



GCSE MARKING SCHEME

AUTUMN 2019

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

INTRODUCTION

This marking scheme was used by WJEC for the 2019 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 2019 MARK SCHEME

GCSE Mathematics – Numeracy Unit 2: Higher Tier	Mark	Comments
<p>1. (Change to £) 550×0.53 $(\pounds)291.5(0)$ (Only £10 and £20 notes available so he can buy) $(\pounds)290$</p> <p>(Fewest number of notes making up £290.) 14 £20 (notes) and 1 £10 (notes)</p> <p>(Cost in \$ to buy £290 is) $290 \div 0.53$ or $550 - 1.5(0) \div 0.53 (= 550 - 2.83\dots)$ $(\\$)547.17$</p>	<p>M1 A1 A1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>FT 'their $(\pounds)291.5(0)$' (provided not a multiple of 10) rounded down to nearest multiple of 10 Accept stated or implied as $(\pounds)1.50$ can't be converted Sight of $(\pounds)290$ with no incorrect working implies previous A1</p> <p>FT 'their £290' provided it is a multiple of 10 Must be fewest number of notes Sight of correct notes with no incorrect working implies previous A1</p> <p>FT 'their whole number multiple of £10' $\div 0.53$ Ignore attempt at any further calculation if $290 \div 0.53$ seen</p> <p>Must be $<(\\$)550$ and depends on M1 M1 previously awarded Must be to the nearest cent Mark final answer</p> <p>If final M0 A0, then award SC1 for $(\\$)2.83$ (left) or similar FT</p>

<p>2(a)</p>  <p>in any orientation</p>	B1	<p>Allow:</p> <ul style="list-style-type: none"> intention of straight lines and right angles two equal rectangles joined <p>Do not accept if end elevation also drawn, unless plan view is labelled</p>
<p>2(b)(i) (Concrete costs) $66 \times 39(p)$ or equivalent</p> <p>(Builder charges) $27 + \frac{1}{3} \times 27$ or equivalent</p> <p>(Total cost of making the step) (£) 61.74</p>	<p>M1</p> <p>M1</p> <p>A1</p>	<p>(=£25.74) Allow M1 for sight of a multiplication involving the digits 66... with 39(p) or equivalent</p> <p>(= £36) Allow methods breaking down the hour to find the cost for 20 minutes provided sufficient evidence seen Do not allow:</p> <ul style="list-style-type: none"> $27 + 0.3 \times 27 = 27 + 8.10 = £35.10$ $27 + \frac{1}{3} \times 27 = 27 + 8.10 = £35.10$ <p>Allow $27 + 0.33 \times 27 = £35.91$ or better</p> <p>CAO</p>
<p>2(b)(ii)</p> <p>(Area cross-section) as sum of two products: $50 \times (20+25) - 24 \times 25$ (= 2250 – 600) or $(20+25) \times (50-24) + 20 \times 24$ (= 1170 + 480) or $50 \times 20 + 25 \times (50-24)$ (= 1000 + 650) OR (Area cross-section) as sum of three products: $24 \times 20 + 26 \times 20 + 26 \times 25$ (= 480 + 520 + 650)</p> <p>(Area cross-section) 1650 (cm²)</p> <p>(Length = Volume ÷ area cross-section) $66\ 000 \div 1650$</p> <p>40 (cm)</p>	<p>M2</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Check diagram for working Accept a similar method given by an equation or expressions</p> <p>M1 for sight of either:</p> <ul style="list-style-type: none"> difference or sum of 2 products, with 1 correct sum of 3 products with 2 correct all products correct but no attempt to sum <p>CAO</p> <p>FT $66000 \div$ 'their 1650' provided 'their 1650' is dimensionally correct</p> <p>ISW FT $66000 \div$ 'their 1650' only allowing rounding or truncation of decimals</p>

