



# Mark Scheme (FINAL)

## January 2026

Pearson Edexcel International Advanced Level In  
Statistics 1

WST01/01A

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

## General Instructions for Marking

1. The total number of marks for the paper is 75.
2. The Edexcel Mathematics mark schemes use the following types of marks:

### **'M' marks**

These are marks given for a correct method or an attempt at a correct method. In Mechanics they are usually awarded for the application of some mechanical principle to produce an equation.

e.g. resolving in a particular direction, taking moments about a point, applying a suvat equation, applying the conservation of momentum principle etc.

The following criteria are usually applied to the equation.

To earn the M mark, the equation

- (i) should have the correct number of terms
- (ii) be dimensionally correct i.e. all the terms need to be dimensionally correct

e.g. in a moments equation, every term must be a 'force x distance' term or 'mass x distance', if we allow them to cancel 'g' s.

For a resolution, all terms that need to be resolved (multiplied by sin or cos) must be resolved to earn the M mark.

M marks are sometimes dependent (DM) on previous M marks having been earned.

e.g. when two simultaneous equations have been set up by, for example, resolving in two directions and there is then an M mark for solving the equations to find a particular quantity – this M mark is often dependent on the two previous M marks having been earned.

### **'A' marks**

These are dependent accuracy (or sometimes answer) marks and can only be awarded if the previous M mark has been earned. E.g. M0 A1 is impossible.

### 'B' marks

These are independent accuracy marks where there is no method (e.g. often given for a comment or for a graph)

A few of the A and B marks may be f.t. – follow through – marks.

### **3. General Abbreviations**

These are some of the traditional marking abbreviations that will appear in the mark schemes.

- bod – benefit of doubt
  - ft – follow through
  - the symbol  $\checkmark$  will be used for correct ft
  - cao – correct answer only
  - cso – correct solution only. There must be no errors in this part of the question to obtain this mark
  - isw – ignore subsequent working
  - awrt – answers which round to
  - SC: special case
  - oe – or equivalent (and appropriate)
  - dep – dependent
  - indep – independent
  - dp decimal places
  - sf significant figures
  - \* The answer is printed on the paper
  - The second mark is dependent on gaining the first mark
4. All A marks are 'correct answer only' (cao.), unless shown, for example, as A1 ft to indicate that previous wrong working is to be followed through. After a misread however, the subsequent A marks affected are treated as A ft, but manifestly absurd answers should never be awarded A marks.
5. For misreading which does not alter the character of a question or materially simplify it, deduct two from any A or B marks gained, in that part of the question affected.
6. If a candidate makes more than one attempt at any question:
- If all but one attempt is crossed out, mark the attempt which is NOT crossed out.
  - If either all attempts are crossed out or none are crossed out, mark all the attempts and score the highest single attempt.
7. Ignore wrong working or incorrect statements following a correct answer.

## Special notes for marking Statistics exams (for AAs only)

- Any correct method should gain credit. If you cannot see how to apply the mark scheme but believe the method to be correct then please send to review.
- For method marks, we generally allow or condone a slip or transcription error if these are seen in an expression. We do not, however, condone or allow these errors in accuracy marks.

## General Principles for Mechanics Marking

(**N.B.** specific mark schemes may sometimes override these general principles)

- Rules for M marks:
  - correct number of terms
  - dimensionally correct
  - all terms that need resolving (i.e. *multiplied* by cos or sin) are resolved
  - only terms that need resolving are resolved
  - +/- errors are condoned
  - sin/cos confusion is condoned
- Omission or extra  $g$  in a resolution is an accuracy error not method error.
- Omission of mass from a resolution is a method error.
- Omission of a length from a moments equation is a method error.
- Omission of units or incorrect units is not (usually) counted as an accuracy error.
- DM indicates a dependent method mark, i.e. one that can only be awarded if a previous specified method mark(s) has been awarded.
- Any numerical answer which comes from use of  $g = 9.8$  should be given as a decimal to 2 or 3 SF.
- Use of  $g = 9.81$  should be penalised once per (complete) question.
  - N.B. Over-accuracy or under-accuracy of correct answers should only be penalised once per complete question. However, premature approximation should be penalised every time it occurs.
- Marks must be entered in the same order as they appear on the mark scheme.
- In all cases, if the candidate clearly labels their working under a particular part of a question i.e. (a) or (b) or (c)... then that working can only score marks for that part of the question.
- Accept column vectors in all cases.
- Misreads – if a misread does not alter the character of a question or materially simplify it, deduct two from any A or B marks gained, bearing in mind that after a misread, the subsequent A marks affected are treated as A ft

