ $\times 2\frac{1}{2}$ OR    equivalent $= 20/6$ (hrs) or equivalent OR $3.33(\dots)$ (hrs) OR 200(min) 3hrs 20min	M1 M1 A1 A1	Do not accept $20 \div 6$ until it is evaluated. F.T. if at least one M1 and of equivalent difficulty. <i>If question is misread as 'It took Machine A 4 hours ..... ...How long did it take Machine B.....?' award SC1 for <math>(4 \times 3) / 2\frac{1}{2}</math> or 4.8 hours and a further SC1 for 4hrs 48min.</i>
13 (a)    Sight of (angle DAE = ) $70^\circ$ . (length of arc DE = ) $70/360 \times 2 \times \pi \times 10$ 12.2(....) Perimeter = 62.2(....)(m)  (b) (area of rectangle =) 150(m <sup>2</sup> ) (area of sector =) $70/360 \times \pi \times 10^2$ (61.08..) Area of land = 211(.08..)(m <sup>2</sup> )	B1 M1 A1 A1  B1 M1 A1	Seen or implied in calculations or on the diagram. F.T. 'their $70^\circ$ '  Their 12.2 + 50  F.T. 'their $70^\circ$ ' BUT must be the same as for (a).
14.    (Volume of cone) $\frac{1}{3} \times \pi \times 19.8^2 \times 15$ $= 6158(.14..)(\text{cm}^3)$ '7 litre' or 7000(cm <sup>3</sup> ) (hemisphere required)  $\frac{2}{3} \times \pi \times r^3 = 7000$ $r^3 = \frac{7000 \times 3}{2 \times \pi}$ (3342) $r = 14.95(\dots)(\text{cm})$ (Diameter = ) 29.9	M1 A1 B1  M1 m1  A1 A1	Accept answers between 6155 and 6161. F.T. their volume in cm <sup>3</sup> .  F.T. their volume in cm <sup>3</sup> if not whole litre.  Accept to 1dp but may lose final A1. F.T. $2 \times$ 'their radius' to nearest mm. Pre approximation of their radius may result in A0. <i>If <math>\frac{4}{3}\pi r^3</math> used allow SC1 for <math>r = 11.86(\dots)</math> and a further SC1 for <math>d = 23.7</math></i>



## UNIT 2 (FOUNDATION TIER)

JUNE 2012 UNIT 2 (Non calculator) Foundation	Marks	FINAL MARK SCHEME Comments
1. (a) (i) Seven thousand and eighty nine	B1	
1. (a) (ii) 37204	B1	
1. (b) 815	B1	
1. (c) 568	B1	
1. (d) 600 or 6 hundred OR hundred(s)	B1	
1. (e) e.g (68, 69 or $70 \times 10$ or 11) OR $68.9 \times 10$ 680 OR 690 OR 700 OR 770 etc	M1 A1	Good estimates F.T their estimates for simple calculations M0, A0 for actually calculating $68.9 \times 11$ (757.9) Unsupported answers get M0, A0.
1. (f) 1, 3, 9, 27	B2	B1 for any 2 or 3 with no incorrect OR all 4 correct and one incorrect
2. 80g          800kg          80mg          80kg 270mm      270cm          270m          270km 170cm      17m            170mm      1700cm 27 litres    270 ml        2.7 cm <sup>3</sup> 2700litres	B1 B1 B1 B1	
3. (a) 	B1 B1 B1	Allow 1, 2 and 3 to represent A, B and C respectively. Allow 6/10 and 3/10 to represent A and C respectively. A should be between $\frac{1}{2}$ exclusive and $\frac{3}{4}$ inclusive (up to the end of 'it'.) B should be at 1. C should be between $\frac{1}{4}$ inclusive (beyond the end of 'that') and $\frac{1}{2}$ exclusive.
3. (b) unlikely	B1	
4. (a) (i) Add 14 to the previous term	B1	Accept +14 Do not accept '2 multiples of 7' or 'two 7s' Do not accept $n + 4$
4. (a) (ii) Multiply the previous term by 2	B1	Accept $\times 2$ or 'double' Do not accept $n \times 2$
4. (b) 5	B1	Do not accept $5 \times 5$
4. (c) $60/100 \times 70$ = 42 I.S.W.	M1 A1	Any correct method for finding 60% A0 for 42%.
4. (d) Strategy for finding how many 85p in £10 11 (and (£)9.35) 65p change  <b>QWC on the next page</b>	M1 A1 B1	10 is £8.50, 11 is 9.35, (12 is 10.20) For 11 and (£)9.35 OR 11 and no incorrect working. F.T. if possible

<p style="text-align: center;"><b>JUNE 2012</b> <b>UNIT 2 (Non calculator) Foundation</b></p>	<p style="text-align: center;"><b>Marks</b></p>	<p style="text-align: center;"><b>FINAL MARK SCHEME</b> <b>Comments</b></p>
<p>4. (d) continued</p> <p style="text-align: center;">QWC</p> <p>Look for</p> <ul style="list-style-type: none"> <li>• Spelling</li> <li>• Clarity of text explanations</li> <li>• The use of notation – watch for ‘=’, ‘£’, ‘p’ being used appropriately.</li> </ul> <p>QWC2: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining their processes or steps</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul> <p>QWC1: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining their processes or steps</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul>	<p style="text-align: center;">QWC 2</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.</p> <p>OR</p> <p>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</p>
<p>5. A (4, -3)            (4<sup>th</sup> quadrant) B (-2, 0)            (x – axis, left of O) C (- 3, -2)            (3<sup>rd</sup> quadrant)</p>	<p style="text-align: center;">B1 B1 B1</p>	<p>Reversed coordinates gets B0 each time.</p>
<p>6. Overall strategy including triangle is isosceles Top angle = 40 <math>x = 360 - 90 - 90 - 40</math> <math>= 140</math></p>	<p style="text-align: center;">M1 A1 M1 A1</p>	<p><b><u>Look at diagram also</u></b></p> <p>F.T. ‘their 40’ except 90°.</p>
<p>7. (a) (i) (£) 6m</p>	<p style="text-align: center;">B1</p>	<p>Ignore £s. Allow <math>6 \times m</math> or <math>m \times 6</math> or <math>m6</math></p>
<p>7. (a) (ii) <math>x - 4</math> (kg)</p>	<p style="text-align: center;">B1</p>	<p>Ignore kg. Allow <math>x\text{kg} - 4\text{kg}</math>, and <math>y = x - 4</math></p>
<p>7. (b) <math>-2</math></p>	<p style="text-align: center;">B2</p>	<p>B1 for <math>-14</math> B0 if x and/or y still left in their answer, e.g. <math>-14x + 12y</math></p>
<p>7. (c) <math>5x = 20</math> <math>x = 4</math></p>	<p style="text-align: center;">B1 B1</p>	<p>Isolating the <math>5x</math> F.T. <math>ax = b</math> (<math>a \neq 1</math>) Accept embedded answers, e.g. <math>5 \times 4 - 3 = 17</math></p>
<p>7. (d) <math>(n - 4)/6</math> OR <math>\frac{n-4}{6}</math></p>	<p style="text-align: center;">B2</p>	<p>B1 for <math>n - 4</math> OR B1 for a linear expression in n divided by 6 including <math>n - 4 \div 6</math>, OR <math>n - 4 / 6</math> but not <math>n - 4/6</math> <math>n - 4 = -4n \div 6</math> gets B1 for sight of <math>n - 4</math> <math>-4n \div 6</math> gets B1 for linear expression in n divided by 6 Ignore <math>n=</math> at the start and <math>=n</math> at the end of their work.</p>