3(a)(i) 11 to 15	B1	
<p>3(a)(ii) Midpoints 3, 8, 13, 18</p> $3 \times 3 + 8 \times 7 + 13 \times 12 + 18 \times 18$ $(9 + 56 + 156 + 324 = 545)$ $\div 40$ $13.6(25 \text{ mugs})$	<p>B1</p> <p>M1</p> <p>m1</p> <p>A1</p>	<p>FT 'their midpoints' provided at least 3 of 'their 4 midpoints' lie within the appropriate group, including lower and upper bounds</p> <p>Use of lower bound gives 465</p> <p>Use of upper bounds gives 625</p> <p>Allow 13 or 14 (mugs) from correct working</p> <p>Use of lower bounds gives 11.625 (allow 11 or 12)</p> <p>use of upper bounds gives 15.625 (allow 15 or 16)</p>
<p>3(b) (Volume) $\pi \times 4.3^2 \times (11.8 - 2)$ or equivalent</p> <p>Answer in the range</p> $568 \text{ (cm}^3\text{) to } 569.4 \text{ (cm}^3\text{)}$	<p>M2</p> <p>A1</p>	<p>Accept methods shown in stages</p> <p>Allow M1 for sight of $\pi \times 4.3^2 \times 11.8$ or $\pi \times 4.3^2 \times 2$, including if embedded or included with incorrect working.</p> <p>CAO. Accept $\frac{90601\pi}{500}$ or $181.2(02..\pi)$</p> <p>Provided M1 previously awarded then also award SC1 for an answer in the range</p> <ul style="list-style-type: none"> • 684.8 to 686 (cm³) (for the volume of the mug ignoring the 2 cm) or • 682.8 to 684 (cm³) (for the volume of the mug subtract 2 cm) <p>but do not ignore further working in either case</p>

<p>4(a)(i) (Circumference of a wheel) $\pi \times 6.4$ or $\pi \times 0.064$</p> <p>(Number of revolutions is) $2340 \times 100 \div (\pi \times 6.4)$ or $2340 \div (\pi \times 0.064)$ or equivalent</p> <p>(Number of revolutions is) Answer in the range 11636(.69...) to 11644(.1083)</p>	<p>M1</p> <p>M2</p> <p>A1</p>	<p>Ignore inclusion of '×4' (for 4 wheels) for M1 M2 (A0)</p> <p>FT 'their circumference' provided 'their calculation of circumference' includes π in the calculation (with consistent place value for M2, with inconsistent place value for M1) M1 for appropriate calculation but containing a place value error, e.g. $2340 \div (\pi \times 6.4)$ or $234000 \div (\pi \times 0.064)$ or $2340 \div (\pi \times 0.64)$</p> <p>CAO, except allow an answer of 11700 (from premature approximation of circumference to 20cm) Mark final answer (Do not ignore further work such as $\div 4$)</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"> • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanations and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means <p>For W1, candidates will be expected to:</p> <ul style="list-style-type: none"> • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.
<p>4(a)(ii) Assumption, e.g. 'rode all the way', 'didn't carry the skateboard', 'was able to use his skateboard' 'skated in a straight line', 'each wheel rotates the same number of times' 'wheels perfectly circular', 'no wear on the wheels', 'the wheels are all on the ground throughout'</p>	<p>E1</p>	<p>Allow, e.g. 'went directly to Sab's house'</p> <p>Do not accept, e.g. '2340m is not exact', 'he doesn't stop on his journey', 'constant speed'</p>

<p>4(b) (Mass of Finbar's skateboard deck) $2.6 \times 1800 \times 1.2$ AND (Mass of Sab's skateboard deck) $0.7 \times 1600 \times 1.4$</p>	<p>M3</p>	<p>Accept shown in stages but not if embedded within incorrect working</p> <p>M2 for one of the following provided not embedded within incorrect working, may be shown in stages: (Mass of Finbar's skateboard deck) $2.6 \times 1800 \times 1.2$ OR (Mass of Sab's skateboard deck) $0.7 \times 1600 \times 1.4$</p> <p>M1 for any one of the following, including embedded within incorrect working, may be shown in stages:</p> <ul style="list-style-type: none"> • (Finbar's deck volume) $1800 \times 1.2 (= 2160)$ • (Sab's deck volume) $1600 \times 1.4 (= 2240)$ • (g per cm) $2.6 \times 1800 (= 4680)$ • (g per cm) $0.7 \times 1600 (= 1120)$
<p>(Mass of Finbar's skateboard deck) 5616 (g) AND (Mass of Sab's skateboard deck) 1568 (g)</p> <p>(Difference is) 4048 (g)</p>	<p>A1</p> <p>A1</p>	<p>CAO</p> <p>Answer must be in grams FT 'their 5616' – 'their 1568' provided M2 previously awarded</p>