Question Number	Scheme	Marks
1.(a)	[F(5) = ] $\frac{5}{6}$	B1 (1)
1.(b)	[E(X) = ] $-2 \times \frac{1}{4} + 1 \times \frac{1}{6} + 3 \times \frac{1}{3} + 4 \times \frac{1}{12} + 6 \times \frac{1}{6}$ or $\frac{1}{12}(-6 + 2 + 12 + 4 + 12)$ $= \underline{2}$	M1 A1 (2)
1.(c)	[E(X <sup>2</sup> ) = ] $(-2)^2 \times \frac{1}{4} + 1 \times \frac{1}{6} + 3^2 \times \frac{1}{3} + 4^2 \times \frac{1}{12} + 6^2 \times \frac{1}{6}$ (o.e.) or $\frac{1}{12}(12 + 2 + 36 + 16 + 72)$ or $\frac{138}{12}$ or $\frac{23}{2}$ (o.e.)  [Var(X) = ] $\frac{23}{2} - 2^2 = \underline{7.5}$ (o.e.)	M1  M1A1 (3)
Alt(c)	$E(X - \mu)^2 = (-2 - 2)^2 \times \frac{1}{4} + (1 - 2)^2 \times \frac{1}{6} + (3 - 2)^2 \times \frac{1}{3} + (4 - 2)^2 \times \frac{1}{12} + (6 - 2)^2 \times \frac{1}{6}$ $= \underline{7.5}$ (o.e.)	M1M1 A1 (3)
<b>Notes</b>		<b>Total : 6</b>
1.(a)	B1 for $\frac{5}{6}$ or exact equivalents e.g. $\frac{10}{12}$ or $0.8\dot{3}$ isw	
1.(b)	M1 for an attempt at E(X) with at least 3 correct products seen. E(X) ÷ 5 (or n) is M0 May be seen as $-\frac{1}{2} + \frac{1}{6} + 1 + \frac{1}{3} + 1$ or may be implied by 2	
1.(c)	A1 2 cao (answer only 2/2 provided no incorrect method is seen) M1 for an attempt at E(X <sup>2</sup> ) with at least 3 correct products seen. May be seen as $1 + \frac{1}{6} + 3 + \frac{4}{3} + 6$ May be implied by $\frac{23}{2}$ oe E(X <sup>2</sup> ) ÷ 5 (or n) is M0 Allow expression even if labelled as Var(X)	
Alt(c)	M1 for using variance formula with correct substitution ft their E(X) and their E(X <sup>2</sup> ). May be implied by 7.5 provided a correct E(X <sup>2</sup> ) is seen	
Alt(c)	A1 for 7.5 or any exact equivalent e.g. $\frac{15}{2}$ (answer only 3/3 provided no incorrect method is seen)	
Alt(c)	M1 for an attempt at E(X - μ) <sup>2</sup> with at least 3 correct products seen ft on their E(X). May be seen as $4 + \frac{1}{6} + \frac{1}{3} + \frac{1}{3} + \frac{8}{3}$ . If answer ÷ 5 (or n) then M0	
Alt(c)	M1 for an attempt at E(X - μ) <sup>2</sup> with all 6 correct products seen ft on their E(X). May be seen as e.g. $4 + \frac{1}{6} + \frac{1}{3} + \frac{1}{3} + \frac{8}{3}$ If answer ÷ 5 (or n) then M0	
Alt(c)	A1 for 7.5 or any exact equivalent e.g. $\frac{15}{2}$	