<p style="text-align: center;"><b>JUNE 2012</b> <b>UNIT 2 (Non calculator) Foundation</b></p>	<p style="text-align: center;"><b>Marks</b></p>	<p style="text-align: center;"><b>FINAL MARK SCHEME</b> <b>Comments</b></p>																									
<p>8. (a) Completed ball numbers and disc colours</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding-right: 5px;">yellow</td> <td style="border-right: 1px solid black; padding: 0 5px;">1</td> <td style="padding: 0 5px;">3</td> <td style="padding: 0 5px;">5</td> <td style="padding: 0 5px;">7</td> </tr> <tr> <td style="padding-right: 5px;">(green)</td> <td style="border-right: 1px solid black; padding: 0 5px;">1</td> <td style="padding: 0 5px;">3</td> <td style="padding: 0 5px;">5</td> <td style="padding: 0 5px;">7</td> </tr> <tr> <td style="padding-right: 5px;">blue</td> <td style="border-right: 1px solid black; padding: 0 5px;">3</td> <td style="padding: 0 5px;">9</td> <td style="padding: 0 5px;">15</td> <td style="padding: 0 5px;">21</td> </tr> <tr> <td style="padding-right: 5px;">(red)</td> <td style="border-right: 1px solid black; padding: 0 5px;">(3)</td> <td style="padding: 0 5px;">9</td> <td style="padding: 0 5px;">(15)</td> <td style="padding: 0 5px;">21</td> </tr> <tr style="border-top: 1px solid black;"> <td></td> <td style="border-right: 1px solid black; padding: 0 5px;">(1)</td> <td style="padding: 0 5px;">3</td> <td style="padding: 0 5px;">(5)</td> <td style="padding: 0 5px;">7</td> </tr> </table> <p>8. (b) (i) 6/16 I.S.W. OR exact decimals or %s, 37.5% or .375</p>	yellow	1	3	5	7	(green)	1	3	5	7	blue	3	9	15	21	(red)	(3)	9	(15)	21		(1)	3	(5)	7	<p>B1</p> <p>B2</p> <p>B2</p> <p>B1</p>	<p>B1 for 2 or 3 correct columns OR 2 or 3 correct rows.</p> <p>F.T. their table B1 for a numerator of 6 in a fraction less than 1. B1 for a denominator of 16 in a fraction less than 1. Do not penalise incorrect reduction of fractions.</p> <p>NOTES Penalise –1 for use of words such as “6 out of 16”, “6 in 16” OR “6:16”. When fraction and wrong notation seen, DO NOT penalise wrong notation.</p> <p>F.T. 1– ‘their (b)(i)’ if a fraction &lt; 1 OR F.T. their table B0 if the incorrect reduced fraction from (b)(i) is used.</p>
yellow	1	3	5	7																							
(green)	1	3	5	7																							
blue	3	9	15	21																							
(red)	(3)	9	(15)	21																							
	(1)	3	(5)	7																							
<p>8. (b) (ii) 10/16 I.S.W. OR exact decimals or %s, 62.5% or .625</p> <p>9.(a) Attempt to use 8:38 + 6 hours 34 minutes or 13: 38 – 5 + 6 hours 34 minutes 15:12 or 3:12pm</p>	<p>M1</p> <p>A1</p>	<p>Sight of 14 72 or 3 12 implies M1. Accept ‘8.38 + 6.34’</p> <p>Accept 15 12 pm. A0 for 3:12 OR 15:12 am <i>Answers of 3hours 12 mins or 15 hours 12 mins implies M1, A0</i></p>																									
<p>9.(b) Time difference 8 hours (0)1:05 or 1:05 (a.m.) AND Wednesday</p>	<p>B1</p> <p>B2</p>	<p>Implied by an ans. of 25:05, or 00 65 or attempt 17:05 + 8 FT through ‘their time difference’ + 17:05 provided <math>\geq 6</math> and <math>\leq 10</math>, and correctly evaluated Allow 1 05 or 1.05 AND Wednesday B1 for (0)1:05 or 1:05 (a.m.) or 1 05 or 1.05 B1 for Wednesday and time 01:05pm</p>																									
<p>10. (Auto marked) C, B, D</p>	<p>B3</p>	<p>With no other entries With no other entries With no other entries</p>																									
<p>11. Correct reflection in the x-axis (maybe implied by final answer)</p> <p>Correct rotation of their reflection</p>	<p>B2</p> <p>B2</p>	<p>B1 for a reflection in the y-axis or in any line <u>indicated</u></p> <p>FT their reflection provided it is unambiguously identifiable. B1 for anticlockwise rotation through 90° OR rotation of triangle A through 90° clockwise indicated as triangle C Any sight of rotation in all 4 quadrants, then no marks</p>																									

<p style="text-align: center;"><b>JUNE 2012</b> <b>UNIT 2 (Non calculator) Foundation</b></p>	<p style="text-align: center;"><b>Marks</b></p>	<p style="text-align: center;"><b>FINAL MARK SCHEME</b> <b>Comments</b></p>
<p>12. (USBs cost £)6000 (Webcams takings) (£)990 Or sight of 660+330 (may be in different stages of working) (USB profit =) 7590 - 990 - 6000 (=£600)  <p style="text-align: right;">(USB profit is) 10%</p></p>	<p>B1 B2  M1 A1</p>	<p>B1 for sight of 33 or 330 or 660 or <math>22 \times 1.50 \times 30</math> or <math>22 \times 30 + \frac{1}{2}</math> 'their <math>22 \times 30</math>' or equivalent calculation</p> <p>Do not accept 330 or 660 as their 990 FT 7590 - their 990 - their 6000 FT (their USB profit/ their 6000) <math>\times 100</math> <i>Alternative:</i> B2 (Webcams takings <math>30 \times 33 = \text{£}990</math> (or B1 for sight of 33 or 660 or <math>22 \times 1.50 \times 30</math> or equivalent calculation) B1 (USB takings <math>7590 - 990 =</math>) 6600 M1 (Selling price each USB) <math>6600 \div 120 (= \text{£}55)</math> A1 (USB profit) 10%</p> <p><u>Unsupported 10% gets all 5 marks</u></p>