<p>5(a)(i) Height of the gate 110 (cm) or 1.1(0 m)</p> <p>(Diagonal² =) $2^2 + 1.1^2$ or $200^2 + 110^2$</p> <p>Diagonal² = 5.21 or (Diagonal =) $\sqrt{5.21}$ or Diagonal² = 52100 or (Diagonal =) $\sqrt{52100}$ or 228.(...cm)</p> <p>(Diagonal =) 2.28(...m) or 2.3(m)</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>A1</p>	<p>Allow other estimates of height of the gate (100 cm to 110 cm inclusive) If units are given they must be correct If incorrect conversion of units seen later, B0 and FT for possible M1 A1 A1</p> <p>FT 'their derived 110 or 1.1(0)' provided units are consistent in the application of Pythagoras' Theorem Allow use of 190 cm to 200 cm for the width of the gate in calculating the diagonal length</p> <p>Answer must be in metres Allow truncation to 2.2(m) Do not accept truncation to 2(m) FT from M1 for the correctly evaluated square root of 'their 5.21' provided 'their answer' > 2 (m) for possible A1</p>
<p>5(a)(ii) Assumption, e.g. 'diagonal plank went to each end', 'thought of the planks as lines', 'that it is a right angle (triangle)', 'it goes from corner to corner'</p>	<p>E1</p>	<p>Allow, e.g. 'no thickness' (allow as implying width) 'width (or length) of gate is not exact' (could mean diagonal plank not quite touching across full width of the gate)</p> <p>Do not accept, e.g. 'all planks have the same thickness' (as not an assumption whether meaning width or not), 'the gaps are not exact' (as question defines the gaps) 'lengths are not exact', 'that this diagonal plank is longer than the others', 'it's straight'</p> <p>Ignore additional spurious comments</p>

<p>5(b) (Cost of 1 horizontal plank is) (£) $3 \times 8.55 \div 5$ OR (Cost of 1 diagonal plank is) (£) $4 \times 8.55 \div 5$</p> <p>(Total cost of gate is) $2 \times 8.55 + 5 \times 3 \times 8.55 \div 5 + 4 \times 8.55 \div 5$ or $2 \times 8.55 + 5 \times 5.13 + 6.84$ $17.10 + 25.65 + 6.84$</p> <p style="text-align: right;">(=) (£) 49.59</p>	<p>M1</p> <p>m2</p> <p>A1</p>	<p>Accept for sight of (£)5.13</p> <p>Accept for sight of (£)6.84</p> <p>m1 for 2 out of the 3 terms correct</p> <p>CAO</p> <p>If no marks, award SC1 for sight of $(8.55 \div 5 = \text{£})1.71$ or $((3+4+5) \times 8.55 \div 5 = \text{£})20.52$</p>
<p><i>Alternative method</i> $(2 \times 5 + 5 \times 3 + 4)$ $\times 8.55$ $\div 5$ (£) 49.59</p>	<p>M1</p> <p>m1</p> <p>m1</p> <p>A1</p>	<p><i>m1 in either order</i></p> <p>CAO</p>
<p>6. Sight of 7450 (kg) AND 92.5 (kg)</p> <p style="text-align: center;">$\frac{7450}{92.5}$</p> <p style="text-align: center;">= 80 (bags)</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>Allow sight of 92.4999... throughout but not 92.49</p> <p>FT for $7400 \leq t < 7500$ and $90 < b \leq 95$ Allow convincing arguments using multiples of 92.5</p> <p>CAO</p>

