RECOGNISING ACHIEVEMENT

GCSE

Applications of Mathematics (Pilot)

General Certificate of Secondary Education

Unit **A382/02:** Higher Tier

Mark Scheme for June 2013

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations used in the detailed Mark Scheme.

Annotation	Meaning
	Correct
	Incorrect
	Benefit of doubt
	Follow through
	Ignore subsequent working (after correct answer obtained), provided method has been completed
	Method mark awarded 0
	Method mark awarded 1
	Method mark awarded 2
	Accuracy mark awarded 1
	Independent mark awarded 1
	Independent mark awarded 2
	Misread
	Special case
	Omission sign

These should be used whenever appropriate during your marking.

The **M**, **A, B**, etc annotations must be used on your standardisation scripts for responses that are not awarded either 0 or full marks.
It is vital that you annotate these scripts to show how the marks have been awarded.
It is not mandatory to use annotations for any other marking, though you may wish to use them in some circumstances.

Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
   A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
   B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
   SC marks are for special cases that are worthy of some credit.

2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

   Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

   Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT 180 × (*their* '37' + 16), or FT 300 – $\sqrt{}$(*their* '$5^2 + 7^2$'). Answers to part questions which are being followed through are indicated by eg FT 3 × *their* (a).

   For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.

5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.

   - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
   - **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
   - **nfww** means **not from wrong working**.
   - **oe** means **or equivalent**.
   - **rot** means **rounded or truncated**.
   - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
   - **soi** means **seen or implied**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.

7. In questions with a final answer line following working space,

   (i) if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

   (ii) if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

   (iii) if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation **×** next to the wrong answer.

8. In questions with a final answer line:

   (i) If one answer is provided on the answer line, mark the method that leads to that answer.

   (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

   (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.

9. In questions with no final answer line:

   (i) If a single response is provided, mark as usual.

   (ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.

10. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

11. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

12. Ranges of answers given in the mark scheme are always inclusive.

13. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

14. Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

Question			Answer	Marks	Part Marks and Guidance	
1			Gold increase 4 times; diamond increase about 2 times; gold better or get more from gold Or gold as increase about twice as much as diamond increase Or 14050 × 4.1 = 57605, buy gold	2	**M1** for either gold increase 4 times or 410 ÷ 100 or diamond increase about 2 times or 29100 ÷ 14050 or better with no or incorrect conclusion If **M0** then **SC1** for gold increases by 400% and diamond increases by 200% Or 14050 × **figs** 41	Allow equivalent % or index comparison ie 207 (or 200) compared with 410 or diamond increase by 100% & gold increase by 300% Allow examples using money Allow sensible rounded values used for 29100 and 14050 & for 410 Gold with no reason or just quoting values scores 0 marks
2	**(a)**		49	1		
	(b)		10:30 (am) and 11 (am)	1		
	(c)		(tyre) 15 and (battery) 6	2	**M1** for one correct If **M0** then **SC1** for 15 and 6 reversed	
	(d)		Fully correct	3	**M2** for two of the statements correct in a graph with at most 3 sections Or **M1** for one of the statements correct in a graph with at most 3 sections	(9am, 0) (9:30, 25) (10:15, 25) (11am, 40) Accept lines 'ruled' by eye & points plotted, but no lines for M marks
	(e)		(Team) Red overtook (Team) Blue 10:42	1FT 1FT	Strict **FT** *their* graph for both marks reading ±½ small square	Must have graph to score any marks
3	**(a)**	**(i)**	$\frac{37}{40}$ **oe isw**	1	eg 92.5% or 0.925	**oe** fraction / decimal / percentage Condone rounding to 2dp provided correct fraction or correct working seen Do not penalise arithmetical error if change of form Do not allow ratio , 'out of' or' in'

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	$\frac{54}{60}$ **oe**	1	eg 90% or 0.9	**oe** fraction / decimal / percentage Do not penalise arithmetical error in change of form If answer given in consistent incorrect format as **3(a)(i)** & both would've been correct, do not penalise in **3(a)(ii)**
	(b)		2.3	3	**M2** for (11 + 2 × 14 + 3 × 12 + 5 + 6 × 2) ÷ 40 Or **M1** for 11 + 2 × 14 + 3 × 12 + 5 + 6 × 2 If **M0** then **SC2** for 80.3 Or **SC1** for attempt at sum of products ÷ 40	92 ÷ 40 Condone up to 2 errors / omissions in sum 92 ie not involving the brackets ie no working for *their* 92
	(c)	**(i)**	All arrive within (or earlier) than the expected delivery time (up to 5 days) or higher probability of arriving within expected delivery time	1		Ignore extra reasons provided no contradiction **FT** their reasons if true for their answers in parts **(a)** and **(b)**
		(ii)	Require next day delivery or letters on average (mean) arrive sooner	1		Ignore extra reasons provided no contradiction **FT** their reasons if true for their answers in parts **(a)** and **(b)**
	(d)		Unlikely, repeating a survey doesn't usually generate identical results	1		Must have reason; ignore extra reasons provided no contradiction