## UNIT 2 (HIGHER TIER)

JUNE 2012 UNIT 2 Unitted Higher Tier		FINAL MARK SCHEME Comments
1.(a) Attempt to use 8:38 + 6 hours 34 minutes or 13: 38 – 5 + 6 hours 34 minutes 15:12 or 3:12pm	M1 A1	Sight of 14 72 or 3 12 implies M1. Accept '8.38 + 6.34' Accept 15 12 pm. A0 for 3:12 or 15 12 am <i>Answers of 3 hours 12 mins or 15 hours 12 mins implies M1, A0</i>
1.(b) Time difference 8 hours (0)1:05 or 1:05 (a.m.) AND Wednesday	B1 B2	Implied by an answer of 25:05, or 00 65 or attempt 17:05 + 8 FT through 'their time difference' + 17:05 provided $\geq 6$ and $\leq 10$ , and correctly evaluated Allow 1 05 or 1.05 AND Wednesday B1 for (0)1:05 or 1:05 (a.m.) or 1 05 or 1.05 B1 for Wednesday and time 01:05pm
2.(a) 26, 29, 34	B2	B1 for any 2 correct terms in the correct position, or 25,26,29 or $1^2+25, 2^2+25, 3^2+25$
2.(b) 63	B2	B1 for evidence of differences 1, 4, 9, 16, or statement '(goes up in) square numbers' Award B0 for $n^2$
3. C B D	B1 B1 B1	With no other entries With no other entries With no other entries
4.(a) $40/4 = 5x$ or $5x = 10$ or $40 = 20x$ or $40 = 4 \times 5x$ or $8=4x$ $x = 2$	M1 A1	Accept embedded answers. Mark final answer
4.(b) $6x - 15 > 21$ or $2x - 5 > 21/3$ $6x > 21 + 15$ or $6x > 36$ or $2x > 7 + 5$ $x > 6$	B1 B1 B1	FT until 2 <sup>nd</sup> error. Use of '=' gets no marks, unless replaced in final answer, then award all 3 marks Mark final answer. Must be a simplified answer  <i>If working shows <math>6x - 15 &gt; 21</math>, then <math>6x &gt; 6</math> and then <math>x &gt; 1</math> award B1, B0, B1 <math>2x - 5 &gt; 21</math> is 2 errors, hence B0</i>
4.(c) $3g^2 = f$ $g^2 = f/3$ $g = (\pm) \sqrt{f/3}$	B1 B1 B1	<u>FT until 2<sup>nd</sup> error, equivalent level of difficulty</u> Accept $3g^2 = f + 0$ Accept inclusion of $\pm 0$ Square root clearly needs to include the /3, and accept inclusion of $\pm 0$ <i>Do not accept 0f instead of 0+f <math>9g^2 = f</math> is 1 error, first B0 then FT</i>
5. Correct reflection in the x-axis (may be implied by final answer) Correct rotation of their reflection	B2 B2	B1 for a reflection in the y-axis or in any line <u>indicated</u>  FT their reflection provided it is unambiguously identifiable B1 for anticlockwise rotation through 90° OR rotation of triangle A through 90° clockwise indicated as triangle C Any sight of rotation in all 4 quadrants, then no marks

JUNE 2012 UNIT 2 Unitised Higher Tier		FINAL MARK SCHEME Comments										
<p>6. (USBs cost £)6000 (Webcams takings) (£)990 Or sight of 660+330 (may be in different stages of working) (USB profit =) 7590 - 990 - 6000 (=£600)</p> <p>(USB profit is) 10%</p> <p>Look for</p> <ul style="list-style-type: none"> <li>• relevance</li> <li>• spelling</li> <li>• clarity of text explanations,</li> <li>• the use of notation (watch for the use of '=', £, % being appropriate)</li> </ul> <p>QWC2: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul> <p>QWC1: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul>	<p>B1 B2 M1 A1</p> <p>Q W C 2</p>	<p>B1 for sight of 33 or 330 or 660 or <math>22 \times 1.50 \times 30</math> or <math>22 \times 30 + \frac{1}{2}</math> 'their <math>22 \times 30</math>' or equivalent calculation Do not accept 330 or 660 as their 990 FT 7590 - their 990 - their 6000 A1 FT (their USB profit/ their 6000) <math>\times 100</math></p> <p><i>Alternative:</i> B2 (Webcams takings <math>30 \times 33 = \text{£}990</math> (or B1 for sight of 33 or 660 or <math>22 \times 1.50 \times 30</math> or equivalent calculation) B1 (USB takings <math>7590 - 990 =</math>) 6600 M1 (Selling price each USB) <math>6600 \div 120 (= \text{£}55)</math> A1 (USB profit) 10%</p> <p><u>Unsupported 10% gets all 5 marks</u></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 and grammar.</p>										
<p>7.(a) 0.3, 0.7 on all 3 sets of branches</p> <p>(b) Sight of <math>0.3 \times 0.7</math> or 0.21 <math>0.3 \times 0.7 + 0.7 \times 0.3</math> <math>= 0.42</math></p>	<p>B2 B1 M1 A1</p>	<p>B1 for any 3 correct entries OR 1 pair correct</p> <p>FT from (a), but probability values used must <math>&gt;0</math> and <math>&lt;1</math> Correct method with addition of the 2 products seen or implied Mark final answer</p>										
<p>8.(a)</p> <table border="1" data-bbox="135 1541 746 1608"> <tr> <td>(14/20)</td> <td>22/40</td> <td>36/60</td> <td>52/80</td> <td>62/100</td> </tr> <tr> <td>0.7</td> <td>0.55</td> <td>0.6</td> <td>0.65</td> <td>0.62</td> </tr> </table> <p>(b) 0.62 or equivalent Reason, e.g. "last value", "most throws"</p> <p>(c) Conclusion, e.g. "settle", "stable", "smooth out", "would get a more accurate answer"</p> <p>(d) <math>1 - 0.62</math> or <math>1 - \frac{62}{100}</math> <math>0.38</math> or <math>\frac{38}{100} (=19/50)</math></p>	(14/20)	22/40	36/60	52/80	62/100	0.7	0.55	0.6	0.65	0.62	<p>B3 B1 E1 E1 M1 A1</p>	<p>B2 for 6, 7 or 8 correct entries, including FT values and calculations, or B1 for 4 or 5 correct entries, including FT values and calculations</p> <p>FT their final column entry in (a) Do not accept 'most accurate'. Mark independently of B1 If no estimate given, but statement that 100 throws as more results then award B0, E1</p> <p>Do not accept implication that it stays at 0.62</p> <p>FT <math>1 - (b)</math>, or <math>1 -</math> 'their final result in the table in (a)' Ignore incorrect cancelling</p>
(14/20)	22/40	36/60	52/80	62/100								
0.7	0.55	0.6	0.65	0.62								