<p>7. $\frac{485}{\tan 41^\circ}$ or $\tan 49^\circ \times 485$ or $\frac{485 \times \sin 49^\circ}{\sin 41^\circ}$</p> <p>OR</p> <p>$\frac{485}{\tan 27^\circ}$ or $\tan 63^\circ \times 485$ or $\frac{485 \times \sin 63^\circ}{\sin 27^\circ}$</p> <p>(Horizontal distances from Snowdon =) 557.9(...) or 558 (m) 951.8(...) or 951.9 or 952 (m)</p> <p>(Distance between boats =) 393.8 to 394.1 (m)</p>	<p>M2</p> <p>A1</p> <p>A1</p> <p>B1</p>	<p>M1 for $\tan 41^\circ = \frac{485}{d}$ or $\tan 49^\circ = \frac{d}{485}$ or</p> <p>$\frac{d}{\sin 49^\circ} = \frac{485}{\sin 41^\circ}$ OR</p> <p>M1 for $\tan 27^\circ = \frac{485}{d}$ or $\tan 63^\circ = \frac{d}{485}$ or</p> <p>$\frac{d}{\sin 63^\circ} = \frac{485}{\sin 27^\circ}$</p> <p>FT 'their 557.9(...)' and 'their 951.8(...)' provided M1 or M2 awarded Answer needs to be correct for their values</p>
<p><i>Alternative method for final 3 marks:</i></p> <p>Distance between boats =) $485(\tan 63^\circ - \tan 49^\circ)$ OR $485\left(\frac{1}{\tan 27^\circ} - \frac{1}{\tan 41^\circ}\right)$</p> <p>(Distance between boats =) 393.8 to 394.1 (m)</p>	<p>M2</p> <p>A1</p>	<p>FT provided M2 previously awarded</p> <p>Answer needs to be correct for their values</p>
<p><i>Alternative full method:</i></p> <p>Correct use of sin or cos to find the lengths of 1 or 2 hypotenuse e.g. $\frac{485}{\sin 41^\circ}$ AND/OR $\frac{485}{\cos 63^\circ}$ (=739(.26...)) (=1068(.3...))</p> <p>$\frac{739(.26...)}{\sin 27^\circ} \times \sin 14^\circ$ OR $\frac{1068(.3...)}{\sin 139^\circ} \times \sin 14^\circ$</p> <p>OR $\sqrt{739(.26...)^2 + 1068(.3...)^2} - 2 \times 739(.26...) \times 1068(.3...) \times \cos 14^\circ$</p> <p>OR $\sqrt{1068(.3...)^2 - 485^2} - \sqrt{739(.26...)^2 - 485^2}$</p> <p>(Distance between boats =) 393.8 to 394.1 (m)</p>	<p>M2</p> <p>M2</p> <p>A1</p>	<p>Only award these M marks if they clearly go on to attempt to calculate the distance between the boats using the sine rule (only 1 needed) or cosine rule or 2 applications of Pythagoras (both needed)</p> <p>M1 for a correct expression for 1 of the hypotenuse if they go on to use the cosine rule or 2 applications of Pythagoras</p> <p>FT from M1 previously awarded if possible M1 for the unrearranged versions of the sine or cosine rule with correct substitution</p> <p>CAO</p>

