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# **GCSE MARKING SCHEME**

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**AUTUMN 2023**

**GCSE  
MATHEMATICS – NUMERACY  
UNIT 2 – HIGHER TIER  
3310U60-1**

## INTRODUCTION

This marking scheme was used by WJEC for the 2023 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.

## WJEC GCSE MATHEMATICS – NUMERACY

## AUTUMN 2023 MARKING SCHEME

GCSE Numeracy Unit 2: Higher Tier	Mark	Comments
<p>1. (Number of revolutions is) <math>\frac{1000}{\pi \times 29 \div 12}</math>  or <math>\frac{1000 \times 12}{\pi \times 29}</math>  or equivalent</p> <p>Answer in the inclusive range 131 to 132 (revolutions)</p>	<p>M3</p> <p>A1</p>	<p>Complete method May be seen in stages</p> <p>M2 for any one of the following, or equivalents:</p> <ul style="list-style-type: none"> <li>• <math>\pi \times 29 \div 12</math></li> <li>• <math>\frac{1000}{\pi \times 29}</math></li> <li>• <math>\frac{\pi \times 29}{1000 \times 12}</math></li> <li>• <math>\frac{1000}{\pi \times (29 \div 2) \div 12}</math></li> <li>• <math>\frac{1000}{\pi \times (2 \times 29) \div 12}</math></li> </ul> <p>M1 for any one of the following, that may be embedded in other working:</p> <ul style="list-style-type: none"> <li>• <math>29 \div 12</math> (= 2.4(1666...))</li> <li>• <math>1000 \times 12</math> (= 12000)</li> <li>• <math>\pi \times 29</math> (= 91.06 to 91.118)</li> <li>• <math>\frac{1000}{\pi \times n \div 12}</math> where <math>n \neq 0</math>, e.g. <math>1000 \times 12 \div (\pi \times 29^2)</math></li> <li>• <math>\frac{1000}{29 \div 12}</math> (= 413.79...)</li> <li>• <math>1000 \times 12 \div 29</math> (= 413.79...)</li> </ul> <p>CAO</p>

<p>2(a)(i) Unambiguously indicates or states 'Yes' with a reason, e.g.          'both 25 kg to 35 kg',          'the highest frequencies at the same mass'</p>	E1	<p><i>Ignore any additional spurious or contradictory statements provided 'Yes' selected</i></p> <p>Allow 'Yes' with a reason, e.g.          'both at 30 kg',          'both at the same mass',          'both have the same mass',          'tallest (highest frequency) is 30 kg for both polygons'</p> <p>Do not accept 'Yes' with a reason, e.g.          'don't know',          'both in the same place',          'the groups have the same width',          'the graph tells us this'</p>
<p>2(a)(ii) Unambiguously indicates or states 'Can't tell' with a reason, e.g.          'there were 30 dogs with a masses between 15 kg and 25 kg',          'no raw data is given',          'the actual mass of each dog is not given',          'the data is grouped'</p>	E1	<p><i>Ignore any additional spurious or contradictory statements provided 'Can't tell' selected</i></p> <p>Allow 'Can't tell' with a reason, e.g.          'doesn't show this',          'you can't tell the exact number of dogs',          'doesn't give the amount of dogs'</p> <p>Do not accept 'Can't tell' with a reason, e.g.          'don't know',          'it is an estimate',          'it isn't accurate',          'because they can be anywhere from 10 kg to 20 kg'</p>
<p>2(a)(iii) Unambiguously indicates or states 'Correct' with a reason, e.g.          'Pencwm polygon shows a greater drop for greater masses',          'fewer dogs but more large dogs in Glanafon',          'more dogs in Pencwm, but fewer large dogs',          'about the same number of large dogs, with fewer dogs in Glanafon',          'about the same number of large dogs, with more dogs in Pencwm',</p>	E1	<p><i>Ignore any additional spurious or contradictory statements provided 'Correct' selected</i></p> <p><b>Do not</b> allow a reason based on calculations of proportions <b>alone</b>, e.g. Pencwm 27.5%, Glanafon 41.6%</p> <p>Allow 'Correct' with a reason, e.g.          'Pencwm (polygon) shows a steeper drop from 30 kg',          'line for Pencwm is steeper (drop)',          'Glanafon (polygon) has a less steep drop for larger dogs',          'the greater masses are more frequent (in Glanafon)',          '2 of the 3 points for Glanafon are above Pencwm',          'Pencwm line drops below Glanafon after 40 (kg)',</p> <p>Do not accept 'Correct' with a reason, e.g.          '36 dogs in Pencwm and 37 dogs in Glanafon' alone without considering proportion,          'the greatest is 45 kg',          'higher frequency in Glanafon',          'Pencwm is bigger but doesn't have higher proportion',          'as seen by the skew in (the) Glanafon (polygon)',          'seen by the shape (of the polygon) for Glanafon'</p>

