REVISE
.wales

1.09 — Percentages & fractions of quantities

Mark schemes for the 1.09 question pack

Spec 1.8.1, 1.8.2 — Unit 1

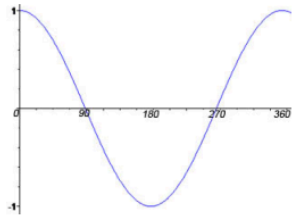
SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 12 questions in the corresponding revise.wales question pack (26 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

Final		
1(a)(i) (Ysgol) Caewen and (Year Group) 10	B1	
1(a)(ii) FALSE TRUE FALSE TRUE TRUE	B3	All 5 correct B2 for any 4 correct B1 for any 3 correct
1(b)(i) 1480 (miles)	B2	B1 for sight of any one of • 200 ÷ 5 • 40 (miles) in 1 year • 80 (miles in 2 years) B0 for an answer for 2018 as 1600 (miles) *Ignore statement of incorrect unit, such as km for miles*
1(b)(ii) Reason suggesting rate of increase not necessarily linear, e.g. 'unlikely to be a constant rate of increase', 'not a uniform pattern each year', 'they can vary', 'because there can be more one year than another year', 'it is a total over 5 years so the number each year can increase or decrease', 'not the same miles every time', 'there could be more routes in different years', 'don't know what will happen', 'because this is just an estimate based on previous data', 'cycling becoming more popular, rate may increase because of it' 'could have run out of money'	E1	Do not allow if additional incorrect statements are made Allow, e.g. 'because it can change', 'perhaps they have not built any more since 2016', 'cycling becoming more popular', 'January 2018 hasn't happened yet' Do not accept, e.g. 'because it is an estimate'

4(a) (Jade saves each week) 72 × 0.21 or 7.2(0) + 7.2(0) + 0.72 (= £ 15.12) (Total savings 15.12) × 20 (£) 302.4(0) (Jade's father pays £350 – 302.40 =) (£) 47.6(0) Organisation and communication Writing	M1 M1 A1 B1 OC1 W1	Do not accept '1512' without indication of pence, unless used correctly in working These 2 M marks can be awarded in either order, i.e. 72 × 20 (=1440), followed by × 0.21 CAO FT 'their £302.40' provided • a percentage calculation using 72 has been involved AND • provided their answer is < (£) 350 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.
4(b)(i) $100 - \frac{3}{25} \times 100$ or $\frac{(25-3)}{25} \times 100$ 88(%)	M1 A1	Or equivalent Allow M1 for 88/100 If no marks, award SC1 for an answer of or sight of 12(%) provided it is not from incorrect working
4(b)(ii) $abc + \pi a^2 c$	B1	
4(c) 35 × 9 ÷ 45 or 35 ÷ 5 or equivalent 7 (cm) or 70 mm	M1 A1	Allow with incorrect place value from conversion of units CAO. Do not accept an answer of: • 70 without units (mm) • 7 or 70 with incorrect units

		Allow ± '1 small square'.
4. Sight of 1·25 or 125(%)	B1	Accept sight of n and 1·25n where n may be any numerical value e.g. '18 and 22·5'.
$\frac{n}{1\cdot25n}$ (×100)	M1	$\frac{1}{1\cdot25}$ (n =1) OR 0·8 implies B1M1.
= 80(%)	A1	An answer of 80(%) gains B1M1A1