<p>8(a)</p> $3 \times \frac{5}{9} \times \frac{143\,000}{26\,000} \quad \text{OR}$ $3 \times 0.555\dots \times 5.5 \quad \text{or equivalent}$ $= 9.16(6\dots) \text{ or } 9.2 \text{ (mins)}$ <p>= 9 mins 10 sec or 9 mins 12 sec OR e.g. 'which is less than 9.25 (mins)'</p>	<p>M2</p> <p>A1</p> <p>A1</p>	<p><u>A table method altering all 3 at the same time is M0</u></p> <p>M1 for the correct use of 3 with either 5/9 or 143(000)/26(000)</p> <p>e.g. <table style="display: inline-table; border: none;"><tr><td style="text-align: center;"><u>Time</u></td><td style="text-align: center;"><u>Engines</u></td><td style="text-align: center;"><u>Gallons</u></td></tr><tr><td style="text-align: center;">16.5</td><td style="text-align: center;">5</td><td style="text-align: center;">143 000</td></tr></table></p> <p>OR <table style="display: inline-table; border: none;"><tr><td style="text-align: center;">$1\frac{2}{3}$</td><td style="text-align: center;">9</td><td style="text-align: center;">26 000</td></tr></table></p> <p>CAO</p> <p>FT from M1 or M2 previously awarded, provided of equivalent difficulty A correct comparison needed</p>	<u>Time</u>	<u>Engines</u>	<u>Gallons</u>	16.5	5	143 000	$1\frac{2}{3}$	9	26 000			
<u>Time</u>	<u>Engines</u>	<u>Gallons</u>												
16.5	5	143 000												
$1\frac{2}{3}$	9	26 000												
<p><i>Alternative method 1:</i></p> $5 \times \frac{3 \text{ (or } 180)}{9.25 \text{ (or } 555)} \times \frac{143\,000}{26\,000} \quad \text{OR}$ $5 \times 0.324\dots \times 5.5 \quad \text{or equivalent} \quad \text{OR}$ $5 \times 0.3278\dots \times 5.5 \quad \text{or equivalent if } 9.15 \text{ used}$ <p>= 8.9(18...) (engines) AND a statement e.g. '9 engines would do it quicker'</p>	<p>M2</p> <p>A2</p>	<p><u>A table method altering all 3 at the same time is M0</u></p> <p>Allow use of 9.15 for 9.25 for M marks only M1 for the correct use of 5 with either 3/9.25 or 143(000)/26(000)</p> <p>e.g. <table style="display: inline-table; border: none;"><tr><td style="text-align: center;"><u>Engines</u></td><td style="text-align: center;"><u>Time</u></td><td style="text-align: center;"><u>Gallons</u></td></tr><tr><td style="text-align: center;">27.5</td><td style="text-align: center;">3</td><td style="text-align: center;">143 000</td></tr></table></p> <p>OR <table style="display: inline-table; border: none;"><tr><td style="text-align: center;">1.6216..</td><td style="text-align: center;">9.25</td><td style="text-align: center;">26 000</td></tr></table></p> <p>OR <table style="display: inline-table; border: none;"><tr><td style="text-align: center;">1.639..</td><td style="text-align: center;">9.15</td><td style="text-align: center;">26 000 (using 9.15)</td></tr></table></p> <p>CAO</p> <p>A1 for 8.9(18...) (engines) <u>without</u> a correct statement</p> <p>OR</p> <p>A1 for 'their 8.9(18...) from premature approximation <u>with</u> a correct statement</p>	<u>Engines</u>	<u>Time</u>	<u>Gallons</u>	27.5	3	143 000	1.6216..	9.25	26 000	1.639..	9.15	26 000 (using 9.15)
<u>Engines</u>	<u>Time</u>	<u>Gallons</u>												
27.5	3	143 000												
1.6216..	9.25	26 000												
1.639..	9.15	26 000 (using 9.15)												
<p><i>Alternative method 2:</i></p> $\frac{26000 \times 9 \times 9.25 \text{ (or } 555)}{5 \times 3 \text{ (or } 180)} \quad \text{OR}$ $26000 \times 1.8 \times 3.08\dots \quad \text{or equivalent} \quad \text{OR}$ $26000 \times 1.8 \times 3.05 \quad \text{or equivalent if } 9.15 \text{ used}$ <p>= 144 300 (gallons) AND a statement e.g. 'quicker to pump 143 000 (gallons)'</p>	<p>M2</p> <p>A2</p>	<p><u>A table method altering all 3 at the same time is M0</u></p> <p>Allow use of 9.15 for 9.25 for M marks only M1 for the correct use of 26(000) with either 9/5 or 9.25/3</p> <p>e.g. <table style="display: inline-table; border: none;"><tr><td style="text-align: center;"><u>Gallons</u></td><td style="text-align: center;"><u>Engines</u></td><td style="text-align: center;"><u>Time</u></td></tr><tr><td style="text-align: center;">46800</td><td style="text-align: center;">9</td><td style="text-align: center;">3</td></tr></table></p> <p>OR <table style="display: inline-table; border: none;"><tr><td style="text-align: center;">80166.6..</td><td style="text-align: center;">5</td><td style="text-align: center;">9.25</td></tr></table></p> <p>OR <table style="display: inline-table; border: none;"><tr><td style="text-align: center;">79300</td><td style="text-align: center;">5</td><td style="text-align: center;">9.15 (using 9.15)</td></tr></table></p> <p>CAO</p> <p>A1 for 144 300 (gallons) <u>without</u> a correct statement</p> <p>OR</p> <p>A1 for 'their 144300' from premature approximation <u>with</u> a correct statement</p>	<u>Gallons</u>	<u>Engines</u>	<u>Time</u>	46800	9	3	80166.6..	5	9.25	79300	5	9.15 (using 9.15)
<u>Gallons</u>	<u>Engines</u>	<u>Time</u>												
46800	9	3												
80166.6..	5	9.25												
79300	5	9.15 (using 9.15)												
<p><i>Alternative method 3:</i></p> $\frac{26\,000}{5 \times 3} \quad \text{AND} \quad \frac{143\,000}{9 \times 9.25}$ $= 1733.3(3\dots) \quad \text{AND} \quad = 1717.7\dots \quad \text{AND}$ <p>(galls/engine/min) (galls/engine/min)</p> <p>Statement e.g. 'last week's rate was quicker'</p>	<p>M2</p> <p>A2</p>	<p>M1 for 1 correct calculation Allow use of 9.15 for 9.25 for M marks only</p> <p>Must come from M2</p> <p>A1 for 2 correct rates <u>without</u> a correct statement OR</p> <p>A1 for 1 correct rate <u>with</u> a correct statement</p>												

