GCSE MARKING SCHEME

AUTUMN 2020

GCSE
MATHEMATICS - NUMERACY
UNIT 2 – INTERMEDIATE TIER
3310U40-1

INTRODUCTION

This marking scheme was used by WJEC for the 2020 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 2020 MARK SCHEME

<table>
<tr><th>GCSE Mathematics Numeracy
Unit 2: Intermediate Tier</th><th>Mark</th><th>Comments</th></tr>
<tr><td>1(a)(i) 4/7 × 4.97 or 4.97 - 3/7 × 4.97

(£)2.84</td><td>M1

A1</td><td>Or equivalent (4.97 – 2.13).
Allow, for M1 only, use of
• 0.57 × 4.97
• 4.97 - 0.428 × 4.97
• 4.97 - 0.43 × 4.97
Do not allow use of 0.6 × 4.97 or 4.97 - 0.42 × 4.97

CAO</td></tr>
<tr><td>1(a)(ii) 2×8.5(0)×0.74 or 2×8.5(0) – 2×8.5(0)×0.26

(£)12.58</td><td>M1

A1</td><td>Or equivalent (17 –4.42)

If no marks, award SC1 for an answer of either
• (£)6.29 (one flag bought)
• (£)14.79 (only one of the 2 flags reduced by 26%)

If no marks in (i) and (ii), award SC1 in (ii) for answers of (£)2.13 and (£)4.42 respectively</td></tr>
<tr><td>1(b) $\frac{1}{3}$</td><td>B1</td><td></td></tr>
<tr><td>2. <u>Consistent</u> method to find cost per kg or quantity per £ or p, e.g.

<table><tr><td>Bird Feast</td><td>16(.)20 ÷ 12.55</td><td>12.55 ÷ 16(.)20</td></tr><tr><td>Cheep Feed</td><td>32(.)00 ÷ 25</td><td>25 ÷ 32(.)00</td></tr><tr><td>Kind to birds</td><td>15(.)60 ÷ 12</td><td>12 ÷ 15(.)60</td></tr></table>
<u>Consistent</u> accurate evaluation pence or £ per kg or quantity per £ or p, e.g.

<table><tr><td></td><td>£ (p) / kg</td><td>£ / 25kg</td><td>kg / p</td><td>kg / £</td></tr><tr><td>Bird Feast</td><td>1(.)29(08..)</td><td>32.27...</td><td>0.0077..</td><td>0.77...</td></tr><tr><td>Cheep Feed</td><td>1(.)28</td><td>32</td><td>0.0078 ...</td><td>0.78...</td></tr><tr><td>Kind to birds</td><td>1(.) 3(0)</td><td>32.50</td><td>0.00769 …</td><td>0.769…</td></tr></table>
Conclusion ‘Cheep Feed’</td><td>M2

A2

E1</td><td>A valid method is comparison in pairs, when cheaper of first pair used in further comparison
M1 for any 2 consistent calculations
M0 for any 1 calculation shown

Consistent place value and any multiple of these

A1 for any 2 consistent evaluations

ISW
Consistent place value and any multiple of these

Do not accept Bird Feast truncated to (£)1.30 per kg unless (£)1.29(08...) seen previously

Allow 0.76 (kg / £) or 0.77 kg / £ for Kind to birds

FT provided at least M1, A1 previously awarded for appropriate conclusion based on all 3 being considered</td></tr>
<tr><td>Organisation and communication

Writing</td><td>OC1

W1</td><td>For OC1, candidates will be expected to:
• 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

For W1, candidates will be expected to:
• 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.</td></tr>
</table>