Question			Answer	Marks	Part Marks and Guidance	
4	(a)		Correct layout of 12 panels showing overall dimensions or overall dimensions implied and gap dimensions from edge of roof eg 2 rows of 6 each panel 1.2 ↔ & 0.9 ↕ with horizontal gap total of 0.8 or vertical gap total 0.9 with all edge gaps ≥ 0.3	3	**B2** for correct layout of 12 panels showing a gap from each edge and a minimum of one panel dimension or total dimension of block(s) of the 12 panels Or **B1** for a layout of 12 panels that can physically fit on the roof with a gap from at least two adjacent sides If **B0** then **SC2** for correct layout of 13 or 14 panels with correct dimensions of panels & gaps shown Or **SC1** for correct layout of 13 or 14 panels showing a gap from each edge and a minimum of one panel dimension or total dimension of block(s) of the 13 or 14 panels	Allow layouts with gaps between panels with dimensions shown
	(b)	(i)	14(th) 11(th) 12(th) 13(th)	1		Condone 14(th) 12(th) 11(th) 13(th)
		(ii)	Any weather condition that indicates poor light eg fog, cloudy, overcast, snow, stormy	1		Condone rain Ignore extras provided no contradiction
	(c)	(i)	630 minutes or 10 ½ hours or 10.5 hours or 10 hours 30 minutes	2	**M1** for 10.5 or 10 ½ or 630 If **M0** then **SC1** for answer in range 10 hours to 11 hours inclusive or 600 minutes to 660 minutes inclusive	Condone 10:30 & 10.30 for 1 mark Accept h and m as abbreviations Answers may be given in hours and minutes for **SC** mark

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	Allow 8 – 8.5 provided working shown	3	**M2** for 7 – 9.5 provided working shown Or **M1** for attempt to divide shape and/or part area found If **M0** then **SC2** for answer 8 – 8.5 with no working Or **SC1** for answer 7 – 9.5 with no working	Working may be seen on diagram and it is sufficient to see area divided up
	(d)	**(i)**	Conclusion with explanation and specific reference to dates from graph	2	**M1** for conclusion with explanation and no specific reference to dates from graph or explanation with reference to specific dates, but no conclusion	Must have explanation or example that 'fits' their conclusion
		(ii)	10th or 29th 4 – 4.2	2 1 FT	**M1** for indication looking for 16(th) highest bar, may be seen on graph Strict **FT** *their* date provided their date is 9^{th}, 10^{th}, 11^{th}, 21^{st}, 25^{th}, 29^{th}	Allow 16 on answer line for **M1** only For 11^{th} & 21^{st} accept 3.7 - <4 For 9^{th} accept 4.2 – 4.5 For 25^{th} accept 4.1 – 4.4

Question			Answer	Marks	Part Marks and Guidance	
	(e)		(50% of 3500 =) 1750	B1		Follow *their* method for amounts in pence converted to £
			2600 × 43.3 or 112580(p) or 2600 × 0.433 or (£)1125.80	M1		Allow units not given in working **FT** *their* 50% of 3500 provided method shown for **M** marks
			(2600 – 1750) × 3.1 or 2635(p) or (2600 – 1750) × 0.031 or (£)26.35	M1		2600 – 1750 = 850
			1750 × 13 or 22750(p) or 1750 × 0.13 or (£)227.50	M1		Must **FT** arithmetical errors where working seen
			their 1125.80 + *their* 26.35 – *their* 227.50	M1dep	Dep on (*their* units produced × 43.3) + (*their* units exported × 3.1) – (*their* units imported × 13) Units consistent at this stage	Award **M** marks for correct alternative methods eg 2600 × 46.4 scores 1st **M** mark 2600 × 46.4 with 1750 × 3.1 scores 1st 2 **M** marks and **B1** 2600 x 46.4 with 1750 × 16.1 scores 1st 3 **M** marks and **B1**
			£924.65 or 92465p	A1		92465 with no or incorrect units scores 5 marks
5	**(a)**		(56, 36)	2	**M1** for $(\frac{1}{2}$ (40+72), $\frac{1}{2}$ (20+52)) or one of 56 or 36 correct If **M0** then **SC1** for 56 and 36 reversed	