<p>8(b) Valid reason e.g. 'Engines may not deliver water at the same rate' or 'May not have enough water available', or 'Not enough room for 9 engines', or 'Not enough water pressure available', or 'They may not be able to work for that long', or 'One (or more) of the engines may be faulty'</p>	<p>E1</p>	<p>Ignore additional spurious comments</p> <p>Do not allow e.g. 'The fire may have gone out'</p>
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<p>9.</p> <p>(Area factor =) 1.96 or equivalent OR 100/196</p> <p>(Scale factor =) $\sqrt{1.96}$ (= 1.4) or equivalent OR $\sqrt{100/196}$</p> <p>(Height of larger flag =) $40 \times \sqrt{1.96}$ or 40×1.4 OR $40 \div \sqrt{100/196}$ = 56 (cm)</p>	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>Use of an area factor of 96 or 0.96 can at most be awarded B0B1M1A0 on FT</p> <p>Sight of 1.96 is sufficient for this B1 mark Note: $100/196 = 0.51(02\dots)$</p> <p>FT 'their 1.96' for values of 96 or 0.96 only Note: $\sqrt{100/196} = 0.71(42\dots)$</p> <p>CAO</p>
<p>10(a) (£) 2000×1.0095^2 or equivalent</p>	<p>B1</p>	<p>(£)19 added followed by (£)19.18(05)</p>
<p>10(b) (£) 3000×1.0102^n</p> <p>3000×1.0102^{18} (= (£)3601.(25...)) OR 1.0102^{18} (=1.2004)</p> <p>54 (months) OR 4 years 6 months (Date =) 30th June or 1st July, 2021</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>A1</p>	<p>e.g. $3000 \times 1.0102 = 3030.6(0)$</p> <p>Allow 3000×1.0102^{17} (= (£)3564.(89...)) with convincing work that (£)3600 will be reached in 3 months' time.</p> <p>ISW on 54 (months). May be implied CAO. Allow 31st June, 2021 This A1 implies the previous A1</p>
<p>11(a) (Area ABC =) $\frac{1}{2} \times 155 \times 170 \times \sin 107^\circ$</p> <p>OR</p> <p>(Area ACD =) $\frac{1}{2} \times 164 \times 190 \times \sin 94.9^\circ$</p> <p>Area ABC = 12 599(...) or 12 600 (m²) AND Area ACD = 15 523(...) (m²)</p>	<p>M1</p> <p>A2</p>	<p>ISW A1 for each correct area</p>
<p>11(b) Strategy of finding DF and using it in the cosine rule to find AF (AF =) $\sqrt{164^2 + (190 - 17.9)^2 - 2 \times 164 \times (190 - 17.9) \times \cos 94.9^\circ}$</p> <p>(= $\sqrt{61336.09\dots}$)</p> <p>= 247.6(...) or 247.7 or 248 (m)</p> <p>84 (posts needed)</p>	<p>S1</p> <p>M2</p> <p>A1</p> <p>B1</p>	<p>Allow use of 18 instead of 17.9 AND/OR 95 instead of 94.9 for M2 only M1 for (AF² =) $164^2 + (190 - 17.9)^2 - 2 \times 164 \times (190 - 17.9) \times \cos 94.9^\circ$ (AF² = 61336.09...) OR M1 for use of 190 instead of (190 - 17.9)</p> <p>CAO. Can only be awarded if (190 - 17.9 =) 172.1 and 94.9 used in the cosine rule</p> <p>FT 'their derived 247.6(...)' $\div 3$ (rounded up) + 1 provided rounding required OR FT 'their derived 247.6(...)' $\div 3$ (rounded down) + 2 provided rounding required</p>

12(a)	0.002	B1	
12(b)	$(M =) \frac{0.002 \times 135\,000}{1 - (1 + 0.002)^{-12 \times 30}}$ $= (\text{£}) 526.42(08\dots)$ $526.42 \times 360 - 598.86 \times 300$ $= (\text{£}) 9853.2(0)$	<p>M2 FT from (a) M1 for one error in substitution OR for 1 slip in the formula, but 'their 0.002' must be correctly substituted The use of 25 instead of 30 is M0 as this is a check for the monthly payments for 25 years</p> <p>A1 ISW FT from M2 only Rate of 0.24 leads to (£) 32 400 Rate of 0.024 leads to (£) 3240.63(4...) Rate of 0.00002 leads to (£) 376.35(5...) Rate of 0.2 leads to (£) 27 000</p> <p>M1 (£)189511.2(0) – (£)179658 FT 'their (£)526.42'</p> <p>A1 Only FT provided their answer > 0 Allow the following Use of unrounded 526.42(0..) leads to (£)9853.50(4..) Use of unrounded 526.42(0...) AND 598.85(6...) leads to (£)9854.61(5...)</p>	