16. Use of 7175 AND (1)·2345 or (1)23·45(÷100) $7175 \times 1{\cdot}2345$ = (£)8858	B1 M1 A1	Or equivalent complete method. FT for 'their 7175' provided $7170 \leq x < 7180$ and 'their 1·2345' provided $1{\cdot}234 \leq y < 1{\cdot}235$ Sight of (£)8857·53(75) or (£)8857·54 implies B1M1. CAO.
17.(a) General cosine curve with appropriate orientation and position. Correct sketch with curve passing through (0°,1), (90°,0) and (270°,0) and approximately (180°,-1) and (360°,1) AND 90(°), 180(°), 270(°), 360(°) indicated on the x-axis AND -1 and 1 indicated on the y-axis.  	M1 A1	Ignore curve shown for values x< 0° or x> 360°. Accept 180° as mid-way between 0° and 360° if unlabelled. Accept 360° as unlabelled provided the sketch does not exceed 360°.
17.(b) 46(°) AND 314(°) OR 45·6(°) AND 314·4(°) OR 45·57(29…°) AND 314·4(27…°).	B2	B1 for sight of one correct angle. Allow embedded answers. If more than two answers offered award B1 for sight of one correct angle. If no marks, awarded SC1 for truncated answers 45(°) AND 315(°) OR 45·5(°) AND 314·5(°).
18. $0{\cdot}7 \times 0{\cdot}2 \times 0{\cdot}1 \times 6$ = 0·084 or equivalent	M2 A1	M1 for sight of $0{\cdot}7 \times 0{\cdot}2 \times 0{\cdot}1$ OR 0·014 OR 7/500 or equivalent. Fractional answer: 21/250 or equivalent. (ISW)
19. Sight of $25x^2 + 15x - 15x - 9$ $25x^2 - 19x - 9 = 0$ $x = \dfrac{-(-19) \pm \sqrt{(-19)^2 - 4 \times 25 \times (-9)}}{2 \times 25}$ $x = \dfrac{19 \pm \sqrt{1261}}{50}$ x = 1·09 with x = –0· 33 (answers to 2dp)	B1 B1 M1 A1 A1	Or equivalent. '= 0' required, but may be implied by an attempt to use the quadratic formula or if $a = 25, b = -19,$ $c = -9$ used in the quadratic formula. **This substitution into the formula must be seen for M1, otherwise award M0A0A0.** FT 'their derived quadratic equation' of equivalent difficulty (a, b and c must be non-zero). Allow one slip in substitution **for M1 only**, but must be correct formula. Can be implied from at least one correct value of x evaluated, provided M1 awarded. CAO for their quadratic equation.

2(a) Whale indicated or implied on bearing 010° from Aberporth and 280° from Aberystwyth.	B2	Accept indication from one bearing line drawn with the second bearing shown on this line, including one line terminating at the correct intersection point B1 for either of the bearings correctly shown or unambiguously indicated, e.g. by an unambiguous mark on the correct bearing
Region in the sea inside a circle, centred at the whale, of correct (4cm) radius ± 2mm	B2	FT 'their position of the whale' For B2 the region must be entirely within the sea or on FT indicated as a region within the sea Allow intention of circle provided it lies completely within the tolerance given by the overlay B1 for (intention of a) circle, radius out of tolerance but within ± 4 mm, centred at the whale including any region on the land
2(b) $20 \times 12 \times 2.5 \div 100$ 6 (m)	M2 A1	M1 for any 3 of these 4 terms correct in a calculation which may be shown in stages CAO Answer given within the statement takes precedence Sight of 600 is awarded M1 and also SC1 provided not from incorrect working
2(c)(i) $\frac{13}{20}$ (× 100) or $\frac{12.5}{20}$ (× 100) or $\frac{12.8}{19}$ (× 100) or $\frac{12}{20}$ (× 100) or $\frac{12}{19}$ (× 100) or $\frac{12.8}{20}$ (× 100) or $\frac{13}{19}$ (× 100) or equivalent OR A trial and improvement method, considering percentages or decimals of 19 or 20 with a correct calculation shown between (60% of 19) 0.6 × 19 (= 11.4) and (70% of 20) 0.7 × 20 (= 14) inclusive An answer in the inclusive range 60(%) to 70(%)	B1 B1	Allow: • fraction written as division, e.g. 13 ÷ 20 • inclusion of consistent change of place value • a similar suitable fraction, e.g. 12/18 Only award if B1 previously awarded, however allow B2 for an unsupported answer in this range. If no marks, award SC1 for any of the following answers: • 50(%) from $\frac{10}{20}$ (× 100) or equivalent • 52(%) to 53(%) from $\frac{10}{19}$ (× 100) or equivalent