3(a) 4	B1	
3(b) 21	B1	
3(c) 24	B1	
3(d) $100 \times \frac{4}{34}$ or $100 \times 4 \div 34$ 11.8 (%)	M2 A2	M1 for 100 multiplied by a fraction with either the correct numerator, or the correct denominator, except M0 for $100 \times 4 \div 100$ OR M1 for sight of $\frac{4}{34}$ or $4 \div 34$ CAO. Must be correct to1 decimal place A1 for 11.7(...%)
4(a)(i) Angle 55° (±2°) or 15.277...(%) (±0.55...%) 1080 × 55 (±4) ÷ 360 or 3 × 55 (±4) or 1080 × 15.277... (±1.11..) 165 (people)	B1 M1 A1	Sight of 55 ignoring any incorrect units is B1 only, until used in a relevant calculation FT for M1 only if the angle is out of tolerance but within ±4° or equivalent working with percentage ±1.11...% Ignore incorrect units given OR a whole number in the inclusive range 159 to 171 (people) only as FT from working with 55° ± 2° or 15.277..% ±0.55..% Do not FT beyond tolerance of ± 2° or ±0.55..% *Check diagram for angles or percentages*
4(a)(ii) Carrots 100° ±2° **and** Sprouts 35° ±2° or 27.77..% ±0.55% **and** 9.722..% ±0.55% or appropriate sight of 65° (±4) 1080 × 100 (±2) ÷ 360 - 1080 × 35 (±2) ÷ 360, or 1080 × 65 (±4) ÷ 360 or 3 × 65 (±4) or 3 ×100 (±2) – 3 × 35 (±2) or $\frac{(100\ (\pm2) - 35\ (\pm2))}{360} \times 1080$ or equivalent 195 (people)	B1 M1 A1	Both angles within tolerance FT 65 (±4) × 'their number of people per degree' FT for M1 only if one angle is out of tolerance but this one angle is within ±4° or equivalent working with percentage ±1.11...% OR a whole number in the inclusive range 183 to 207 (people) only as FT tolerance in angles or percentages *Check diagram for angles or percentages*
4(b) 420 - 420 × 3 ÷ 14 or 420 × (14 – 3) ÷ 14 (= 420 – 90) 330 (people) 330 × 2 ÷ 3 220 (people)	M1 A1 M1 A1	Allow use of × 0.21 as indication of 3 ÷ 14 CAO FT 'their derived 330', including use of 90 (FT use of 90 gives an answer of 60) Allow FT answer not being a whole number
4(b) Alternative method *(Fraction who preferred frozen peas)* $\frac{11}{14} \times \frac{2}{3}$ $\frac{22}{42}$ *or equivalent* *(Number who preferred frozen peas)* $\frac{22}{42} \times 420$ *220 (people)*	*M1* *A1* *m1* *A1*	*ISW* *FT from incorrect cancelling of 22/42 for m1 only (A0)*

5. Total number of half-days 185, 304 and 165 AND total number of pupils in Year 11 is 140 (238 + 185 + 304 + 270 + 165) ÷ 140 or 1162 ÷ 140 8.3 (half-days)	B1 M1 A1	 FT ' their total of number of half days' ÷ 'their 140' Must be from a correct evaluated total for 'their entries for the number of half days' ISW
6(a) Appropriate sight of (€) 6000 (Tax at 15%) 0.15× 6000 (= €900)	B1 B1	Ignore £ for € If (a) is not attempted, accept calculations seen in (b)
6(b) (Tax at 22%) 0.22 × 20000 or 0.22 × (30000 – 10000) or equivalent (€) 4400 Total tax due (€) 5300	 M2 A1 A1	Ignore £ for € M1 for 30000 – 10000 (= €20000) CAO, not FT ISW FT 900 + 'their 4400' provided M2 previously awarded

7(a) 3 150 000 - 0.85 × 3 150 000 (=3 150 000 - 2 677 500) or 0.15 × 3 150 000 472 500 (people)	M1 A1	
7(b) (Aged 75 or over who used internet) (0.4 × 286 500 =) 114 600 (Population who used the internet) (0.85 × 3 150 000 =) 2 677 500 $\frac{114\,600}{2\,677\,500}$ (× 100) 4.3 (%)	B1 B1 M1 A2	May be implied in further working. May be implied in further working. FT 3 150 000 – 'their 472 500' (from (a)) FT provided both 0.4 × 286 500 and 0.85 × 3 150 000 attempted Must be correct to 2 significant figures. A1 for 4.28(0...%) or from correct working 4(%) or 4.2(%) If no marks, award SC1 for an answer of 9.1(%) from $\frac{286\,500}{3\,150\,000} \times 100$ If B1 awarded, also award SC1 for *3.638...(%) or 10.7...(%) or with appropriate rounding or truncation OR SC2 for 3.6 (%) or 11 (%),* *from:* $\frac{114600}{3150000} \times 100 = 3.638...(\%) = 3.6\ (\%)$ *or* $\frac{286500}{2677500} \times 100 = 10.7...(\%) = 11\ (\%)$