<p>2(b) (Total number of dogs  <math>20 + 30 + 45 + 25 + 7 + 4 =</math> 131</p> <p><math>10 \times 20 + 20 \times 30 + 30 \times 45 + 40 \times 25 + 50 \times 7 + 60 \times 4</math>  <math>(= 200 + 600 + 1350 + 1000 + 350 + 240)</math>  <math>(= 3740)</math></p> <p><math>\div 131</math></p> <p>(28.5(496.... kg) so) 3.95 (kg) (less)</p>	<p>B1</p> <p>M1</p> <p>m1</p> <p>A2</p>	<p>May be implied by the sight of  <math>((20 + 30 + 45 + 25 + 7 + 4) \div 6 =) 21.8(33....)</math></p> <p>Ignore any additional products seen  FT 'their midpoints' provided at least 5 are within or at the bounds of the relevant groups  e.g. use of</p> <ul style="list-style-type: none"> <li>lower bounds of each group gives 3085</li> <li>upper bounds of each group gives 4395</li> </ul> <p>FT an error in summing 20, 30, 45, 25, 7 and 4</p> <p>CAO  ISW further rounding or truncation  Allow 4 (kg) from correct working  Accept (29 (kg) and) 3.5 (kg) from correct working</p> <p>Award A1 for any of the following as the final answer</p> <ul style="list-style-type: none"> <li>28.5(496.... kg)</li> <li>29 (kg) (from correct working)</li> </ul> <p>OR</p> <p>Award A1 on FT from M1 m1 previously awarded for a correct evaluation of 'their estimate mean' e.g. use of lower bounds gives <math>(3085/131 =) 23.54...</math></p>
<p><u>2(b) Alternative MS if Glanafon's last 2 points used for possible award of B1 M1 m1 only</u></p> <p>(Sight of <math>20 + 30 + 45 + 25 + 10 + 7 =</math> 137</p> <p><math>10 \times 20 + 20 \times 30 + 30 \times 45 + 40 \times 25 + 50 \times 10 + 60 \times 7</math>  <math>(= 200 + 600 + 1350 + 1000 + 500 + 420)</math>  <math>(= 4070)</math></p> <p><math>\div 137</math></p>	<p>B1</p> <p>M1</p> <p>m1</p>	<p>May be implied by the sight of  <math>((20 + 30 + 45 + 25 + 10 + 7) \div 6 =) 22.8(33....)</math></p> <p>Ignore any additional products seen  FT 'their midpoints' provided at least 5 are within or at the bounds of the relevant groups  e.g. use of</p> <ul style="list-style-type: none"> <li>lower bounds of each group gives 3385</li> <li>upper bounds of each group gives 4755</li> </ul> <p>FT an error in summing 20, 30, 45, 25, 10 and 7</p>

<p>3(a) (Difference 60 million – 41 000 000 =) 19 000 000 or 19 million</p> <p>(Underspend) <math>\frac{19\,000\,000}{60\,000\,000} (\times 100)</math> or equivalent</p> <p>31.67(%)</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>May be implied in further working Allow 19 m(il)</p> <p>FT 'their 60 million – 41 000 000' including if a place value error made</p> <p>CAO (must be 2 d.p.)</p> <p>Answer space takes precedence</p>
<p>3(a) <u>Alternative method</u> (Underspend)</p> <p>(100 -) <math>\frac{41\,000\,000}{60\,000\,000} (\times 100)</math> or equivalent</p> <p>31.67(%)</p>	<p>M1</p> <p>A2</p>	<p>Allow place value error</p> <p>CAO (must be 2 d.p.)</p> <p>Answer space takes precedence</p> <p>A1 for 31.6(6...%), 31.7(%), 32(%) or 68.33(%)</p>
<p>3(b) <math>4 \times 10^6</math></p>	<p>B1</p>	