Question Number	Scheme	Marks
3.(a)	$[S_{vs} =] 177.311 - \frac{36.8 \times 29}{8} = 43.911 =$ awrt <b><u>43.9</u></b>	A1
	$[S_{ss} =] 209.72 - \frac{36.8^2}{8} = 40.44 =$ awrt <b><u>40.4</u></b>	M1 A1
(b)	$r = \frac{"43.911"}{\sqrt{55.275 \times "40.44"}}, = 0.92875... =$ awrt <b><u>0.929</u></b>	M1, A1 (3)
(c)	e.g. $r$ is close to 1 so there is support for the publisher's belief/data can be described as a linear regression	B1ft (1)
(d)	$b = \frac{"43.911"}{55.275}, = 0.7944... =$ awrt <b><u>0.79</u></b>	M1, A1
(e)	$a = \bar{s} - b\bar{v} = \frac{36.8}{8} - "0.7944..." \times \frac{29}{8} = 4.6 - "0.7944..." \times 3.625 [= 1.720...]$	M1
	$\underline{s = 1.72 + 0.794v}$	A1 (4)
(e)	$\frac{y}{1000} = "1.72" + "0.794" \times \left( \frac{x+50}{200} \right)$	M1
(f)	$\underline{y = 1920 + 3.97x}$	A1ft A1 (3)
	Gradient of textbooks is greater spend more advertising on textbooks	B1ft dB1ft (2)

**Total: 15**

**Notes**

- (a) M1 for a correct expression for  $S_{vs}$  or  $S_{ss}$  may be implied by awrt 43.9 or awrt 40.4  
A1 (for  $S_{vs} =$ ) awrt 43.9  
A1 (for  $S_{ss} =$ ) awrt 40.4 or allow  $\frac{1011}{25}$   
Condone missing labels
- (b) M1 for a correct expression for  $r$ , ft their 43.911 (but not 177.311) and their 40.44 (not 209.72)  
A1 for awrt 0.929 (note awrt 0.929 scores 2/2)
- (c) B1ft for saying it **does** support the belief oe **and** giving a suitable reason e.g. **strong** correlation or as  $r$  is close to 1 ft on their value for  $r$ .  
If  $|r| < 0.5$  then allow e.g. "close to 0" so does not support oe  
condone a reason that 0.929 is approximately 1

- |     |       |  |
|-----|-------|--|
| (d) | M1    | for a correct expression for $b$ , ft their 43.911 and allow 3sf values to be used. Implied by awrt 0.79   |
|     | A1    | for awrt 0.79 or allow an exact fraction including the 3sf values e.g. $\frac{439}{553}$   |
|     | M1    | for a correct method for $a$ , ft their value of $b$ scored for the values correctly substituted or implied by a correct equation  |
|     | A1    | for <b>equation</b> for $s$ in terms of $v$ with $a = \text{awrt } 1.72$ and $b = \text{awrt } 0.794$  |
| (e) | M1    | for correct substitution into their equation. Must be in $y$ and $x$ . May attempt to find summary statistics in terms of $x$ and $y$ before finding the regression line $y$ on $x$ – in such cases it needs to be a fully correct method, allowing 1 slip but correct value for $d$   |
|     | A1ft  | for $d = \text{awrt } 3.97$ (accept awrt 4.0) or $5 \times (\text{their } b)$ (correct to 2 sig. figs.) provided M1 is scored  |
|     | A1    | for $c = \text{awrt } 1920$ (to 3sf) provided M1 is scored   |
| (f) | B1ft  | for a suitable comparison based on gradients, following through on their gradients<br>Condone comparison of '3.97x' and '1.2x'. Must be a comparison not just stating a fact. Does not need to be in context. Ignore other statements provided they do not contradict the comparison<br>Do not allow substituting in values unless it is used to compare gradients i.e. they would need to substitute in at two different values for $x$ (or $v$ ) for both lines. |
|     | dB1ft | dependent on the previous B mark. It is for recommending spend more on advertising textbooks (allow "yes" to mean spending more on advertising textbooks).<br><b>Must be consistent with their correct comparison from their equations.</b><br><b>If gradient in (e) &lt; 1.2 then a comparison of gradients leading to spending on novels.</b>  |

