

REVISE

.wales

F3.07 – Compound measures – speed, density & flow rates

Mark schemes for the F3.07 question pack

Spec 3.5.8, 3.5.9 – Unit 3

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 12 questions in the corresponding revise.wales question pack (37 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

<p>15.</p> <p>Method to eliminate variable e.g. equal coefficients with intention to <u>appropriately</u> add or subtract First variable found $x = 4$ or $y = -3$. Substitute to find the 2nd variable. Second variable found.</p>	<p>M1</p> <p>A1</p> <p>m1</p> <p>A1</p>	<p><i>IMIV = 12 (U..)(UIII) ISVV A1</i></p> <p><i>No marks for 'trial and improvement'. No marks for an unsupported answer.</i></p> <p>Allow 1 error in one term, not one with equal coefficients.</p> <p>C.A.O. F.T. their '1st variable'.</p>
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16.(a) $20 \times 15 - \pi \times 4^2$ $\times 10$ $2497(\dots)$ OR $3000 - 160 \pi$	M1 m1 A1	Accept an answer between 2497 and 2498 inclusive OR 2500. SC1 for sight of $\pi \times 4^2 \times 10$ OR 160π (accept 502 to 503 inclusive).
16.(b) (Mass =) $2497(\dots) \times 2.4$ OR $2497(\dots) \times 0.0024$ $= 5993.6(\dots)(g)$ OR $5.9936(\dots)(kg)$ $6(kg)$	M1 A1 A1	F.T. 'their volume in (a)' Accept value truncated or rounded to a whole number. Ignore units. F.T. from 'their 5993.6..g' or 'their 5.9936..kg' ONLY if M1 awarded AND 'their 5993.6..g' > 500g or 'their 5.9936..kg' > 0.5kg If no marks awarded, allow SC1 for (Mass =) 'their volume' \times density, where density may have incorrect place value e.g. '2497(\dots) \times 0.024'

<p><u>Alternative method 2</u> . Indicates 2 (letters out of 6 gain points) (Expected number of wins =) $\frac{2}{6} \times 24$ or equivalent $= 8$ (Number of wins required =) $\frac{100}{10}$ $= 10$ (wins) AND 'No' (Leah is not expected score 100 points)</p>	<p>B1 M1 A1 M1 A1</p>	<p>Any unambiguous indication. FT 'their stated number of '10 point' letters'. Award M1A1 for 8/24 suggesting '8 wins out of 24' FT their <u>derived</u> number of <u>expected</u> wins. <u>Note for Alternative method 2</u> If 'number of wins required' is calculated before calculating 'number of expected wins' then the conclusion ('AND') will be attached to the 8 rather than the 10.</p>
<p>OCW Organisation and Communication. Accuracy of writing.</p>	<p>OC1 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 explanation and working in a way that is clear and logical • <u>write a conclusion that draws together their results and explains what their answer means</u> <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>7. $4x + 5 = 57$ or equivalent $4x = 52$ $x = 13$</p>	<p>M1 A1 A1</p>	<p>FT from $4x = k$. Accept $x = k/4$ (but, if on FT k is a multiple of 4, final answer must be given as a whole number.) M1A1A0 for '$x = 52/4$' Mark final answer. Allow (M1)A1A1 for a correct embedded answer BUT only (M1)A1A0 if contradicted by $x \neq 13$.</p>
<p>8. 3, 4, 4, 9 OR 3, 3, 5, 9.</p>	<p>B3</p>	<p>B1 for a range = 6. B1 for a total = 20. B1 for a median = 4. Penalise use of negative or non-integer values -1. FOUR numbers must be shown, otherwise B0.</p>
<p>9.(a) $\frac{54}{300} \times 100$ or equivalent $= 18(\%)$</p>	<p>M1 A1</p>	<p>Allow sight of 18/100 or 0-18 for M1. M0 for 54/300 alone.</p>
<p>9.(b) Use of $\frac{\text{Distance}}{\text{Time}}$ $\frac{100}{2.5}$ or equivalent $= 40$ (mph)</p>	<p>M1 M1 A1</p>	<p>Allow M1 even for e.g. $100 / 2.3(0)$ or $100/150$. C.A.O.</p>
<p>10. $(a + b = 180 - 25) = 155$ (a =) $\frac{155}{5} \times 2$ OR (b =) $\frac{155}{5} \times 3$ or equivalent $a = 62(^{\circ})$ AND $b = 93(^{\circ})$</p>	<p>B1 M1 A1</p>	<p>B1 for sight of 155 FT 'their stated 155'. Allow M1A0 if the angles are reversed and <u>not</u> corrected.</p>