<p>3(c) (Change to \$) <math>350 \times 1.25</math> <math>(\\$437.5(0))</math></p> <p>(Only \$10 and \$50 notes available so he can buy) <math>(\\$430)</math></p> <p>(Fewest number of notes making up \$430) <b>8</b> \$50 (notes) and <b>3</b> \$10 (notes)</p> <p>(Cost in £ to buy \$430 is) <math>430 \div 1.25</math> or <math>350 - 7.5(0) \div 1.25 (= 350 - 6)</math> <math>(£)344</math></p>	<p>M1 A1</p> <p>A1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p><i>Do not penalise slips in giving incorrect use of £ for \$</i></p> <p>FT 'their <math>(\\$437.5(0))</math>' (provided not a multiple of 10) rounded down to nearest multiple of 10 Accept stated or implied as <math>(\\$)7.50</math> can't be converted <math>(\\$430)</math> implies previous M1 A1, provided not from incorrect working</p> <p>FT 'their \$430' provided it is a multiple of 10 (and provided M1 previously awarded) Must be fewest number of notes, that may be listed Sight of correct number of notes with no incorrect working implies previous A1, unless contradicted</p> <p>FT 'their whole number multiple of \$10' <math>\div 1.25</math> Ignore attempt at any further calculation if <math>430 \div 1.25</math> seen</p> <p>Must be <math>&lt; (£)350</math> <b>and</b> depends on M1 M1 previously awarded Mark final answer</p> <p>If final M0 A0, then award SC1 for (£) 6 (left) or similar on FT, provided not from incorrect or inappropriate working</p>
<p>3(c) <u>Alternative method</u> <math>£40 = \\$50</math> and <math>£8 = \\$10</math> <math>8 \\$50</math> notes, <math>3 \\$10</math> notes</p> <p>(Cost to buy £350 is) <math>8 \times 40 + 3 \times 8</math> <math>(£)344</math></p>	<p>M1 A3</p> <p>M1 A1</p>	<p>A2 for 8 \$50 notes <b>and</b> sight of <math>350 - 8 \times 40</math> or equivalent OR A1 for 8 \$50 notes</p>
<p>Organisation and communication</p> <p>Writing</p>	<p>OC1</p> <p>W1</p>	<p>For OC1, candidates will be expected to:</p> <ul style="list-style-type: none"> <li>• present their response in a structured way</li> <li>• explain to the reader what they are doing at each step of their response</li> <li>• lay out their explanations and working in a way that is clear and logical</li> <li>• write a conclusion that draws together their results and explains what their answer means</li> </ul> <p>For W1, candidates will be expected to:</p> <ul style="list-style-type: none"> <li>• show all their working</li> <li>• make few, if any, errors in spelling, punctuation and grammar</li> <li>• use correct mathematical form in their working</li> <li>• use appropriate terminology, units, etc.</li> </ul>

4(a)(i) $440 \times 48 \div 2.2$  9600 (kg)	M1 A1	May be seen in stages  Mark final answer Allow answers in the inclusive range 9588 to 9601 from premature approximation Answer space takes precedence
4(a)(ii) 230 000 000 000	B1	
4(b)  (Area) $2.47 \times 40000 \div 10000$ or equivalent 9.88 (acres)  (Density of trees) $615 \div 9.88$ 62(.2...trees per acre) (>60)	M1 A1  m1 A1	<b><u>Throughout, if 4 marks are awarded, penalise -1 if conclusion 'Yes' is not indicated</u></b> <b><u>On FT the conclusion may be different to 'Yes'</u></b>  May be implied in further working Allow 9.8 (acres), 9.9 (acres) or 10 (acres)  Depends on M1 m1 previously awarded
4(b) <u>Alternative method 1</u> (Area) $2.47 \times 40000 \div 10000$ or equivalent 9.88 (acres)  (Maximum number of trees) $9.88 \times 60$ 592(.8) (trees) or 593 (trees) (< 615)	M1 A1  m1 A1	May be implied in further working Allow 9.8 (acres), 9.9 (acres) or 10 (acres)  Depends on M1 m1 previously awarded Allow suitable rounding, e.g. 590 or 600
4(b) <u>Alternative method 2</u> (Area) $2.47 \times 40000 \div 10000$ or equivalent 9.88 (acres)  (Minimum area) $615 \div 60$ 10.25 (acres) (> 9.88)	M1 A1  M1 A1	May be implied in further working Allow 9.8 (acres), 9.9 (acres) or 10 (acres)  Do not allow embedded in further working Allow rounded to 10 (acres) provided 'their area' (9.88m <sup>2</sup> ) has not been rounded to 10
4(b) <u>Alternative method 3</u> (Minimum area) $615 \div 60$ 10.25 (acres)  (Convert to m <sup>2</sup> ) $10000 \times 10.25 \div 2.47$ 41 497(.97 m <sup>2</sup> ) or 41 498(m <sup>2</sup> ) (>40 000)	M1 A1  m1 A1	May be implied in further working Allow 10 (acres)  Depends on M1 m1 previously awarded Accept suitable rounding, e.g. 41 000 or 41 500
4(b) <u>Alternative method 4</u> (Trees in 2.47 acres) $615 \div (40000 \div 10000)$ or equivalent 153.75 (trees)  (Density of trees) $153.75 \div 2.47$ 62(.2...trees per acre) (> 60)	M1 A1  m1 A1	May be implied in further working Allow 153, 153.8 or 154 (trees)  Depends on M1 m1 previously awarded
4(b) <u>Alternative method 5</u> (Forest area per tree) $40000 \div 615$ 65(.0406.. m <sup>2</sup> )  (Fire risk, area per tree) $10000 \div (60 \times 2.47)$ 67(.476...m <sup>2</sup> ) (> 65)	M1 A1  M1 A1	Do not allow embedded in further working