2(c)(ii) $(19 - 0.1 \times 19) \times 1000\,000\,000$ or $(19 - 0.1 \times 19) \times (1) \times 10^9$ or $0.9 \times 19 \times 1000\,000\,000$ or $1.9 \times 10^{10} \times 9 \times 10^{-1}$ or equivalent	M2	Must have engaged with at least one stage of interpretation of the size of 'billion' in figures M1 for any one of the following: • for sight of digits 171 irrespective of place value • $19 - 0.1 \times 19$ • 19 billion $- 0.1 \times 19$ billion • $(19 - 0.1 \times 19) \times 1000$ million • 0.9×19 • 1.9×10^{10} (19 billion in standard form) • 1.9×10^9 only if clearly calculated from 10% of 19 billion
1.71×10^{10}	A2	A1 for any of the following: • 17 100 000 000 • 1.71×10^4 million • equivalent correct value not given correctly in standard form, e.g. 17.1×10^9 • an answer of 1.7×10^{10} OR A1 for FT from M1 or M2 • 'their number' given correctly in standard form provided it is $> 1.71 \times 10^6$ (including for the number in the last bullet point listed for M1) A0 for 17.1 billion or 17 100 million (M1 A0) Treat use of an estimate of 19 as a MR-1 from an accuracy mark, e.g. use of 20 gives an answer of 1.8×10^{10}, award (M2 A2 MR-1) 3 marks

5(a) (Total number of pebbles =) 40×1 + 40×1.5 + 20×3.7 + 20×1.8 + 80×0.5 (40 + 60 + 74 + 36 + 40) = 250 (pebbles) (Number of pebbles < 70g = 40×1 + ¾ of 40×1.5 =) 85 (Percentage < 70g =) $\frac{85}{250}$ (×100) = 34 (%)	M1 A1 B1 M1 A1	Allow M1 for the sum of 5 products with any 3 correct CAO FT 'their 40×1' and ¾ of 'their 40×1.5' FT 'their 85' provided > 40 and < 100 but not 70 (if not derived) AND FT 'their derived 250' On FT, the whole number part of their answer needs to be calculated correctly
5(b)(i) Uniform scale in blocks of 4	B2	Complete numbering of the scale needed up to 16 B1 for • Incomplete scale with at least 1 correct value and no incorrect values • 3 correct values and 1 incorrect • Frequency of 40 (for the 1st bar) and 80 (for the 2nd bar). May be seen on diagram. May be seen as frequency of 20 for each 5×5 block • 20 × x + 10 × 4x = 120 or equivalent (x being the height of the 1st bar) Accept use of trials for x, with minimum of 2 trials getting closer to 120 OR Evidence that x = 2 • 20 × y/2 + 10 × 2y = 120 or equivalent (y being the first value on the y-axis) Accept use of trials for y, with minimum of 2 trials getting closer to 120 OR Evidence that y = 4
5(b)(ii) 40 g	B1	

10.(a) (*AOY* =) 36(°)	B1	Check diagram.
(% shaded =) $\frac{36}{360}$ (× 100) or equivalent	M1	FT 'their derived or stated angle *AOY*' provided not 54°. Award M0A0 for $\frac{360(°)}{36(°)} = 10$, but award M1A1 if a final answer of 10% is seen.
= 10(%)	A1	If no marks awarded, award: • SC2 for unsupported 10% (*AOY* not shown or stated to be 36(°)) • SC1 for a final answer of 15% (from using 54(°)).
10.(b) Statement explaining that, 'The **tangent** at any point on a circle is **perpendicular** (or equivalent) to the **radius** at that point'.	E1	Accept unambiguous similar wording. e.g. 'Radius and tangent 90(°)'. Diameter could be used in place of radius. Must refer to tangent and radius by name (not simply *AY* and *OA* or description).