<p>8(a) (Population in 1964) $\frac{100 + 682}{100} \times 30000$ or 7.82×30000 or $30000 + 30000 \times \frac{682}{100}$ or equivalent</p> <p>(Population in 2014) $\frac{100 + 20}{100} \times 234600$ or 1.2×234600</p> <p style="text-align: right;">281520 (people)</p>	<p>M1</p> <p>M1</p> <p>A1</p>	<p>(= 234600 people) <i>M0 for</i> 6.82×30000 (= 204600) or 1.682×30000 (= 50460)</p> <p>FT 'their derived 234600' including 1.2×204600 (= 245520) 1.2×50460 (= 60552)</p> <p>CAO</p>
<p>8(b) $287106 \div 432$</p> <p style="text-align: right;">660 (people per km²)</p>	<p>M1</p> <p>A2</p>	<p>A1 for sight of 664.597.... rounded or truncated</p>
<p>8(c) $1442 \times 1000 \div 1\,000\,000$</p> <p style="text-align: right;">1.4(42 g/cm³)</p>	<p>M1</p> <p>A1</p>	<p>Mark final answer Allow M1 A1 for $1442 \div 1000 = 1.4(42)$ Do not accept from incorrect working, e.g. M0 A0 if 1.442 seen with an incorrect statement, e.g.</p> <ul style="list-style-type: none"> • "1 g = 1000 kg" • "g to kg is $\div 1000$"

6.	$\frac{45}{1.25}$ or equivalent	M2	May be seen in stages. Must be a complete and correct method e.g. $\frac{45}{75} \times 60$ or $\frac{45}{5} \times 4$ (working with 15 mins)
			Award M1 for sight of one of the following:
			<ul style="list-style-type: none"> • $\frac{45}{1 \text{ hour } 15 \text{ mins}}$
			<ul style="list-style-type: none"> • $\frac{45}{1.15}$
			<ul style="list-style-type: none"> • 39.13(0...)
			<ul style="list-style-type: none"> • $\frac{45}{75}$
			<ul style="list-style-type: none"> • 0.6
	36 (mph)	A1	CAO.

12.(a) $110(^{\circ})$	B1	Award B1 for an answer in the range $108(^{\circ})$ to $112(^{\circ})$.
12.(b) $335(^{\circ})$	B1	Award B1 for an answer in the range $333(^{\circ})$ to $337(^{\circ})$.

<p>14. (a) (Area =) $\frac{7.4 + 9.1}{2} \times 5.7$ or equivalent</p> <p style="text-align: right;">$\times 15.6$</p> <p>Allow an answer from 733 to 734 (cm³) inclusive.</p>	<p>M1</p> <p>m1</p> <p>A1</p>	<p>(= 47.025)</p> <p>May be seen in stages.</p> <p>Allow M1 for correct intent <u>seen</u>. e.g.</p> <p>$7.4 + 9.1 \times 5.7 \div 2$</p> <p>CAO</p> <p>Note: 733.59 or 733.6 (cm³)</p>
<p>14. (b) 733.59×19.3</p> <p style="text-align: right;">14158.287(g)</p> <p>Allow an answer from 14.1 to 14.2 (kg) inclusive.</p>	<p>M1</p> <p>A1</p> <p>B1</p>	<p>FT 'their volume from (a)' $\times 19.3$</p> <p>FT 'their 14158.287' $\div 1000$</p> <p>Allow 14 from correct working.</p> <p>Note: 14.158(287) or 14.16 or 14.2 (kg)</p>
<p>14.(b) <u>Alternative method (converting to g first)</u></p> <p style="text-align: right;">0.0193 (kg/cm³)</p> <p style="text-align: right;">733.59×0.0193</p> <p>Allow an answer from 14.1 to 14.2 (kg) inclusive</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>FT 'their volume from (a)' and FT 'their 0.0193' provided a place value error has been made.</p> <p>Allow 14 from correct working.</p> <p>Note: 14.158(287) or 14.16 or 14.2 (kg)</p>