JUNE 2012 UNIT 2 Unitised Higher Tier		FINAL MARK SCHEME Comments												
9. Sight of, or calculations that imply knowledge of facts 10mm = 1cm and 100cm = 1m, or 1000mm = 1m, or equivalent combinations that could lead to a correct conversion $9 \times 10^{-5}$ (m)	B1 B2	B1 for 0.00009 or $0.09 \times 10^{-3}$ or equivalent <i>SCI for their value &gt;0 and &lt;1 correctly expressed in standard form with power of 10 negative. First B1 may also be awarded if appropriate</i>												
10.(a) Any 2 of the lines $x+y=8$ , $5x+y=10$ and $2y-x=4$ drawn correctly Correct region identified  (b) x and y selected <u>within</u> their region	B2 B1 B1	B1 for any 1 line correct  CAO  Not on the lines. FT their identified region. If a closed region is formed but not shaded, accept a point within their closed area within the three lines drawn or by two lines with the inclusion of axes. Not for a non identified open region via extension of the graph paper  If no region selected accept any possible correct points, e.g. (2, 4)												
11.(a) $40^\circ$ Angle at the centre is twice the angle at circumference  (b) $140^\circ$  Circle theorem description e.g. Radius meets tangent at $90^\circ$ , or Alternate segment theorem	B1 E1 B2 E1	Dependent on B1, unless correct workings seen but with 1 error in their calculation FT their $\angle BOC$ , i.e. $(180 - \angle BOC)/2 + 90$ , provided unambiguous B1 for finding $\angle OCB = 50^\circ$ or $\angle BCT = 40^\circ$ may be seen on the diagram. Dependent on B2, unless correct workings seen but with 1 error in their calculation FT from their (a)												
12.(a) Points <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> </tr> <tr> <td><math>y=2^x</math></td> <td>(<math>\frac{1}{4}</math>)</td> <td><math>\frac{1}{2}</math></td> <td>1</td> <td>(2)</td> <td>(4)</td> </tr> </table> Suitable choice of axes through the origin and uniform scales, x from -2 to 2 and y from 0 to 4  Plotting all 5 points correctly and joining with a curve  (b) Reading from their graph for $y=3$  (c) Reading their graph for $x = 0.5$	x	-2	-1	0	1	2	$y=2^x$	( $\frac{1}{4}$ )	$\frac{1}{2}$	1	(2)	(4)	B1 B1 B1 B1 B1	 Axes must be clear, but may not be labelled  (FT their evaluations of y if shown) FT from their points and the three given point  <u>Do not FT scales, where the scale is &lt; 1cm representing 1 unit</u> FT their curve, or their graph provided the points are joined Tolerance for accuracy, within 1 small square Accept an answer of $\sqrt{2}$ FT their curve, or their graph provided the points are joined Tolerance for accuracy, within 1 small square
x	-2	-1	0	1	2									
$y=2^x$	( $\frac{1}{4}$ )	$\frac{1}{2}$	1	(2)	(4)									
13.(a) Correct sketch (shift up) (0, 3) indicated on the correct sketch	B1 B1	Depends on the first B1. Dashes to indicate '3 notches' is insufficient												
13.(b) Correct sketch (shift to left) (-3, 0) indicated on the correct sketch <b>OR</b> (0, 9) indicated on the correct sketch	B1 B1	Depends on the first B1.												

### UNIT 3 (FOUNDATION TIER)

JUNE 2012 UNIT 3 (Calculator allowed) Foundation Tier	Marks	FINAL MARK SCHEME Comments
1. (a) 66.48 (plants) 79.8(0) (roses) 49.92 (compost)  196.2(0)	B1 B1 B1  B1	F.T. their figures for 1 error Unsupported 196.2(0) gets B4.
1. (b) (i) $19 \times 5$ = 95 (reward points)	M1 A1	Any valid method F.T. their total <u>Unsupported 95 gets the M1, A1.</u> SC1 for 85 F.T. their $(6+7+4) \times 5$ <b>OR F.T. 'their tens, 190' from part (a) <math>\div 2</math></b>
1. (b) (ii) (£)3.8(0)	B1	F.T. their total
1. (c) (i) 16800	B1	
1. (c) (ii) 17000	B1	
1. (d) 46	B1	B0 for 46.0 or 46.00
1. (e) $40 + 12$ = 52	M1 A1	Correct substitution
2. (a) 8 6 12 14  2. (b) 4 OR Sky  2. (c) <u>Both axes labelled</u> , e.g. frequency along one axis and BBC1 (1), BBC2 (2), ITV (3), SKY (4) along other axis anywhere within the base (inc.) of the corres. bar. <u>and uniform scale for the frequency axis starting at 0 and labelled 'frequency' OR 'Number'.</u>  Four bars at correct heights (bars must be of equal width)	B2  B1  B2  B2	B1 for any two/three correct frequencies If frequencies score 0, then give B1 for all 4 correct tallies.  F.T. their table of frequencies B0 for 14, but B1 for 4 (or Sky) and 14  B1 if no scale, but allow one square to represent 1 OR B1 if not labelled as 'frequency' or similar. If frequency scale starts with 1 at the top of the first square the starting at 0 will be implied for this axis.  F.T. their table of frequencies B1 for any 2 or 3 correct bars on F.T. Bars must have same width
3. Evidence of square counting 48 – 52 240 – 260	M1 A1 B1	<b><u>Numbers in this range get the M1, A1</u></b> F.T. $5 \times$ 'their area' <b><u>Numbers in this range get the 3 marks</u></b>
4. Reading at the end of the period 24387 Reading at the beginning of the period 23754 Number of units used 633 $633 \times 16 (\div 100)$ 101.28 Charge: 30p per day for 90 days 27.00 Total cost 128.28	B1 M1 A1 B1 B1	C.A.O. F.T. their number of units Must be in £s for the A1 <b><u>OR for 2700 if working in pence</u></b> F.T. their figures.
5. (a) Angle BAC ( $40^\circ$ ) Angle ABC ( $76^\circ$ ) Completed triangle	B1 B1 B1	Allow $\pm 2^\circ$ Allow $\pm 2^\circ$ Only if at least one angle correct. <b><u>Complete reflection of the triangle gets B2</u></b>
5. (b) Two appropriate arcs  Angle of $60^\circ$	M1  A1	Allow construction of $60^\circ$ at the other end of the line for M1 and A1 Allow $\pm 2^\circ$
5. (c) Intersecting arcs of equal radii above and below the given line. Line bisector	M1  A1	