4(a)(i) Entries 146 and 160 in the table and the cumulative frequency diagram completed correctly (correct plots (11, 146) and (13, 160) and all plots joined)	B2	B1 for any one of the following: • 146 and 160 in the table, correct plots but **not** joined • 146 and 160 in the table, with one correct plot and one incorrect plot in completing the **cumulative** frequency diagram with plots joined • one error in the table, including FT 'their 146' + 14 and these **cumulative** entries used correctly to complete the **cumulative** frequency diagram with plots joined • correct cumulative frequency diagram with plots joined, with incorrect, incomplete or not attempted entries in the table
4(a)(ii) 8.2 to 8.4 (minutes)	B1	Answer space takes precedence Allow 8 minutes 12 seconds to 8 minutes 24 seconds FT reading from the graph for 'their median', from ½ × 'their 160', provided 'their 160' ≥ 110, with a tolerance of ½ small square from 'their **cumulative** frequency graph', provided it is possible to read 'their median' from the vertical axis on the graph paper provided
4(a)(iii) 7.2 minutes	B1	Answer space in the statement takes precedence, if blank award for indication of '7.2' (circled) in the list Allow '7' in the answer space provided 7.2 indicated in the list Do not accept '8' in the answer space if 7.2 indicated in the list
4(a)(iv) $\frac{20}{160}$ (× 100) or $\frac{1}{2}$ × 25 (%) or equivalent 12.5 (%) or 12½ (%)	M1 A1	FT for (100 ×) 20/'their 160', provided 'their 160'> 106 On FT allow rounding or truncation to 1 decimal place
4(b) (Costs are 180 + 220) (£) 400 **AND** (Profit is 700 – 180 – 220) (£) 300 **OR** (Receipts / Costs =) $\frac{700}{400}$ (× 100) (Percentage profit is) $\frac{300}{400}$ (× 100) or $\frac{700}{400}$ (× 100) – 1 (× 100) 75 (%)	B1 M1 A1	May be embedded, e.g. 700 – 400 = 300 (= 1.75 or 175%) FT 'their 400' and 700 – 'their 400' provided their costs or profit are ≠ 180, ≠ 220 and ≠ 700 CAO Allow if all costs and the total are consistently multiplied by 3.
4(c) 8(.)40 ÷ 1(.)20 or 8(.)40 – 8(.)40 ÷ 6 or equivalent (£) 7 or 700 (p)	M1 A1	Accept a **complete** and **convincing** method of trial and improvement If units are given they must be correct Sight of 7 + 1.40 = 8.40 is awarded M1 A0 unless (£)7 is selected

7(a) $\frac{2 \times 10^3}{2 \times 10^6}$ (× 100) or equivalent = 1 (%)	M1 A1	e.g. $\frac{2000}{200\,000}$ (× 100)
7(b) $(0.02 \times 10^6) + (3.98 \times 10^6)$ or 2000 + 398 000 OR $(0.2 \times 10^6) + (1.2 \times 10^6)$ or 200 000 + 1 200 000	M1	Or equivalents
= 400 000 AND 1 400 000	A2	Or equivalents e.g. (4×10^5) AND (1.4×10^6) Note: these do not need to be in correct standard form notation A1 for each
(Fraction that was electrified =) $\frac{400\,000}{1\,400\,000}$ or equivalent	B1	e.g. $\frac{4 \times 10^5}{1.4 \times 10^6}$ Must not involve sums within the numerator or denominator FT 'their 400 000' and 'their 1 400 000' provided not the USA figures *e.g. for use of the rest of the world's data* *B1 for $\frac{3.98 \times 10^6}{1.2 \times 10^6}$ or equivalent*
= $\frac{2}{7}$	B1	Mark final answer FT 'their 400 000' and 'their 1 400 000' provided equivalent level of difficulty *e.g. for use of the rest of the world's data* *B1 for $\frac{199}{600}$* Ignore attempt to convert to a %