Question			Answer	Marks	Part Marks and Guidance	
	(b)		45.25 – 45.3 Allow 45 provided correct method seen	3	**M2** for $\sqrt{(72 – 40)^2 + (52 – 20)^2}$ Or **M1** for $(72 – 40)^2 + (52 – 20)^2$ If **M0** then **SC1** for √(sum of squares of *their* differences) If correct scale drawing allow **SC1** for answer in range 4.25 – 4.3	$\sqrt{2048}$ $32^2 + 32^2$ or 2048

Question			Answer	Marks	Part Marks and Guidance	
6	(a)		Any evaluated trial between 1 and 2	M1		Evaluated trial means trial and correct outcome, rounded or truncated
			A better evaluated trial	M1dep	Allow 1.4 if 1.3 was first trial	
			An evaluated trial to at least 2dp from 1.31 to 1.35 inclusive	M1dep		Trial / Solution / Difference 1.1 / 0.605 / -0.645 1·2 / 0.864 / -0.386 1.3 / 1.183 / -0.067 1.4 / 1.568 / 1.318 1.5 / 2.025 / 0.775 1·31 / 1.218431 / -0.03156 1·32 / 1.254528 / 0.004528 1·33 / 1.291297 / 0.041297 1·34 / 1.328744 / 0.078744 1·35 / 1.366875 / 0.116875 1.315 / 1.236… / -0.0136 .. 1.316 / 1.24…. / -0.009991 1.317 / 1.24…. / -0.006371 1.318 / 1.247… / -0.00274.. 1.319 / 1.250888… / 0.000888
			1.32	A1	If **M0** then **SC2** for answer 1.32 Or **SC1** for answer 1.31	Note 2nd & third **M1**'s can be earned if 2nd trial is say 1.34, having started with say 1.3

Question			Answer	Marks	Part Marks and Guidance	
	(b)		33.6 and 14.4	4	**M3** for $3 \times \frac{3}{4} \times 64 \times 1/(7 + 3)$ or $7 \times \frac{3}{4} \times 64 \times 1/(7 + 3)$ Or **M2** for $\frac{3}{4} \times 64 \times 1/(7 + 3)$ Or **B1** for $\frac{3}{4} \times 64$ If **B0 M0** then **SC3** for 44.8 and 19.2 or for 11.2 and 4.8 Or **SC2** for $3 \times 64 \times 1/(7 + 3)$ or $7 \times 64 \times 1/(7 + 3)$ or $3 \times 16 \times 1/(7 + 3)$ or $7 \times 16 \times 1/(7 + 3)$ Or **SC1** for $64 \times 1/(7 + 3)$ or $16 \times 1/(7 + 3)$	Allow **M3** for correct values reversed 48

Question			Answer	Marks	Part Marks and Guidance	
7	(a)		£37670	4	**M3** for 46000 – (0.2 × 37400 + 0.4 × (46000 – (37400 + 6475))) or 8330 Or **M2** for (T =) 0.4 × (46000 – (37400 + 6475)) + 0.2 × 374000 Or **M1** for C = 2125 or 0.2 × 37400	Follow through their arithmetical errors 850 + 7480
	(b)		Is A ≤ 7475? B = A – 7475 Is B ≤ 35400? C = B – 35400 T = 0.4 × C + 0.2 × 35400	3	**M2** for 3 or 4 correct in correct boxes Or **M1** for 1 or 2 correct in correct boxes	For all marks condone ? missing If digits consistently transposed eg 7475 written as 7457 etc treat as **MR**
8	(a)	(i)	C correct & marked with sufficient & correct angle / line bisectors seen Or all three correct angle / line bisectors meeting at a single point	3	**M2** for C correct position with no / incorrect / insufficient angle bisectors seen Or **M1** for at least one correct angle or line bisectors	Tolerance +/- 2mm or +/- 2 degrees
		(ii)	Circle centre C radius 2cm ± 2mm	1		Allow for *their* C from part **(i)**