<p style="text-align: center;"><b>JUNE 2012</b> <b>UNIT 3 (Calculator allowed) Foundation Tier</b></p>	<p style="text-align: center;"><b>Marks</b></p>	<p style="text-align: center;"><b>FINAL MARK SCHEME</b> <b>Comments</b></p>
<p>6. (a) 18 25 37 <u>49</u> 53 62 71 49</p>	<p>M1 A1</p>	<p><b><u>For ordering all 7 numbers</u></b></p>
<p>6. (b) Sum of the numbers (315) Sum/7 45</p>	<p>M1 m1 A1</p>	<p>For attempt to add the numbers For a division by 7 of a number in the range 240–390 C.A.O. (25 + 49 + 62 + 18 + 53 + 37 + 71)/7 gets M1,m1</p>
<p>6. (c) 53</p>	<p>B1</p>	
<p>7. (a) 5.47</p>	<p>B2</p>	<p>B1 for 5.46(6844830) All places given must be correct <b><u>rounded or truncated</u></b></p>
<p>7. (b) 18.20</p>	<p>B2</p>	<p>B1 for 18.19(890107) All places given must be correct <b><u>rounded or truncated</u></b> <b><u>B1 for 18.2</u></b></p>
<p>8. (a) 34 (miles)</p>	<p>B1</p>	
<p>8. (b) 50 (miles)</p>	<p>B1</p>	
<p>8. (c) 144 (minutes) OR 2 hours 24 minutes</p>	<p>B1</p>	<p>Accept 2:24 or 2.24</p>
<p>8. (d) Correct line drawn to (118, 17:24)</p>	<p>B1</p>	<p>Allow <math>\pm \frac{1}{2}</math> square, but line must stop at his point.</p>
<p>9. Angles are <math>144^\circ</math>, <math>96^\circ</math>, <math>78^\circ</math> and <math>42^\circ</math> <b><u>A B C D</u></b></p> <p>3 or 4 angles correct and correctly labelled.</p> <p>3 or 4 angles correct, labels not fully correct. 2 angles correct and correctly labelled. 2 angles correct, labels not fully correct. 1 angle correct and correctly labelled.</p> <p>OR</p> <p><u>If 0 OR 1 for their diagram or no diagram.</u> 360/240. Look for the angles <math>144^\circ</math>, <math>96^\circ</math>, <math>78^\circ</math> and <math>42^\circ</math> calculated correctly for this M1, A1.</p>	<p>B4 OR B3 B3 B2 B1</p> <p>M1 A1</p>	<p>Correct labels (Words NOT the frequency OR angle). 3 correct labels is enough.</p> <p>If only B1 is scored for the diagram, and all the angles given correctly, then cancel the B1 and award M1, A1 for 2 marks. If B0 scored for the diagram, check the angles and the method to see if the M1 and the A1 can be awarded. (1 is) <math>1\frac{1}{2}^\circ</math> gets the M1. OR SC1 for all correct percentages: 40, 26.7, 21.7, 11.7</p>
<p>10. Total cost of carrots = <math>\pounds 27.63 - 12.6 \times 1.85</math> = <math>(\pounds) 4.32</math> OR 432(p) Carrots cost per kg = <math>4.32/5.4</math> = 80 (p) OR <math>(\pounds) (0) \cdot 8(0)</math></p> <p>Look for</p> <ul style="list-style-type: none"> <li>• Spelling</li> <li>• Clarity of text explanations</li> <li>• The use of notation – watch for kg, ‘=’, ‘<math>\pounds</math>’, ‘p’ being used appropriately.</li> </ul> <p>QWC2: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining their processes or steps</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul> <p>QWC1: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining their processes or steps</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul>	<p>M1 A1 M1 A1</p> <p>QWC 2</p>	<p><math>(\pounds) 27.63 - (\pounds) 23.31</math></p> <p>F.T. ‘their 4.32’, but not <math>\pounds 27.63</math>. Final answer must be in correct money format</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 and grammar.</p>

<p style="text-align: center;"><b>JUNE 2012</b> <b>UNIT 3 (Calculator allowed) Foundation Tier</b></p>	<p style="text-align: center;"><b>Marks</b></p>	<p style="text-align: center;"><b>FINAL MARK SCHEME</b> <b>Comments</b></p>
<p>11.(a) All points correctly plotted</p> <p>(b)(i) Method of finding the mean for thumb or foot, sum of 6 appropriate measurements and intention to divide their sum by 6 Thumb 59 (mm) Foot 27 (cm)</p> <p>(ii) <u>Appropriate</u> straight line of best fit through Thumb 59 (mm), Foot 27 (cm), with some values above and some values below the line on each side of the mean point</p> <p>(c) Positive</p>	<p>B2</p> <p>M1</p> <p>A1</p> <p>B2</p> <p>B1</p>	<p>Ignore any attempt to draw a line of best fit. B1 for 3, 4 or 5 points correctly plotted, not joined. B1 if all points plotted correctly but joined.</p> <p>(354/6 or 162/6)</p> <p>Does not need to be expressed as coordinates Sight of thumb 59 (mm) or foot 27 (cm) implies M1 Statement that the line passes through mean without any attempt at calculation is M0, A0</p> <p>Need to check passes through (59, 27) even if not calculated. Accept line of best fit that passes through (40,10) FT from (i) for B2 if reasonable; however if their means produce an unreasonable line but it is drawn through the point then award B1 only. B1 straight line through the mean point but not a reasonable line of best fit B1 reasonable straight line of best fit but not through the mean point</p>
<p>11.(d) Explanation, e.g. “otherwise points would be squashed”, “no small values”, “efficient use of the graph paper”, “a clearer display”, ‘no one had thumb and feet measurements below those shown’, “ it would be a waste of graph paper”, “too big a gap between zero and the data range”</p>	<p>E1</p>	<p>Do not accept “no zig-zag (to show a missing part of the axes)”, or “can’t have zero length thumb or foot”, “can’t have zero length of thumb or foot”, without further explanation Do not accept if only referring to the point (0,0)</p>
<p>12. (a) <math>12.6 \times 3.2</math> <math>40(\text{cm}^2)</math> or <math>40.3(\text{cm}^2)</math> or <math>40.32(\text{cm}^2)</math></p>	<p>M1</p> <p>A1</p>	<p>Accept an unsupported correct answer</p>
<p>13. Strategy:            length + width = 10                                  OR <math>2 \times \text{length} + \text{width} = 17</math>                                  OR    length = <math>17 - 10</math></p> <p>Length = 7cm Width = 3 cm Area = <math>4 \times 7 \times 3</math> = 84 <math>\text{cm}^2</math></p>	<p>S1</p> <p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>U1</p>	<p>Strategy for finding the dimensions of a rectangle</p> <p>F.T. ‘their 7’ and ‘their 3’</p>

<p style="text-align: center;"><b>JUNE 2012</b> <b>UNIT 3 (Calculator allowed) Foundation Tier</b></p>	<p style="text-align: center;"><b>Marks</b></p>	<p style="text-align: center;"><b>FINAL MARK SCHEME</b> <b>Comments</b></p>
<p>14. Understanding that 1litre = 10×100 ml or 1litre =1000ml</p> <p>Hint of pink: 800ml white, 200ml red</p> <p>Hint of purple: 4000ml white, 600ml blue, 400ml red</p> <p>Method of costing, e.g. costing correctly expressed for hint of pink or hint of purple, or equivalent or 1 correct product in the sum of 3, or 2 correct products in the sum of 5 combined calculations shown below.</p> <p style="text-align: center;"><math>48 \times 1.2(0) + 6 \times 1.3(0) + 6 \times 1.35</math> (need 1 correct product in a sum of 3, using all correct paint prices)</p> <p>OR</p> <p style="text-align: center;"><math>8 \times 1.2(0) + 2 \times 1.35</math> <math>+ 40 \times 1.2(0) + 6 \times 1.3(0) + 4 \times 1.35</math> (need 2 correct products in a sum of 5, using all correct paint prices)</p> <p><math>48 \times 1.2(0) + 6 \times 1.3(0) + 6 \times 1.35</math>, OR <math>8 \times 1.2(0) + 2 \times 1.35 + 40 \times 1.2(0) + 6 \times 1.3(0) + 4 \times 1.35</math></p> <p style="text-align: center;">(£)73.5(0)</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>A1</p>	<p>May be seen or implied</p> <p>Or sight of 8:2, or sight of 4/5 white with 1/5 red, or white and red quantities in the correct ratio seen but NOT 4 (100ml),1 (100ml)</p> <p>Or sight of 40:6:4, or sight of 20/25 white with, 3/25 blue and 2/25 red or equivalent, or white, blue and red quantities in the correct ratio seen but NOT 20(100ml), 3(100ml), 2(100ml)</p> <p>(Maybe ½ these values, then doubled)</p> <p>N.B. The cost of hint of pink or hint of purple may be found within a combined calculation, this gets M1 (Hint of pink (£)12.3(0), hint of purple (£)61.2(0))</p> <p>(Note: sight of, for example (£)12.30, triggers: B1 (1000ml = 1 litre), B1 Hint of pink ratio, and M1 for stage correct towards an overall calculation)</p> <p>(57.6(0) + 7.8(0) + 8.1(0) ) (9.6(0) + 2.7(0) + 48 + 7.8(0) + 5.4(0))</p> <p>CAO</p> <p><i>SC1 for £36.75, with possible first B1 for unit conversion if seen</i></p> <p><b><u>Treat working with hint of blue with one of the other shades of paint as MR-1 then FT for all marks</u></b> (Cost of 1litre of hint of blue is £12.11, so 5litres is £60.55)</p>