<p>2(a)(i) 133×8 1064 (miles)</p>	<p>M1 A1</p>	<p>Mark final answer. Allow 1064 km</p>
<p>2(a)(ii) 8×60 480 (mph)</p>	<p>M1 A1</p>	<p>FT from (a)(i) $60 \times$ 'their 1064' $\div 133$ or 'their 1064' $\div \frac{133}{60}$ or 'their 1064' $\div 2.2(166\dots)$ Allow A1 for $479 \text{ (mph)} < \text{answer} \leq 483.64 \text{ (mph)}$ from $1064 \div 2.2(166\dots)$ rounded or truncated to at least 1 d.p. or similar for a correctly evaluated 'their 1064' $\div 2.2(166\dots)$</p>
<p>2(b) $55 \times 40 \times 23$ 50 600 (cm³) or 50 600 ml or 50.6 litres Unambiguously implies 'Yes' with one of the following: <ul style="list-style-type: none"> • (48 litres =) 48 000 cm³ • 50.6 (litres) • a suitable appropriate statement, e.g. '50 litres is more than 48 litres' </p>	<p>M1 A1 E1</p>	<p>FT from M1 A0 provided appropriate conclusion and conversion is shown Allow 'Yes' with clear use of 1 litre = 1000 cm³, e.g. <ul style="list-style-type: none"> • (48 litres is less than) 50(.6 litres) • 50(.6 litres is greater than 48 litres) • 50 000 (cm³) is greater than 48 000 (cm³) </p>

Unit 2: Intermediate Tier	Mark	Comments
2(c) $a = 43(^{\circ})$	B1	
$b = 137(^{\circ})$	B1	FT $b = 180 -$ 'their a ', provided 'their b ' > 90 and 'their b ' $\neq 112$
$c = 112(^{\circ})$	B1	FT $360 - (68 +$ 'their a ' + 'their b '), provided: <ul style="list-style-type: none">• $112 < \text{'their } a\text{' + 'their } b\text{'}$ < 202• $c \neq 137$• their c' \neq 'their b'
$d = 112(^{\circ})$	B1	FT $d =$ 'their c ', provided $90 < \text{'their } c\text{'}$ < 180

Unit 1: Intermediate Tier	Mark	Comments
9(a)(i) 1×10^5	B1	
9(a)(ii) A suitable calculation, including an <u>appropriate</u> approximation, e.g. $\frac{3\ 100\ 000}{21\ 000}$ or $\frac{3\ 100\ 000}{20\ 000}$ or $\frac{3\ 000\ 000}{20\ 000}$ or $\frac{3\ 000\ 000}{21\ 000}$ or equivalent Answer in the range 142 (people/km ²) to 155 (people/km ²)	M2 A1	Place value must be correct Must include an approximation M1 for the idea to divide (in the correct order), that may also include one place value error, e.g. $\frac{3.1\ million}{20\ 735}$, $\frac{31\ 000\ 000}{20\ 000}$, $\frac{3\ 100\ 000}{20\ 700}$ ISW. Allow 142.8, 142.9 and 143 rounded to 140 Accept equivalents, e.g. 150 written as 1.5×10^2
9(b) Idea that 360 000 is 120% $360\ 000 \div 1.2$ or equivalent 300 000 (people)	B1 M1 A1	Accept from sight of trial to increase 'their value' by 20% provided 'their value' <360 000 Award of M1 also implies previous B1
9(c) (Length) $6.6 \div (4.2 \div 1.4)$ or $6.6 \div 3$ or equivalent Length 2.2 (cm) (Height) $4.2 \times (9.9 \div 6.6)$ or 4.2×1.5 or $1.4 \times (9.9 \div 2.2)$ or equivalent Height 6.3 (cm)	M1 A1 M1 A1	FT $1.4 \times (9.9 \div \text{'their derived length'})$ Note: Length (from $9.9 - 6.6 =$) 3.3(cm) M0 A0 Height (from $1.4 \times (9.9 \div 3.3) =$) 4.2(cm) M1 A1 (FT) Allow answers reversed in the answer space
9(c) <u>Alternative method</u> (Height) $4.2 \times (9.9 \div 6.6)$ or 4.2×1.5 or equivalent Height 6.3 (cm) (Length) $6.6 \div (4.2 \div 1.4)$ or $6.6 \div 3$ or $9.9 \div (6.3 \div 1.4)$ or equivalent Length 2.2 (cm)	M1 A1 M1 A1	FT $9.9 \div (\text{'their derived height'} \div 1.4)$ Allow answers reversed in the answer space