Question Number	Scheme	Marks
4. (a)	$[P(S = 1) = ] 0$	B1 (1)
(b)	$[P(S > 2) = ] 1 - P(S = 2)$ or $[P(S > 2) = ] P(S = 3) + P(S = 4) + P(S = 5)$ $= 1 - \left(\frac{2}{5} \times \frac{1}{4}\right) = \frac{9}{10}$ $= \frac{3}{5} \times \frac{2}{4} \times \frac{1}{3} \times 2 + \frac{3}{5} \times \frac{2}{4} \times \frac{2}{3} \times \frac{1}{2} \times 6 + \frac{3}{5} \times \frac{2}{4} \times \frac{1}{3}$ $= \frac{1}{5} + \frac{3}{5} + \frac{1}{10} = \frac{9}{10}$	M1 M1 A1 (3)
Alt(b)	$[P(S > 2) = ] P(\text{at most one blue in first 2})$ $= \frac{3}{5} \times \frac{2}{4} + 2 \times \frac{3}{5} \times \frac{2}{4} = \frac{9}{10}$	M1 M1A1 (3)
(c)	$[P(S = 3) = ] \left(\frac{3}{5} \times \frac{2}{4} \times \frac{1}{3} + \frac{2}{5} \times \frac{3}{4} \times \frac{1}{3}\right) = \frac{1}{5}$	M1 A1 (2)
(d)	$[P(S = 3   2\text{nd is blue}) = ] \frac{P(S = 3 \cap 2\text{nd is blue})}{P(2\text{nd is blue})} = \frac{\frac{3}{5} \times \frac{2}{4} \times \frac{1}{3}}{\frac{3}{5} \times \frac{2}{4} + \frac{2}{5} \times \frac{1}{4}} = \frac{\frac{1}{10}}{\frac{2}{5}} = \frac{1}{4}$	M1 A1 (2)
(e)	$[P(S = 5) = ] 4 \times \left(\frac{3}{5} \times \frac{2}{4} \times \frac{1}{3} \times \frac{2}{2} \times \frac{1}{1}\right) = \frac{2}{5}$	B1 M1 A1 (3)
Alt(e)	$[P(S = 5) = ] 1 - P(2 \leq S \leq 4) = 1 - \frac{1}{10} - \frac{1}{5} - \frac{3}{10} = \frac{2}{5}$	B1M1A1

Notes		Total: 11
(a)	B1 cao	
(b)	M1 for writing or using $1 - P(S = 2)$ or $P(S = 3) + P(S = 4) + P(S = 5)$ . Condone $1 - P(S \leq 2)$ M1 for a correct expression for $P(S = 2)$ or $P(S = 3) + P(S = 4) + P(S = 5)$ Ignore labelling. May be implied by $\frac{1}{10}$ or $\frac{9}{10}$ but not if from an incorrect method. May see use of combinations e.g. $\frac{1}{{}^5C_2}$	
	A1 $\frac{9}{10}$ oe Note: $P(S > 2) = P(S = 3) + P(S = 4) + P(S = 5)$ send to review	
Alt(b)	M1 for explaining or indicating that there is at most one blue in the first 2 M1 for a correct expression A1 $\frac{9}{10}$ oe	

(c) M1 for both correct products (or  $2 \times \dots$ ) and no others. May see use of combinations e.g.  $\frac{2}{{}^5C_2}$ . May be implied by  $\frac{1}{5}$  oe  
 Give benefit of the doubt if  $\frac{3}{5} \times \frac{2}{4} \times \frac{2}{3}$  oe on its own is seen where the x2 is within the calculation of one product

A1  $\frac{1}{5}$  oe

(d) M1 for a correct ratio of probabilities expression (in symbols or described) or ft their values (num<denom).  
 Do not withhold this mark if they subsequently proceed to e.g. multiply  $P(S = 3)$  and  $P(2\text{nd is blue})$  in the numerator (assuming independence)

May see use of combinations e.g.  $\frac{1}{{}^4C_1}$ . May be implied by  $\frac{1}{4}$  oe

A1  $\frac{1}{4}$  oe

(e) B1 for  $\times 4$  or the sum of 4 identical products

M1 for any one product correct. May use combinations e.g.  $\frac{1}{{}^5C_2}$

A1  $\frac{2}{5}$  oe (note correct answer scores 3/3)

Alt(e)