8. (35000 acres ≈) 35000 × 0.00405 141.75 (km^2) (Food per km^2) 3 400 000 ÷ 141.75 Following correct working, answers in the range 23975 (tonnes) to 24 000 (tonnes)	 M1 A1 M1 A1	*Sight of, for example, 3500 or 0.0405 are treated as MR-1 (from first accuracy mark) in addition to any place value error in 'their 3.4 million'* Allow 141.8 May be implied by further working Allow 3.4 (million) ÷ 141.75 Allow place value error in 'their 3.4 million' FT 'their 141.75', provided derived from a calculation involving 35000 and 0.00405 (Actual answer is 23985.89… tonnes) Do not FT from place value error in 'their 3.4 million' FT for equivalent range, e.g. use of 141.8 gives 23977(.433 tonnes)) so accept answers in the range 23977 to 24000 tonnes
8. Alternative method 1: *(tonnes / acre) 3 400 000 ÷ 35000* *97.1(428….)* *(per km^2) 97.1(428….) ÷ 0.00405* *Following correct working, answers in the range 23975 (tonnes) to 24 000 (tonnes)*	*M1* *A1* *M1* *A1*	*Allow 3.4 (million) ÷ 35000* Allow place value error in 'their 3.4 million' *Do not FT from place value error in 'their 3.4 million'* *May be implied by further working* *FT from place value error in 'their 3.4 million'* *FT 'their 97.1(428….)' provided derived from a calculation involving 3 400 000 and 35 000* *(Actual answer is 23985.89… tonnes)* *Note: Accuracy for place value error in 'their 3.4 million' must be penalised once only on first occurrence*
8. Alternative method 2: *3 400 000 ÷ 0.00405* *839506172.8(….)* *839506172.8(….) ÷ 35000* *Following correct working, answers in the range 23975 (tonnes) to 24 000 (tonnes)*	*M1* *A1* *M1* *A1*	*Allow 3.4 (million) ÷ 0.00405* *Allow place value error in 'their 3.4 million'* *Do not FT from place value error in 'their 3.4 million'* *May be implied by further working* *FT from place value error in 'their 3.4 million'* *FT 'their 839506172.8(….)' provided derived from a calculation involving 3 400 000 and 0.00405* *(Actual answer is 23985.89… tonnes)* *Note: Accuracy for place value error in 'their 3.4 million' must be penalised once only on first occurrence*

9(a) 375 ÷ 1.6 or 375 × 5 ÷ 8 or equivalent 234(.375 mph)	M1 A1	Allow use of ÷1.6 to ÷1.613, ×0.62 to ×0.625 Accept 234.4 (mph) Allow 234.3(... mph)
9(b) 260.5 ÷ 78 ÷ 155.552 × 60 1.288(.... minutes)	 M1 M1 M1 A1	<u>Method marks can be awarded in any order but the operation must be unique (not contradicted or repeated in the working)</u> (Lap distance km) (Average lap time in hours) (Average lap time in minutes) Award M3 for sight of $\frac{260.5 \times 60}{78 \times 155.552}$ CAO, accept rounded to 1.29 (minutes) or 1.3 (minutes) or 1 minute 17(.29...) seconds If no marks, award SC1 for equivalent operations used without 260.5 or with use of an incorrect 260.5, i.e. $\frac{60}{78 \times 155.552}$, 60 ÷ 78 ÷ 155.552 or equivalent
9(c) 250	B1	
9(d) 250 ÷ 1.38 × 1.14 ÷ 12 17(.21... million €)	 M1 M1 M1 A1	<u>Method marks can be awarded in any order but the operation must be unique (not contradicted or repeated in the working)</u> Ignore place value errors in working with ‘millions’ for M marks (= £181.1594... million) (= €206.5217... million) Award M3 for sight of $\frac{250 \times 1.14}{1.38 \times 12}$ CAO. Allow final answer written in full. Allow ‘millions’ not written in the answer If no marks, award SC1 for equivalent operations used without 250, i.e. $\frac{1.14}{1.38 \times 12}$ or 1.14 ÷ 1.38 ÷ 12 or equivalent