### UNIT 3 (HIGHER TIER)

JUNE 2012 UNIT 3 Higher		FINAL MARK SCHEME Comments
1.(a) $12.6 \times 3.2$ $40(\text{cm}^2)$ or $40.3(\text{cm}^2)$ or $40.32(\text{cm}^2)$	M1 A1	Accept an unsupported correct answer
1.(b) Sight of $360^\circ$ $360 \div 22.5 =$ 16 (sides)	B1 M1 A1	Award all marks for an unsupported answer of 16  <i>Interior angle methods:</i>  <i>M1 Use of 157.5 as an interior angle with,</i> <i>For example <math>157.5 = 180(n - 2)/n</math></i> <i>A1 <math>157.5n = 180n - 360</math> or <math>n = 360/22.5</math></i> <i>A1 16 (sides)</i>  <i>M1 Attempt use a trial &amp; improvement, with 2</i> <i>appropriate trials using, for example:</i> <i>(Number of triangles <math>\times</math> 180) / (number of triangles + 2)</i> <i>A2 16 (sides) or A1 for two correct trials, one leading</i> <i>to <math>\geq 157.5^\circ</math> and one leading to <math>\leq 157.5^\circ</math></i>
2.(a) All points correctly plotted and not joined  (b)(i) Method of finding the mean for thumb or foot, sum of 6 appropriate measurements and intention to divide their sum by 6 (Thumb) 59 (mm) (Foot) 27 (cm)  (ii) <u>Appropriate</u> straight line of best fit through Thumb 59 (mm), Foot 27 (cm), with some values above and some values below the line on each side of the mean point  (c) Positive	B2  M1  A1  B2  B1	Ignore any attempt to draw a straight line of best fit. B1 for 3, 4 or 5 points correctly plotted, not joined. B1 if all points plotted correctly but joined.  (354/6 or 162/6)  Does not need to be expressed as coordinates Sight of thumb 59 (mm) or foot 27 (cm) implies M1 Statement that the line passes through mean without any attempt at calculation is M0, A0  Need to check passes through (59, 27) even if not calculated. Accept line of best fit that passes through (40,10) FT from (i) for B2 if reasonable; however if their means produce an unreasonable line but it is drawn through the mean point then award B1 only. B1 straight line through the mean point but not a reasonable line of best fit B1 reasonable straight line of best fit but not through the mean point
2.(d) Explanation, e.g. “otherwise points would be squashed”, “no small values”, “efficient use of the graph paper”, “a clearer display”, “no one had thumb and feet measurements below those shown”, “it would be a waste of graph paper”, “too big a gap between zero and the data range”	E1	Do not accept “no zig-zag (to show a missing part of the axes)”, “can’t have zero length of thumb or foot”, without further explanation Do not accept if only referring to the point (0,0)
3.(a) A line from (0,0) to ( 1 30 pm, 60) Horizontal line joining the first line, for period 30 minutes From end of horizontal line to (5 p.m., 120)  (b)  120 / 5  24 (mph)	B1 B1 B1  M1 A1	Points need to be joined, not necessarily a straight line FT from their first line FT from the end of their second line. Points need to be joined, not necessarily a straight line  Only FT their travel graph provided at least B1 in (a) Accept 120/4.5 A1 leading to an answer of 26.6(6...) or 26.7 or 27 (mph) <i>SC1 for an answer of 27.9(0...) from a calculation</i> <i>120/4.3</i>