B1 for writing  $1 - (P(S = 2) + P(S = 3) + P(S = 4))$  oe Condone  $1 - P(S \leq 4)$

M1 for an attempt at the three terms with at least one product correct

A1  $\frac{2}{5}$  oe (note correct answer scores 3/3)

NOTE:

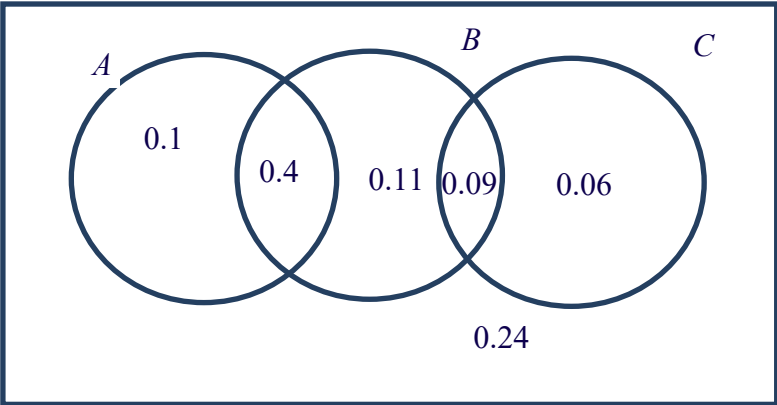
$s$	2	3	4	5
$P(S = s)$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{2}{5}$

**Note Allow MR using 5 + 2 socks. Deduct up to 2 A1 marks**

Question Number	Scheme	Marks
<b>5(a)</b>	<p><math>0.9 &lt; x \leq 1.1</math> group - width <b>0.5</b> (cm)</p> <p>e.g. <math>1.5 \text{ (cm}^2\text{)}</math> is 2 seeds <u>or</u> <math>6.75 \text{ (cm}^2\text{)}</math> is 9 seeds) <u>or</u> <math>0.5c = 6.75</math> oe <u>or</u> 45  <u>or</u> <math>\frac{10}{3}</math></p> <p><math>0.9 &lt; x \leq 1.1</math> group - height <b>13.5</b> (cm)</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>(3)</p>
<b>(b)</b>	The data are continuous oe	B1 (1)
<b>(c)</b>	<p>Mean = <math>\frac{67.8}{48} = 1.4125</math> awrt 1.41 condone <math>\frac{113}{80}</math></p> <p><math>\sigma = \sqrt{\frac{101.56}{48} - \left(\frac{67.8}{48}\right)^2} = 0.347\dots</math> awrt 0.347 (<math>s =</math> awrt 0.351)</p>	<p>B1</p> <p>M1dM1A1</p> <p>(4)</p>
<b>(d)</b>	<p>Median = <math>[1.3] + \frac{3}{11} \times 0.2</math> allow <math>(n + 1) = [1.3] + \frac{3.5}{11} \times 0.2</math>  = awrt <b>1.35</b> ( or if using <math>(n + 1)</math> allow awrt 1.36)</p>	<p>M1</p> <p>A1</p> <p>(2)</p>
<b>(e)</b>	$\frac{27}{48} = \frac{9}{16}$ or 0.5625 or 0.563	B1 (1)
<b>(f)</b>	<p>Mean increases <b>AND</b> standard deviation decreases  e.g. the 0.95 increases to 1.4 and is now closer the mean</p>	<p>B1</p> <p>dB1</p> <p>(2)</p>
<b>Notes</b>		<b>Total: 13</b>
<b>(a)</b>	<p>B1 correct width. May see width = 1.5 copied from the question so look for subsequent work which appears to be their width if not clearly labelled</p> <p>M1 for attempting to find the scale factor. A correct equation in any form scores this mark e.g. <math>\frac{1.5}{2} = \frac{0.5h}{9}</math> . Also score for sight of 6.75 ignore any labelling</p> <p>May use the formula height of class = <math>k \times \frac{\text{frequency}}{\text{class width}} \Rightarrow 1 = k \left( \frac{2}{2.7 - 2.1} \right)</math></p> <p>Score for sight of <math>\frac{10}{3}</math> or 45 which may also be seen in <math>\frac{10}{1} = \frac{45}{h}</math></p> <p>May be implied by a correct height.</p> <p>A1 correct height</p>	
<b>(b)</b>	B1 for a valid reason that the data are continuous oe e.g. allow not discrete Do not allow continuous <u>uniform</u> distribution	
<b>(c)</b>	<p>B1 awrt 1.41 – cannot be scored if only seen within the calculation for the variance.  Condone as a fraction but not <math>\frac{67.8}{48}</math></p>	