<p>8(a)(i) (Calories in cake(s)) $84 \times 600 \div 100$ ($\div 4$) OR (Mass per cake) $84 \div 4$ ($= 21$)g <u>AND</u> (Calories per 1g of cake) $600 \div 100$ ($= 6$ calories) (Calories in 1 cake 21×6) = 126 (calories) (% of required calories) $\frac{126}{2400} (\times 100)$ or $0.0525 (\times 100)$ or $\frac{5.25}{100}$ 5.25(%)</p>	<p>M1 A2 M1 A1</p>	<p>A1 for any one of the following: • (calories in 4 cakes 84×6) = 504 (calories) • an answer from premature approximation of $100 \div 21$ in the range 4.76 to 4.8 giving an answer in the range 125 to 126.050..(calories) M1 FT 'their derived calories' provided • calories information was used in 'their calculation of calories, and • 'their derived calories' $\neq 600$ e.g. 600 calories (in 100 g), or 6 calories (in 1 g), or similar used in a calculation to derive a number of calories A1 ISW further rounding or truncation Allow 5(%), 5.2(%) or 5.3(%) from correct working If no marks, award SC1 for $(600 \times 84 \div 4 =)$ 12 600</p>
<p>8(a)(i) <u>Alternative method only when working is seen as a single calculation</u> $\frac{600}{2400} \times \frac{84}{100} \times \frac{1}{4} (\times 100)$ or equivalent Two correct stages of simplifying or calculation 5.25 (%)</p>	<p>M3 A1 A1</p>	<p>M2 for $\frac{600}{2400} \times \frac{84}{100} (\times 100)$ or equivalent FT from M2 FT from M2 for an answer of 21(%)</p>
<p>8(a)(ii) $84 \times 515 \div (1360 + 2725 + 515 + 4)$ or $84 \times 515 \div 4604$ 9.4 (g)</p>	<p>M1 A2</p>	<p>A1 for 9.3(96... g) not from premature approximation or $\frac{10815}{1151}$ or 9.40 (g)</p>
<p>8(b)(i) $143 \div 2.2$ 65 (kg)</p>	<p>M1 A1</p>	<p>Answer space takes precedence Accept use of $143 \div 2.205 = 64.85...$ (kg) as a more accurate conversion</p>

<p>8(b)(ii) Any one of the following complete methods for the number of minutes to burn off energy in 1 banana:</p> <ul style="list-style-type: none"> • $92 \div (690 \div 60)$ • $60 \times (92 \div 690)$ • $60 \div (690 \div 92)$ <p style="text-align: right;">8 (minutes)</p>	<p>M2</p> <p>A1</p>	<p>May be seen in stages</p> <p>M1 for any one of the following:</p> <ul style="list-style-type: none"> • $690 \div 60$ (= 11.5) • $92 \div 690$ ($= \frac{2}{15} = 0.1333\dots$) • $690 \div 92$ (= 7.5) <p>CAO. Answer space takes precedence</p>
<p>8(b)(iii) $9 \times 38 \div 60$</p> <p style="text-align: right;">5.7 (km)</p>	<p>M2</p> <p>A1</p>	<p>M1 for sight of any one of the following:</p> <ul style="list-style-type: none"> • 9×38 (= 342) • $38 \div 60$ (= 0.6333....) • $9 \div 60$ (= 0.15) <p>CAO, allow 5700m Answer space takes precedence Do not accept 5700 (km) in the answer space</p>

<p>9(a) (Length of the flagpole below the rod =) $3.8 \times \sin 55^\circ$ or $3.8 \times \cos (90^\circ - 55^\circ)$ or $380 \times \sin 55^\circ$ or $380 \times \cos (90^\circ - 55^\circ)$</p> <p style="text-align: center;">3.11(2...m) or 311(.2.. cm)</p> <p>(Total length $1.5 + 3.11 =$) 4.61 (m) or 461 (cm)</p>	<p>M2</p> <p>A1</p> <p>A1</p>	<p>Or alternative full method M1 for correct working without isolating 'length' $\sin 55^\circ = \frac{\text{length}}{3.8}$ or $\cos (90^\circ - 55^\circ) = \frac{\text{length}}{3.8}$ or $\sin 55^\circ = \frac{\text{length}}{380}$ or $\cos (90^\circ - 55^\circ) = \frac{\text{length}}{380}$</p> <p>Allow 3.1 (m) or 310 (cm)</p> <p>Must be to the nearest cm FT provided at least M1 previously awarded, i.e. for 1.5 + 'their 3(.11)' correctly evaluated, to nearest cm, <u>and</u> 'their 3.11' is to at least 2 decimal places</p> <p>If units are given they must be correct</p>
<p>9(b)(i) $120 \times 64 \div 80$ or 64×1.5 or 120×0.8 or $120 \div 1.25$ or $64 \div \frac{2}{3}$ or equivalent</p> <p style="text-align: center;">96 (cm)</p>	<p>M1</p> <p>A1</p>	<p>Answer space takes precedence</p>
<p>9(b)(ii) $75 \times 80 \div 120$ or $75 \div 1.5$ or $75 \times \frac{2}{3}$ or $80 \div 1.6$ or 80×0.625 or $64 \times 75 \div 96$ or equivalent</p> <p style="text-align: center;">50 (cm)</p>	<p>M1</p> <p>A1</p>	<p>FT from (b)(i) $64 \times 75 \div$ 'their 96' or equivalent</p> <p>Answer space takes precedence</p>

End of solutions