JUNE 2012 UNIT 3 Higher		FINAL MARK SCHEME Comments																																																																				
4(a) $15x(x - 3)$	B2	B1 for $15x(x \dots)$ or $15x(\dots - 3)$ or correct partial factorisation																																																																				
4(b) $\frac{2}{3}x + \frac{1}{3}x = 10 - 6$ OR $2x + 3 \times 6 = 3 \times 10 - x$ $x = 4$	B1 B1	FT until 2 <sup>nd</sup> error Do not accept $12/3$ as a final answer. Final answers must be simplified if possible  $2x + 6 = 10 - 1x$ is 2 errors, hence B0, B0																																																																				
4(c) -64	B1	CAO																																																																				
4(d) E.g. $(2 \times 9 - - 7)/50$  $\frac{25}{50}$ $0.5$	M1 A1 A1	Substitution with at least two steps of calculation '-7' written as '+7' is one step of calculation  Decimal answer required. FT provided M1 awarded <i>If no marks: SC1 for answers 0.22, 0.38 or 18.14 following evidence of substitution</i>																																																																				
5. Lines or unambiguous set of points parallel to all sides of the box, radius width from the box  Intention of all lines in the correct position that <b>stop</b> and intention to meet at right angles at all four corners of the box	B2  B1	Mark the intention, $\pm 2$ mm B1 for one set of points or lines parallel to the box, radius width from the box  If sets of points are shown there needs to be sufficient evidence to show the intention of parallel lines and the 4 right angles  <i>A set of points implies at least 3 points, which may include the one given in the question</i> <i>Ignore extra additional arcs or lines used to develop a method</i>  <i>Ignore any regions shaded</i>																																																																				
6. One correct evaluation, $1 \leq x \leq 2$  2 correct evaluations, $1.85 \leq x \leq 2$ , one either side of 0  2 correct evaluations, $1.85 \leq x \leq 1.95$ , one either side of 0 OR correct evaluation of 1.95 if previous B1 awarded  1.9 <i>No calculations shown: accept "too high", "&gt;", etc.</i>	B1  B1  M1  A1	<table border="0"> <tr> <td><math>x</math></td> <td><math>x^3 - x - 5</math></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>-5</td> <td></td> <td></td> </tr> <tr> <td>1.1</td> <td>-4.769</td> <td></td> <td></td> </tr> <tr> <td>1.2</td> <td>-4.472</td> <td></td> <td></td> </tr> <tr> <td>1.3</td> <td>-4.103</td> <td></td> <td></td> </tr> <tr> <td>1.4</td> <td>-3.656</td> <td></td> <td></td> </tr> <tr> <td>1.5</td> <td>-3.125</td> <td></td> <td></td> </tr> <tr> <td>1.6</td> <td>-2.504</td> <td></td> <td></td> </tr> <tr> <td>1.7</td> <td>-1.787</td> <td></td> <td></td> </tr> <tr> <td>1.8</td> <td>-0.968</td> <td></td> <td></td> </tr> <tr> <td><b>1.9</b></td> <td><b>-0.041</b></td> <td>1.85</td> <td>-0.518375</td> </tr> <tr> <td></td> <td></td> <td>1.91</td> <td>0.057871</td> </tr> <tr> <td></td> <td></td> <td>1.92</td> <td>0.157888</td> </tr> <tr> <td></td> <td></td> <td>1.93</td> <td>0.259057</td> </tr> <tr> <td></td> <td></td> <td>1.94</td> <td>0.361384</td> </tr> <tr> <td></td> <td></td> <td><b>1.95</b></td> <td><b>0.464875</b></td> </tr> <tr> <td></td> <td></td> <td>2</td> <td>1</td> </tr> </table>	$x$	$x^3 - x - 5$			1	-5			1.1	-4.769			1.2	-4.472			1.3	-4.103			1.4	-3.656			1.5	-3.125			1.6	-2.504			1.7	-1.787			1.8	-0.968			<b>1.9</b>	<b>-0.041</b>	1.85	-0.518375			1.91	0.057871			1.92	0.157888			1.93	0.259057			1.94	0.361384			<b>1.95</b>	<b>0.464875</b>			2	1
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JUNE 2012 UNIT 3 Higher		FINAL MARK SCHEME Comments
<p>7. Understanding that 1litre = 10×100 ml or 1litre =1000ml</p> <p>Hint of pink: 800ml white, 200ml red</p> <p>Hint of purple: 4000ml white, 600ml blue, 400ml red</p> <p>Method of costing, e.g. costing correctly expressed for hint of pink or hint of purple, or equivalent or 1 correct product in the sum of 3, or 2 correct products in the sum of 5 combined calculations shown below.</p> <p style="text-align: center;"><math>48 \times 1.2(0) + 6 \times 1.3(0) + 6 \times 1.35</math></p> <p>(need 1 correct product in a sum of 3, using all correct paint prices)</p> <p>OR</p> <p style="text-align: center;"><math>8 \times 1.2(0) + 2 \times 1.35</math></p> <p style="text-align: center;"><math>+ 40 \times 1.2(0) + 6 \times 1.3(0) + 4 \times 1.35</math></p> <p>(need 2 correct products in a sum of 5, using all correct paint prices)</p> <p><math>48 \times 1.2(0) + 6 \times 1.3(0) + 6 \times 1.35</math>, OR  <math>8 \times 1.2(0) + 2 \times 1.35 + 40 \times 1.2(0) + 6 \times 1.3(0) + 4 \times 1.35</math></p> <p style="text-align: center;">(£)73.5(0)</p> <p>QWC2 requires process steps for both colours linked with appropriate text and correct use of units, with the £ symbol given in the final answer.</p> <p>If the candidate has not engaged with the complexity of the question, then maximum QWC1 if process steps for both colours is linked with appropriate text, units are generally used and £ symbol given in the final answer</p> <p>Must be relevant work for the problem, otherwise QWC0</p> <p>Look for</p> <ul style="list-style-type: none"> <li>• relevance</li> <li>• spelling</li> <li>• clarity of text explanations,</li> <li>• the use of notation (watch for the units and ‘0’ for unit pence when using £)</li> </ul> <p>QWC2: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer</li> </ul> <p>QWC1: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer</li> </ul>	<p>B1</p> <p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>A1</p> <p>QWC</p> <p>2</p>	<p>May be seen or implied</p> <p>Or sight of 8:2, or sight of 4/5 white with 1/5 red, or white and red quantities in the correct ratio seen but NOT 4 (100ml), 1 (100ml)</p> <p>Or sight of 40:6:4, or sight of 20/25 white with, 3/25 blue and 2/25 red or equivalent, or white, blue and red quantities in the correct ratio seen but NOT 20(100ml), 3(100ml), 2(100ml)</p> <p>(Maybe ½ these values, then doubled)</p> <p>N.B. The cost of hint of pink or hint of purple may be found within a combined calculation, this gets M1 (Hint of pink (£)12.3(0), hint of purple (£)61.2(0))</p> <p>(Note: sight of, for example (£)12.30, triggers: B1 (1000ml = 1 litre), B1 Hint of pink ratio, and M1 for stage correct towards an overall calculation)</p> <p>(57.6(0) + 7.8(0) + 8.1(0) ) (9.6(0) + 2.7(0) + 48 + 7.8(0) + 5.4(0))</p> <p>CAO</p> <p><i>SC1 for £36.75, with possible first B1 for unit conversion if seen</i></p> <p><b><u>Treat working with hint of blue with one of the other shades of paint as MR-1 then FT for all marks</u></b></p> <p>(Cost of 1litre of hint of blue is £12.11, so 5litres is £60.55)</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.</p> <p>OR</p> <p>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 and grammar.</p>
<p>8.(a) Median 20 Interquartile range: (24 to 24.5) – (15.5 to 16) Answers in the range 8 to 9 inclusive</p>	<p>B1 M1 A1</p>	<p>Intention to subtract must be clear Must FT from their calculation if shown</p> <p><i>Treat working with The Leopards as MR-1 only if consistent for median and inter-quartile range</i>  <i>Leopards: Median 16 to 16.5</i>  <i>IQR (22 to 22.5) - 10.5 = 11.5 to 12</i></p>