Question			Answer	Marks	Part Marks and Guidance	
	*(b)		12.1 – 12.13 with full correct trig method	5		Allow final answer 12 provided full (trig/Pythagoras) method shown
			Full correct method with premature rounding leading to answer out of range or (x =) 8 × sin 117 / sin 36	4 – 3	For lower mark x / sin 117 = 8 / sin 36 or part of x found & correct to 3 sig figs (or better) or two trig ratios to find all of x or x = 8 × sin *their* 117 / sin 36 For answer in range 12.1 – 12.13 with no working shown allow 3 marks	Follow their method using Pythagoras / trig ratios / sine rule / cosine rule Eg 8 × cos27 + 8 × sin27 / tan36 8cos27 = 7.128.. 8sin27 = 3.63... 8sin27 / tan36 = 4.9989..
			Second step in trig ratio eg 8 × cos27 or x / sin *their* 117 = 8 / sin 36	2 – 1	For lower mark angle 117 or first step of any trig ratio that would lead to finding part of side x or other missing side or triangle height perpendicular to side x Alt: for scale drawing method **SC3** for correct scale drawing and answer in range 12.1 – 12.13 Or **SC2** for correct scale drawing and answer outside range Or **SC1** for correct scale drawing showing at least 2 sides of triangle with angle 27° and length 8 correct or angle 117 seen	Correct scale drawing implies at least two angles (27, 117, 36) ±2° and side 8cm ±2mm
9	**(a)**		60	1		Condone 50% & $\frac{1}{2}$ of 120
	(b)		$\frac{9}{60}$ **oe**	2	**M1** for $\frac{9}{120}$ **oe** or $\frac{9}{60}$ seen with further working	**oe** fraction / decimal / percentage Condone 9 out 60 or 9 in 60 or 9:60 for **M1** only

Question			Answer	Marks	Part Marks and Guidance	
	(c)		Correct conclusion with implication considering all five days justified by like by like comparison of either probability of unauthorised absence or total number unauthorised absent	3	**M2** for 0.01 **oe** Or correct conclusion considering at least one day justified by like by like comparison of either probability of unauthorised absence or total number unauthorised absent Or like by like comparison considering all five days of either probability of unauthorised absence or total number unauthorised absent, but no conclusion Or **M1** for (12 + 7 + 5 + 8 + 10) ÷ (840 × 5) or 9/60 × 840 or 126 or 630 or correct result for *their* b × 840 [×5] or (12 + 7 + 5 + 8 + 10) ÷ 5 or 8.4 Or like by like comparison of at least one day of either probability of unauthorised absence or total number unauthorised absent, but no conclusion Or relevant probability calculation for one day from the table fraction or decimal (0.014…, 0.0083…, 0.00595…, 0.0095…, 0.0119…) If **M1** then also **SC1** for No with comparison of *their* calculated probability of absence from register with $\frac{9}{60}$ or with *their* **(b)**	For all marks allow comparison with *their* **(b)** Their comparison for each day may be inferred from convincing written comments, but must be justified by calculations Eg For 3 marks 0.15 compared with 0.01 Or 0.15 compared with probabilities for each day or 126 compared with 8.4 or 126 compared with each day or 630 compared with 42 Eg For 2 marks 0.15 compared with any probability for one day Or 126 compared with any one of 12, 7, 5, 8 or 10

Question			Answer	Marks	Part Marks and Guidance	
	(d)		Fully correct two way table with labels on each side Yes No and (years) 7 8 9 10 11 (or 1 2 3 4 5) respectively	2	**M1** for two way table with one side labelled Yes No or Years 7 8 9 10 11 (or 1 2 3 4 5)	Condone extra years 12 & 13 or L6 & U6 Condone years 9 10 11 12 13 For yes / no allow **oe** eg truant / did not truant
10	**(a)**		16M + 10P ≤ 120	1		
	(b)		250M + 400P ≤ 2500	1		
	(c)		M = 5 and P = 3 and Profit £21.50	3	**B1** for M = 5 and P = 3 And **M1** for (5 × 2.5) + (3 × 3) If **B0 M0** then **SC2** for (6, 2) and £21 or (2, 5) and £20 or (3, 4) and £19.50 or (3, 5) and £21.50 Or **SC1** for (*their* M × 2.5) + (*their* P × 3) provided *their* M and P integers & in correct region or incorrect profit with (6,2) or (2,5) or (3,4)	M & P transposed with 'correct' profit & no other working
11	**(a)**		8482(.3…)	2	**M1** for $\frac{1}{3} \times \pi \times 15^2 \times 36$	Be sure answer **nfww** Where π = 3.142 accept final answer 8483.4 or 8483 Where π = 3.14 accept final answer 8478
	(b)	**(i)**	$15^2 + 36^2$ $\sqrt{(15^2 + 36^2)}$ or $\sqrt{1521}$ [= 39]	M1 A1		