<p>6(a) <math>150 \div (22+3) \times 22</math> OR <math>150 \div (22+3) \times 3</math>          (Volume of copper =) 132 (cm<sup>3</sup>) AND          (Volume of tin =) 18 (cm<sup>3</sup>)</p> <p>(Mass of statue =) <math>132 \times 8.96 + 18 \times 7.31</math>          (1182.72 + 131.58)</p> <p>(Mass of statue =) 1314(.3) (g)</p>	<p>M1 A1</p> <p>m1</p> <p>A1</p>	<p>May be implied in further working</p> <p>Allow m1, but A0, for use of rounded or truncated values of 8.96 and 7.31          FT 'their 132' and 'their 18'</p> <p>ISW          FT provided one of their volumes is correct.          Accept 1.3(143) kg from sight of 1314(.3) (g) or 1.314(3) (kg)</p>
<p>6(a) <u>Alternative method calculating mass directly:</u>          (Mass of statue =)  <math>150 \div (22+3) \times 22 \times 8.96 + 150 \div (22+3) \times 3 \times 7.31</math></p> <p>(Mass of statue =) 1314(.3) (g)</p>	<p>M2</p> <p>A2</p>	<p>Allow M2, and possible A1 only, for use of rounded or truncated values of 8.96 and 7.31</p> <p>M1 for <math>150 \div (22+3) \times 22 \times 8.96 (=1182.72)</math> OR <math>150 \div (22+3) \times 3 \times 7.31 (=131.58)</math></p> <p>ISW          Accept 1.3(143) kg from sight of 1314(.3) (g) or 1.314(3) (kg)          Award A1 for</p> <ul style="list-style-type: none"> <li>• 1182.7(2) or 1183 OR</li> <li>• 131.5(8) or 131.6 or 132</li> </ul>
<p>6(b) (Volume factor =) <math>\left(\frac{21.6}{12}\right)^3</math> OR <math>\left(\frac{12}{21.6}\right)^3</math> or  <math>1.8^3</math> OR <math>0.555...^3</math>          (=5.832) (=0.171...)</p> <p>(Volume of bigger statue =)  <math>150 \times \left(\frac{21.6}{12}\right)^3</math> OR <math>150 \div \left(\frac{12}{21.6}\right)^3</math>          = 874(.8) or 875 (cm<sup>3</sup>)</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>or <math>\left(\frac{9}{5}\right)^3</math> OR <math>\left(\frac{5}{9}\right)^3</math></p> <p>Implies the previous B1</p>

