

REVISE

.wales

2.21 – Relative & expected frequency

Mark schemes for the 2.21 question pack

Spec 3.5.3, 3.5.4 – Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 6 questions in the corresponding revise.wales question pack (23 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

7.(a) 3000×0.05 or equivalent. = 150		M1 A1	D1. Allow 5% of 3000 for the M1. C.A.O. SC1 for sight of 3000×0.05 (= 150) within an incorrect solution. e.g. $1000 \times 0.03 + 2000 \times 0.042 + \underline{3000 \times 0.05} + \dots$ (= 30 + 84 + 150 +
7.(b) 0.048 or equivalent e.g. 4.8% or 240/5000 Explanation e.g. 'all data used', 'last point plotted', 'the number of sockets tested was the highest'.		B1 B1	ISW from an answer given as a fraction. Accept any indication that the final reading should give the best estimate.

8.(a)	0.32	B1	
8.(b) (i)	600×0.34 $= 204$	M1 A1	
8.(b)(ii)	$204 - 600/6$ $= 104$	M1 A1	F.T. 'their 204'. M1A1 for '104 out of 600' BUT M1A0 for '104/600'. FT for A1 provided answer is a positive integer.

6.(a)	0.32			
6.(b)	Sample number from Anglesey on 2 nd day = 3000×0.42 = 1260 (Rel.Fqu. for two days =) $\frac{640 + 1260}{2000 + 3000}$ = 0.38	M1 A1 M1 A1		C.F.O. Allow 400 if 50 is used. Allow M1A1 for sight of 1260 e.g. 1260/3000 FT 'their 1260'.
6.(c)	'Answer to part (b)' noted AND Valid explanation e.g. 'more people sampled'	E1		Explanation must refer to the sample being the largest. Allow e.g 'from both days', 'number of people added', 'frequencies are added'. Do not accept 'relative frequencies are added'.

<p>2.(a)</p> <table border="1" data-bbox="225 230 691 333"> <tr> <td>Throws</td> <td>20</td> <td>40</td> <td>60</td> <td>80</td> <td>100</td> </tr> <tr> <td>Heads</td> <td>11</td> <td>18</td> <td>24</td> <td>30</td> <td>37</td> </tr> <tr> <td>Rel. Fq.</td> <td>0.55</td> <td>0.45</td> <td>0.4</td> <td>0.375</td> <td>0.37</td> </tr> </table>	Throws	20	40	60	80	100	Heads	11	18	24	30	37	Rel. Fq.	0.55	0.45	0.4	0.375	0.37	<p>B1 B1</p>	<p>4 32</p>
Throws	20	40	60	80	100															
Heads	11	18	24	30	37															
Rel. Fq.	0.55	0.45	0.4	0.375	0.37															
<p>2.(b) (Mid-points are) 4.5, 14.5 and 24.5. (Estimated total =) $3 \times 4.5 + 5 \times 14.5 + 2 \times 24.5 (= 135)$ $+ 10$ (Estimated mean =) = 13.5 (Difference = $15.2 - 13.5 =$) 1.7</p>	<p>B1 M1 m1 A1 B1</p>	<p>F.T. 'their mid-points' if within group. C.A.O. F.T. for difference between 15.2 and 'their derived estimated mean ($\neq 15.2$)'. Allow -1.7.</p>																		
<p>Organisation and Communication.</p> <p>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 • 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>7.(a) Sight of 0.032 or equivalent e.g. 3.2% or $\frac{160}{5000}$</p> <p>Explanation e.g. 'all data used', 'last point plotted', 'the number of batteries checked was the highest'.</p>	<p>B1</p> <p>E1</p>	<p>Answer line takes precedence. ISW. Allow incorrect probability notation e.g. 160 out of 5000.</p> <p>Accept any indication that the final reading should give the best estimate.</p> <p>Allow 'the more times you repeat an action, the more accurate the estimate is'.</p>										
<p>7.(b)</p> <p>$3000 \times 0.033 \times 0.026$ or $3000 \times 0.033 \times 2.6$</p> <p>(£)2.57(4) or 257(.4)(p) ISW</p>	<p>M2</p> <p>A1</p>	<p>May be done in any order.</p> <p>May be seen in stages or implied in later working. Award M1 for sight of one of the following, allowing one place value error in 0.033 or 0.026 (may be embedded):</p> <ul style="list-style-type: none"> • 3000×0.033 • 99 • $3000 \times (\text{£})0.026$ • $3000 \times 2.6(\text{p})$ • $(\text{£})78$ or $7800(\text{p})$ • 0.026×0.033 • 2.6×0.033 • 0.000858 • 0.0858. <p>Award M1 for sight of the consecutive digits 99 or 78 or 858 in a number involving a place value error e.g. 990 but not 8990.</p> <p>CAO. Allow (£)2.58 or 258(p) (If units are given they must be correct). Incorrect units may imply M2 A0.</p> <p>Award M1 A0 for one of the following answers:</p> <table border="1" data-bbox="890 1261 1382 1411"> <thead> <tr> <th>Answer</th> <th>From</th> </tr> </thead> <tbody> <tr> <td>2(.)34</td> <td>$(3000 \times 0.026 \times 0.03)$</td> </tr> <tr> <td>2(.)10(6) or 2(.)11</td> <td>$(3000 \times 0.026 \times 0.027)$</td> </tr> <tr> <td>2(.)62(2)</td> <td>$(3000 \times 0.026 \times 0.029)$</td> </tr> <tr> <td>2(.)49(6) or 2(.)50</td> <td>$(3000 \times 0.026 \times 0.032)$</td> </tr> </tbody> </table>	Answer	From	2(.)34	$(3000 \times 0.026 \times 0.03)$	2(.)10(6) or 2(.)11	$(3000 \times 0.026 \times 0.027)$	2(.)62(2)	$(3000 \times 0.026 \times 0.029)$	2(.)49(6) or 2(.)50	$(3000 \times 0.026 \times 0.032)$
Answer	From											
2(.)34	$(3000 \times 0.026 \times 0.03)$											
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2(.)49(6) or 2(.)50	$(3000 \times 0.026 \times 0.032)$											

Unit 1. Higher tier		
6. (a)	0.2 AND 0.16	B1
(b)	Suitable uniform scale AND correct plots.	B1 F.T 'their 0.2 and 0.16'.
(c)	0.16 AND e.g. 'because calculated from the greatest number of throws'.	B1 F.T 'their 0.16'.
(d)	Yes AND e.g. 'because 0.16 (or 80/500) is close to 1/6.	B1 F.T 'their 0.16'.
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End of solutions