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	$\frac{x}{360} \times \pi \times 39^2$ or $\frac{x}{360} \times 2 \times \pi \times 39$	B1		Correct use of 39 as radius in sector area/arc length
			$\pi \times 15 \times 39 = \frac{x}{360} \times \pi \times 39^2$ or $2 \times \pi \times 15 = \frac{x}{360} \times 2 \times \pi \times 39$	M1		Equate curved SA & sector area or circumference & arc length May be done in stages
			$\frac{x}{360}$ = 15 / 39 or better	M1		3rd **M1** for correct rearrangement to x = some values may have been calculated
			138 – 138.5	A1		

APPENDIX 1

Exemplar responses for **Q.3(c)(i)**

Response	Mark
Less expensive (or any reference to price)	**0**
Most arrive in 3 days	**0**
No rush for letter to arrive	**0**
More consistent as range is less	**0**
The probability of your letter arriving between the amount of days it specifies is higher than that of CAO (more reliable)	**0**
guaranteed to get package in early part of time	**0**
100% reliable if you want it for definite to arrive within 3-5 days.	**0**
Invitations would be used for this service as they would all be given out on roughly the same day.	**1 BOD**
higher mode easier to predict day of arrival	**1 BOD**
More chance of getting it within 3-5 days (higher probability!)	**1 BOD**
it delivers the letters nearer to the minimum of 3 days rather than the later 5 days	**1 BOD**
Ïf they wanted their letters to be delivered closest to their delivery time	**1 BOD**
All the letters are delivered after 5 days and most of them are delivered within 3 or 4 days. You can send lots of letters	**1 BOD**
a higher percentage of their deliveries arrive on the first out of three days they say the parcels will arrive on	**1**
The deliveries are more consistant and less of their deliveries arrive later than they say. More of CAO's deiveries are later than the expected time delivery	**1**
More chance it arrives when it says it will or has a higher probability to deliver on time'	**1**
Because it will always come between expected time delivery or before	**1**

Exemplar responses for **Q.3(c)(ii)**

Response	Mark
modal amount is lower	**0**
Expected delivery time is only 1 to 3 days	**0**
it is faster	**0**
The results are delivered quicker	**0**
Because they say they will deliver quicker so people would want to order with them	**0**
It delivers letters quicker than ISW	**0**
Most letters arrived between days 1-3.	**1 BOD**
It is much more likely that you will get the package in the first 3 days	**1**
They are much more likely to be able to deliver your letter on the first or second day	**1**
On average the letter will arrive a day before than if sent with ISW (quicker)	**1**
Almost all of the letters are delivered within 1 and 3 days. It is a faster delivery service	**1**
Because it is more likely you will get the parcel faster than using ISW	**1**
because there's more chance that the letter will arrive sooner although slight risk of it arriving late	**1**
Mean delivery time is shorter or faster service by comparing means	**1**

Exemplar responses for **Q.3(d)**

Response	Mark
No there may be postal strikes that week	**0**
No it depends if the courier is in that area	**0**
comments about traffic, different drivers, unpredictable things like snow, different amount of letters	**0**
No something could happen that may make the letter be delivered slower one week compared to the next. Also different letters to different places will take a varying amount of time to be delivered	**0**
No, some of the letters could be lost whilst in the sorting office	**0**
Some delivery times may vary week to week	**0**
Yes, nothing has changed so she should get similar results	**0**
Yes ….	**0**
No could be variations	**0**
No although data is probably very similar there might for e.g be a different delivery person so outside factors might affect the experiment	**1 BOD**
No deliveries didn't always happen on expected days so not much chance of same results	**1**
No you cannot be certain that parcels will arrive on specific days	**1**
No, there may be similarities but it is unlikely the results would be identical	**1**

Exemplar responses for **Q.4(d)(i)**

Response	Mark
Sensible as it is unlikely there will be dramatic changes in a day	**0**
Evan's method is sensible as over those days the weather is only producing 2-3 kW of energy and the average of the 2 days is 2.75	**0**
Not as no obvious trend to graph and not symmetrical	**0**
Sensible as most days are similar to at least one adjacent day	**1**
At many points the number of kWh appears to be approximately between 2 pieces of data on either side ie 9th-11th	**1**
3+2.5/2=2.75 is the average. Evan should have taken a larger average. This is because there is a large difference in some of the results. Evan's method is not sensible	**1**
I dont think that taking the average is sensible because the graph fluctuates and there is no trend in the amount of KWs so you cannot be sure	**1**
Most groups are grouped in similar levels, 4-8 show similar levels, unlikely it will change	**1**
No, I can see this may not be sensible for the unpredictability of graph for example the 13th to 14th of May differ by about 8kwh. This could happen any day so not accurate.	**2**
Not sensible as you can see clear differences between 20th and 22nd the average is 7.75 however on the 21st only about 3.5 was produced.	**2**

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