Unit 2: Higher Tier	Mark	Comments
1(a) (2.31 ÷ 7) ÷ 0.30 or (2.31 ÷ 0.30) ÷ 7 or (231 ÷ 7) ÷ 30 or (231 ÷ 30) ÷ 7 or equivalent	M2	Allow if brackets are implied in further working May be shown in stages M1 for any of the following: • 2.31 ÷ 0.30 (= 7.7) • 2.31 ÷ 7 (= 0.33) • (231 ÷ 7) ÷ 0.30 (= 110) • (2.31 ÷ 7) ÷ 30 (= 0.011) • (231 ÷ 0.30) ÷ 7 (= 110) • (2.31 ÷ 30) ÷ 7 (= 0.011)
1.1 (kWh)	A1	CAO. Ignore incorrect units
1(b) (Height freezer door) 2 × 1800 ÷ 5 or $\frac{2}{5}$ × 1800 or 0.4 × 1800 or equivalent	M1	
720 (mm)	A1	
((Diagonal of freezer door)^2 =) $600^2 + 720^2$	M1	Or alternative **full** method FT 'their height of freezer door' including 1080 or 1800 Accept working in m or cm for possible M1, A1
Diagonal^2 = 878 400 or (Diagonal =) $\sqrt{878\,400}$	A1	
(Diagonal =) 937(.22... mm)	A1	Final answer must be given in mm FT from M1 for the correctly evaluated square root of 'their 878 400' provided 'their answer' > 'their 720' for possible A1 If final M0 A0 A0 awarded as a different length, not 'their 720', is used to calculate the diagonal, award SC1 for a correct statement of Pythagoras' Theorem, and SC1 for a correct evaluation of 'their diagonal'

6(a) 76 (g)	B1	Answer space takes precedence
6(b) 3 × 400 × 25 ÷ 100 or ¾ × 400 or equivalent 300 (little gulls)	M1 A1	If no marks, award SC1 for (¼ × 400 =) 100 (gulls)
6(c) 25(%)	B1	Answer space takes precedence
6(d)(i) Slender(-billed gulls)	B1	
6(d)(ii) Lower quartile	B1	Strictly depends on B1 previously awarded in (d)(i)

8(a)(i) (Total number of 16-year-old girls =) 0.1×10 + 0.4×5 + 1×5 + 0.8×5 + 0.4×5 + 1.2×5 + 0.4×5 + 0.2×15 1 (+) 2 (+) 5 (+) 4 (+) 2 (+) 6 (+) 2 (+) 3 = 25 or equivalent	M2 A1	Allow M2 for sight of all correct products M1 for the sight of any 3 different correct areas Possibly seen on the histogram Needs to be convincing The + signs can be implied by e.g. total = 25
8(a)(ii) (Number of 16-year-old girls > 162.5 =) ((4 ÷ 2) + 2 + 6 + 2 + 3 =) 15 (Percentage > 162.5 cm =) $\frac{15}{25}$ (×100) or equivalent = 60 (%)	 B1 M1 A1	 FT 'their 4' ÷ 2 + 'their 2 + 6 + 2 + 3' for B1 and M1 provided the total is < 25 and the values are integers FT 'their 4' ÷ 2 + 'their 2 + 6 + 2 + 3' ± 1 or the result of an omission of 1 value from their sum CAO If no marks awarded, SC1 for an answer of 40(%) from 10/25 (×100)
8(a)(ii) Alternative method: *(Number of 16-year-old girls < 162.5 =)* *(1 + 2 + 5 + (4 ÷ 2) =) 10* *(Percentage < 162.5 cm =)* $\frac{10}{25}$ *(×100) or equivalent* *(100 − 40 =) 60 (%)*	 *B1* *M1* *A1*	*If the candidate clearly attempts to calculate the % < 162.5 and then subtracts this from 100%* *FT 'their 1 + 2 + 5' + 'their 4' ÷ 2 for B1 and M1 provided the total is < 25 and the values are integers* *FT 'their 1 + 2 + 5' + 'their 4' ÷ 2 ± 1* *or* *the result of an omission of 1 value from their sum* *CAO*
8(b)(i) Frequency densities of 0.2, 0.9, 0.8, 0.25 or equivalent	B2	FT 'their integer values' from (a)(i) Mark final answer B1 for any 2 or 3 correct FT $\frac{\text{'their 1'+'their 2'}}{15}$, $\frac{\text{'their 5'+'their 4'}}{10}$, $\frac{\text{'their 2'+'their 6'}}{10}$ and $\frac{\text{'their 2'+'their 3'}}{20}$ from (a)(i)
8(b)(ii) Correct bars drawn AND a suitable uniform vertical scale	B2	FT their frequency densities from (b)(i) B1 for at least 2 correct bars AND a suitable uniform vertical scale