<p>7(a) (Monthly payments =)</p> $\frac{\frac{0.033}{12} \times 18000}{1 - \left(1 + \frac{0.033}{12}\right)^{-4 \times 12}} \quad \text{OR} \quad \frac{0.00275 \times 18000}{1 - (1 + 0.00275)^{-48}}$ <p style="text-align: center;">or equivalent</p> <p style="text-align: center;">= (£)400.81</p>	<p>M2</p> <p>A1</p>	<p><u>The correct answer alone, without any workings is awarded M0A0, since it is given in the question</u></p> <p>M1 for an expression with only 1 (possibly repeated) incorrect substitution, but do not allow use of <math>r = 3.3</math></p> <p>Accept (£)400.80(89843...) Convincing working must be seen</p>
<p>7(b) (Saving =)</p> $\begin{array}{l} 362.05 \times 5 \times 12 - 400.81 \times 4 \times 12 \quad (-2000) \\ \text{or} \quad 362.05 \times 60 - 400.81 \times 48 \quad (-2000) \end{array}$ <p style="text-align: center;">= (£)484.12</p>	<p>M1</p> <p>A2</p>	<p>Use of accurate values of (£)362.05 and/or (£)400.81 can be accepted</p> <p>FT if more accurate values used e.g.</p> <ul style="list-style-type: none"> <li>(£)484.17 or (£)484.16(8755) from use of accurate Option B monthly payment</li> <li>(£)483.95 or (£)484.94(84006) from use of both accurate monthly payments</li> </ul> <p>A1 for sight of any one of the following:</p> <ul style="list-style-type: none"> <li>an answer of (£)484 to (£)485 as a result of premature rounding</li> <li>(£) 2484.12</li> <li>(£)2484.17 or (£)2484.16(8755) from use of accurate Option B monthly payment</li> <li>(£)2483.95 or (£)2484.94(84006) from use of both accurate monthly payments</li> </ul>
<p>8(a) <math>\frac{360 - 15}{360} \times \pi \times 60 \quad (+60)</math></p> <p style="text-align: center;">= 241 (mm)</p>	<p>M1</p> <p>A2</p>	<p>A1 for any one of the following:</p> <ul style="list-style-type: none"> <li>answer of 240.5(5) to 240.7</li> <li>answer of <math>\frac{115\pi}{2} + 60</math> or <math>57.5\pi + 60</math></li> <li>sight of (180.5(5) to 180.7) + 'their 60' correctly rounded to the nearest mm</li> <li>sight of 181</li> </ul>