JUNE 2012 UNIT 3 Higher		FINAL MARK SCHEME Comments
8.(b) Valid reason e.g., 'median is higher', 'median is slower than The Leopards', 'greater number of players took longer to finish', 'most of the data times for The Tigers is behind The Leopards' The Tigers	M1  A1	Selecting The Leopards is M0, A0  Must be with a valid reason <i>N.B. remember slower times are to the right of the diagram</i>
8.(c) Mid points 5, 15, 25, 35 $5 \times 2 + 15 \times 30 + 25 \times 45 + 35 \times 3$  $\sum fx / 80 (= 1690/80)$ 21(.125)	B1 M1  m1 A1	FT for their mid points from within group (including bounds) FT their $\sum fx / 80$ Accept 21.13 <i>Unsupported 21.12(5) or 21.13 awarded all 4 marks.</i>
9. $4(8x - 5) + 3(4x + 5) = 149$  $44x - 5 = 149$  $x = 154/44 (=3.5)$	M2  A1  A1	For correctly clearing all 3 fractions, OR M1 for clearing 2 fractions FT from M1 (for all further marks), for their equation, for correct expansion of bracket(s) and collection of like terms on LHS Ignore incorrect cancelling
10. Strategy, using Pythagoras' Theorem then trigonometry $8.2^2 = 6.3^2 + AC^2$ $AC = \sqrt{(8.2^2 - 6.3^2)} (= \sqrt{27.55})$ $AC = 5.248 \dots$ $\tan D = AC / 10.6$ Answers in the range $26.1 \dots (^{\circ})$ to $26.35 (^{\circ})$	S1  M1 A1 A1 M1 A1	Needs to involve working towards use of triangle ADC  FT candidates AC Allow rounded or truncated answers in working throughout, but the final answer must be in the given range to award the final A1 <i>Alternative:</i> <i>S1 Complete strategy</i> <i>M1 method for both of the first 2 stages</i> <i>A1 for first stage answer</i> <i>A1 for second stage answer</i> <i>M1 method for the third stage</i> <i>A1 Answers in the range <math>26.1 \dots (^{\circ})</math> to <math>26.35 (^{\circ})</math></i>  <i>For example:</i> <i>S1 Strategy, using trigonometry – cos ratio, cosine rule and sine rule</i> <i>M1 <math>\cos B = 6.3/8.2</math> AND</i> <i><math>AD^2 = 8.2^2 + 16.9^2 - 2 \times 8.2 \times 16.9 \times \cos B</math></i> <i>A1 <math>\text{Angle } B = 39.799 \dots</math> rounded or truncated</i> <i>A1 <math>AD = 11.828 \dots</math> rounded or truncated</i> <i>M1 <math>\sin D/8.2 = \sin B/11.8</math> FT candidates angle B</i> <i>A1 Answers in the range <math>26.1 \dots (^{\circ})</math> to <math>26.35 (^{\circ})</math></i>
11.(a) Volume = $\frac{4}{3} \times \pi \times 8^3$ Answers in the range 2143 to 2146 (cm <sup>3</sup> ) inclusive	M1 A1	

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<p>11.(b) Strategy, attempt to form an equation using the product of at least 3 of the given: <math>\frac{1}{3}</math>, 24, x, <math>(3x + 1)</math>, and showing '=192'</p> $\frac{1}{3}(3x+1) \times x \times 24 (= 192)$ $24x^2 + 8x - 192 = 0 \quad \text{or} \quad 3x^2 + x - 24 = 0$ $(3x \dots 8)(x \dots 3) (= 0)$ $x = 8/3 \quad (\text{and } x=-3)$ <p>Dimension of the base <math>8/3</math> (cm) and 9 (cm)</p>	<p>S1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>B1</p>	<p>Not for an expression</p> <p>Correct expression or equation</p> <p>Collecting terms and equate to zero</p> <p>FT their quadratic equivalent difficulty</p> <p>FT for correct solution of their quadratic</p> <p>FT only if there is a need to discard one negative answer and provided previous M1 awarded</p> <p><i>For formula method, last 3 marks:</i></p> <p><i>Correct substitution in formula with correct evaluation of <math>b^2-4ac</math> M1, then possible A1 &amp; B1 as main method</i></p> <p><i>For a trial &amp; improvement method</i></p> <p><i>S1 As main method</i></p> <p><i>M1 Implied as main method</i></p> <p><i>A1 Implied as main method, but may be trials towards 192</i></p> <p><i>M1 Two correct trials, one either side of 192, or including 192</i></p> <p><i>A1 <math>8/3</math> (cm) or 2.6666....(cm) (Accept 2.67, do not accept 2.6, 2.7 or 3)</i></p> <p><i>B1 Dimension of the base <math>8/3</math> (cm) and 9 (cm) (only FT provided previous M1 awarded)</i></p> <p><b><i>Watch for correct answers from incorrect methods, do not automatically award 6 marks for sight of correct answers</i></b></p>
<p>12. <math>2 \times (125/360) \times \pi \times 3.6</math> = 7.85(398... cm) or 7.9 (cm)</p>	<p>M1</p> <p>A1</p>	
<p>13.(a) Method of finding an area 2 correct areas AND intention to add all areas 200</p>	<p>M1</p> <p>M1</p> <p>A1</p>	<p>Areas are <math>30+70+80+20</math> CAO</p>
<p>13.(b) Identifying the 100, 100 split  40 (seconds)</p>	<p>M1</p> <p>A1</p>	<p>Must be from 200, not FT</p> <p>May be indicated on the histogram.</p> <p>Accept sight of <math>200 \div 2 = 100</math></p> <p>CAO. Check (a), if working is shown it must be from the 100, 100 split, not a 10, 10 split.</p> <p><i>Unsupported 40, is M1, A1</i></p>
<p>14. <math>F = k/d^2</math> or <math>F \propto 1/d^2</math> <math>8 = k/5^2</math> <math>k = 200</math> or <math>F = 200/d^2</math> <math>12.5 = k/d^2</math> <math>d^2 = 16</math> <math>d = 4</math> <b>mm</b></p>	<p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>A1</p>	<p>FT only non linear</p> <p>FT their k, and their non linear if possible</p> <p>CAO with unit mm</p>
<p>15. Finding <math>y=8</math> when <math>x=1</math> and <math>y=5</math> when <math>x=2</math> Split into 3 areas and attempt to sum, or 1 slip in stating <b>OR</b> substitution into trapezium rule  Correct substitution into trapezium rule  17.5</p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>FT their values for y at <math>x=0, 1, 2</math> &amp; 3. Must be clearly working with area, may be incorrect formula for trapezium (<math>8.5+6.5+2.5</math>)</p> <p>Or equivalent. FT their values for y at <math>x=1</math> &amp; 2, OR 2 areas correct in sum of 3</p> <p>CAO</p>



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16. Strategy: use of similar triangles with sine rule or parallel lines with sine rule Use of scale factor 1.5 or 2/3 as appropriate, or angles in ABC correctly as (60,) 80 and 40 $DE/\sin 60 = 9/\sin 40$ or $AB/\sin 60 = 6/\sin 40$ $DE = 9 \times \sin 60/\sin 40$ or $AB = 6 \times \sin 60/\sin 40$ $AB = 8(.084 \text{ cm})$ or $8.1(\text{cm})$	S1  M1  M1 m1 A1	$(DE = 12(.126 \text{ cm}))$ CAO <i>Alternative:</i> <i>S1 Strategy: sine rule, similar triangles and cosine rule</i> <i>OR parallel lines, sine rule and cosine rule</i> <i>M1</i> $CD/\sin 80 = 9/\sin 40$ or $CD = \sin 80 \times 9/\sin 40$ <i>OR</i> $AC/\sin 80 = 6/\sin 40$ or $AC = \sin 80 \times 6/\sin 40$ <i>M1</i> $AC = \frac{2}{3}CD$ or $AC = 9.19$ ( $CD = 13.79$ ) <i>m1</i> $AB^2 = 6^2 + AC^2 - 2 \times 6 \times AC \times \cos 60$ (FT their AC but not their CD used) <i>A1</i> $AB = 8(.084 \text{ cm})$ or $8.1(\text{cm})$ CAO  Unsupported 8(cm) gets no marks



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