10. (Greatest total length of pictures) 21.5 + 22.5 + 23.5 + 24.5 + 26.5 or 21 + 22 + 23 + 24 + 26 + 5 × 0.5 (=) 118.5 (cm) (Lower bound of shelf) 117.5(cm) Difference of 1 cm stated or sight of 118.5 – 117.5 = 1(cm)	 M1 A1 B1 B1	Allow 0.4999(....) for 0.5 throughout, must clearly be a recurring 9 digit Allow for **sight** of upper bounds of pictures: 21.5(cm), 22.5(cm), 23.5(cm), 24.5(cm), 26.5(cm) CAO from use of appropriate correct upper bounds and lower bound Accept FT from clearly **recurring** 9s, as 0.9999999…. is considered as equivalent to 1 Accept 117.5 – 118.5 = -1(cm) Allow 117.5 – 118.5 = 1(cm difference) If no marks, award SC1 for correct **sum** of 'their upper bounds' provided they are all increased but less than 0.5cm greater than the measurements given in the question
11(a) 6 550 000 000 × 0.02 or 6 550 000 000 ÷ 50 (£) 1.31×10^8	M1 A2	A1 for (£)131 million or (£)131 000 000 or equivalent (e.g. 131×10^6) If no marks, award SC1 for sight of (£)1.31×10^{10} (from 6 550 000 000 × 2)
11(b) $\pi \times (25.9 \div 2)^2 \times 2.03$ Answer in the range 1068 (mm^3) to 1070 (mm^3)	M2 A1	Allow M1 for sight of any of the following: • $\pi \times 25.9^2 \times 2.03$ • 4275.8 to 4279 • 1361.7(...) π • $\pi \times ((25.9)^2 \div 2) \times 2.03$ • 2137.9(...) to 2139.(...) • 680.8π to 680.9π CAO. ISW Accept an answer of 340.4(….)π

12(a) $\tan x = \frac{3.9}{56.7}$ $(x =)$ $\tan^{-1} 3.9/56.7$ or $(x =)$ $\tan^{-1} 0.06878....$ $(x =)$ 3.93(°)	M1 m1 A2	A1 for $(x =)$ 3.9(3...°) from correct working An unsupported answer of 3.9 is M0, m0, A0
12(a) Alternative method *(slant height^2 = 3.9^2 + 56.7^2, s = √3230.1, leading to) slant height 56.8(33... m)* ***and*** *either* $\sin x = \frac{3.9}{56.8(33...)}$ *or* $\cos x = \frac{56.7}{56.8(33...)}$ *(x =)* $\sin^{-1}(3.9/56.8(33...))$ *or* $\cos^{-1}(56.7/56.8(33...))$ *(x =) 3.93(°)*	*M1* *m1* *A2*	*A1 for (x =) 3.9(3...°) to 3.9(7...°) from correct working* *An unsupported answer of 3.9 is M0, m0, A0*
12(b) 56.7 × 9.36 ÷ 3.9 or 56.7 × 2.4 or equivalent 136(.08 cm)	M1 A1	Ignore place value errors due to change of units for M1 only If units are given they must be correct, accept answer in metres Allow answers from premature approximation in the range 136 (cm) to 136.1 (cm)
12(b) Alternative method *(Height of poster =)* $\frac{9.36}{\tan 3.9(.....°)}$ *Answer in the range 136 (cm) to 137.3 (cm)*	*M1* *A1*	*FT from (a)* *M0 for* $\tan 3.9(.....°) = \frac{9.36}{\text{Height of poster}}$ *If units are given they must be correct, accept answer in metres*
13(a) 45 (cars)	B1	
13(b) Range correct (07:21 and 07:44) UQ and LQ correct (07:22.5 and 07:35) Median correct (07:25)	B1 B1 B1	Allow 07:21 to 07:22 and 07:44 to 07.45 Accept seen in working if not given on the box-and-whisker Accept seen in working if not given on the box-and-whisker Penalise -1 if the structure of the box-and-whisker plot is not correct, ignore if end vertical lines not shown for whiskers