<p><b>8(b)</b></p> <p>(Greatest possible area of a part = )</p> $\pi \times 80.5 \times 30.25 + \frac{4 \times \pi \times 30.25^2}{2}$ <p>(7646.2 to 7651.2)    (5746.59 to 5750.3)</p>          <p>= 13392.79 to 13401.5 or 4265.25π (mm²)</p> <p>(Minimum number of tins needed =)</p> $20\,000 \times 13399.678.. \div 3\,950\,000$          <p>= 68 (tins)</p>		<p>An answer of 68 tins does not imply full marks should be awarded, as it can be a result of inaccuracy in workings</p> <div>M3</div> <div>M2 for</div> <ul style="list-style-type: none"> <li>• π×80.5×30.25 + 4×π×30.25²</li> </ul> <div>OR</div> <ul style="list-style-type: none"> <li>• π×‘their 80.5’×‘their 30.25’ + <math>\frac{4 \times \pi \times (\text{their } 30.25)^2}{2}</math></li> </ul> <p style="margin-left: 40px;">where 80 &lt; ‘their 80.5’ ≤ 81 and                30 &lt; ‘their 30.25’ ≤ 30.5 and where ‘their 30.25’ could have different values in the two terms, but both have to be in the range shown</p> <div>M1 for</div> <ul style="list-style-type: none"> <li>• the sum of 2 terms with 1 correct and with bounds in the same ranges as for M2</li> </ul> <div>OR</div> <ul style="list-style-type: none"> <li>• π×80×30 + <math>\frac{4 \times \pi \times 30^2}{2}</math> (= 4200π)</li> </ul> <div>A1</div> <p>CAO. May be implied by sight of 267 857 600 to 268 028 400 (total surface area of 20 000 parts)</p> <div>M1</div> <p>FT ‘their 13399.678...’ provided it has come from the use of ‘their upper bounds’ of 80mm and 60mm if bounds used Allow M1 only for 20 000 × 13399.678.. ÷ ‘their 3 950 000’ where 3 900 000 ≤ ‘their 3 950 000’ &lt; 4 000 000</p> <div>A1</div> <p>A0 for 67.8...tins</p> <p>If no marks awarded, and from a misinterpretation of the question, SC3 for an <b>answer of 65</b> tins from <math>20\,000 \times (\pi \times 79.5 \times 29.75 + \frac{4 \times \pi \times 29.75^2}{2}) \div 4\,050\,000</math></p> <p>OR</p> <p>SC2 for an <b>answer of 64(.1...)</b> tins from <math>20\,000 \times (\pi \times 79.5 \times .29.75 + \frac{4 \times \pi \times 29.75^2}{2}) \div 4\,050\,000</math></p> <p>OR</p> <p>SC1 for a correct evaluation (rounded, truncated or unrounded) of the calculation <math>20\,000 \times (\pi \times 79.5 \times 29.75 + \frac{4 \times \pi \times 29.75^2}{2}) \div 4\,050\,000</math></p> <p style="margin-left: 40px;">where 79 ≤ ‘their 79.5’ &lt; 80 and                29.5 ≤ ‘their 29.75’ &lt; 30 and 4 000 000 &lt; ‘their 4 050 000’ ≤ 4 100 000</p> <p>OR</p> <p>If no marks awarded, SC1 for use of 80.5 and 30.25</p>
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9(a) $160 + 20 + 73$ or $180 + 73$ or $180 - 73 = 107$ AND $360 - 107$	B1	Allow $160 + 93$
9(b) (Distance Swansea to Port Talbot =) $\frac{\sqrt{11^2 + 7.5^2 - 2 \times 11 \times 7.5 \times \cos 93^\circ}}{(\sqrt{185.885 \dots})}$ $= 13.6(339\dots) \text{ (km)}$ $(N\hat{S}P =) \sin^{-1} \left( \frac{\sin 93^\circ}{13.6(339\dots)} \times 7.5 \right)$ OR $(N\hat{S}P =) \cos^{-1} \left( \frac{11^2 + 13.6(339\dots)^2 - 7.5^2}{2 \times 11 \times 13.6(339\dots)} \right)$ OR  $(N\hat{P}S =) \sin^{-1} \left( \frac{\sin 93^\circ}{13.6(339\dots)} \times 11 \right)$ OR $(N\hat{P}S =) \cos^{-1} \left( \frac{7.5^2 + 13.6(339\dots)^2 - 11^2}{2 \times 7.5 \times 13.6(339\dots)} \right)$  $(N\hat{S}P =) 33.4(321\dots)^\circ$ OR $(N\hat{P}S =) 53.6(781\dots)$ or $53.7$ or $54^\circ$  (Bearing =) $286^\circ$	M2  A1  M2          A1  A1	FT 'their $93^\circ$ ' M1 for $11^2 + 7.5^2 - 2 \times 11 \times 7.5 \times \cos 93^\circ$  CAO. Mark final answer  FT 'their derived $13.6(339\dots)$ ' and 'their $93^\circ$ ' M1 for $\frac{\sin \text{angle}}{7.5} = \frac{\sin 93^\circ}{13.6(339\dots)}$ or equivalent OR M1 for $7.5^2 = 11^2 + 13.6(339\dots)^2 - 2 \times 11 \times 13.6(339\dots) \times \cos N\hat{S}P$ or equivalent OR M1 for $\frac{\sin \text{angle}}{11} = \frac{\sin 93^\circ}{13.6(339\dots)}$ or equivalent OR M1 for $11^2 = 7.5^2 + 13.6(339\dots)^2 - 2 \times 7.5 \times 13.6(339\dots) \times \cos N\hat{P}S$ or equivalent  e.g. FT use of $13.6$ leads to $(N\hat{S}P =) 33.4(160\dots)^\circ$ with $(N\hat{P}S =) 53.8(732\dots)^\circ$  Accept $286(.32\dots)^\circ$ FT from second M2 only FT $180 + 73 +$ 'their $N\hat{S}P$ ' OR FT $360 - 20 -$ 'their $N\hat{P}S$ '
10. $10.97^2 + (7.32 \div 2)^2$ OR $(7.32 \div 2)^2 + 2.44^2$ OR $2.44^2 + 10.97^2$ or $\sqrt{10.97^2 + (7.32 \div 2)^2}$ OR $\sqrt{(7.32 \div 2)^2 + 2.44^2}$ OR $\sqrt{2.44^2 + 10.97^2}$  (Distance from penalty spot to A =) $\sqrt{10.97^2 + (7.32 \div 2)^2 + 2.44^2}$  (Distance from penalty spot to A =) $11.82 \text{ (m)}$ or an answer in the range $11.814$ to $11.821 \text{ (m)}$	M1       M2    A1	May be embedded within incorrect work and possibly in stages      May be seen in stages Implies previous M1 M1 for $10.97^2 + (7.32 \div 2)^2 + 2.44^2$  Allow $11.8$ or $11.81 \text{ (m)}$ Needs to come from use of $\sqrt{139.5872}$ to $\sqrt{139.7332}$ if method done in stages with premature rounding