	M1	attempt at $\frac{101.56}{48} - \mu^2$ no need for square root ( allow $s$ ). May attempt $\sum fy^2$ using the table – look for an attempt with at least 3 correct products. May be implied by awrt 0.12 or $\frac{2317}{19200}$ or if $s$ then $\frac{2317}{18800}$ . May be implied by awrt 0.35
	dM1	dep on previous method mark for using $\sqrt{\frac{101.56}{48} - \mu^2}$ allow $s$ May be implied by awrt 0.35
(d)	A1	awrt 0.347 (or if using sample sd then awrt 0.351)
	M1	for a correct fraction: $[1.3] + \frac{3}{11} \times 0.2$ or $m = 1.5 - \frac{8}{11} \times 0.2$ or alternatively allow the equation: $\frac{24-21}{m-1.3} = \frac{11}{0.2}$ oe May be implied by $\frac{149}{110}$ May be implied by awrt 1.35 or if using $n+1$ then awrt 1.36
	A1	awrt 1.35 (note 1.3545 may be rounded to 1.355 which is fine) If using $(n+1)$ then allow awrt 1.36) Do not accept a fraction
(e)	B1	awrt 0.563
(f)	B1	for suggesting the mean increases and sd decreases
	dB1	dependent on the previous B mark. Gives <b>complete</b> reasoning why the mean increases and sd decreases. May refer to $\sum fy$ increasing which increases the mean instead of specifically referencing 0.95 condone use of e.g. close for closer ignore any non-contradictory statements

Question Number	Scheme	Marks
6. (a)	$[P(A < 388) = 0.001 \Rightarrow] \frac{388 - \mu}{\sigma} = \pm z \quad (\text{where }  z  > 2.25)$ <p style="text-align: right;">So <math>388 - \mu = -3.0902\sigma</math> (o.e.)</p> $[P(A > 410) = 0.0197 \Rightarrow] \frac{410 - \mu}{\sigma} = \pm z \quad (\text{where } 1 <  z  < 2.5)$ <p style="text-align: right;">So <math>410 - \mu = 2.06\sigma</math> (o.e.)</p> <p>So <math>22 = 5.1502\sigma</math> (calc gives 5.1502323...) <math>\Rightarrow \mu = \dots, \sigma = \dots</math>  <math>\sigma = 4.2716\dots</math> (awrt <b>4.27</b>) and <math>\mu = 401.20\dots</math> (awrt <b>401</b>)</p>	M1 M1 dM1 A1, A1 (5)
	<b>Notes</b>	<b>Total: 9</b>
(a)	M1 for an attempt to standardise with 388 and set equal to $\pm a z$ value where $ z  > 2.25$ M1 for an attempt to standardise with 410 and set equal to $\pm a z$ value where $1 <  z  < 2.5$ <b>Note standardisation is required so M1M1 is required to score dM1A1A1</b> dM1 dependent on both of the previous Ms. For solving their 2 linear equations and proceeding to values for $\sigma$ and $\mu$ You do not need to check the mechanics of solving which may be via a calculator. May be implied by correct values for $\sigma$ and $\mu$ A1 for $\sigma =$ awrt 4.27 (must come from accurate $z$ -values – 3sf or better seen somewhere in their solution) A1 for $\mu =$ awrt 401 Note (M1M1M1A0A1 is possible) <b>Note that if they form two the equations <math>388 - \mu = 3.0902\sigma</math> and <math>410 - \mu = -2.06\sigma</math> this leads to <math>\sigma =</math> awrt -4.27 <math>\mu =</math> awrt 401 which is A0A0</b>	
(b)	M1 for 3 <b>correct</b> values of $x$ including signs which may be embedded in a calculation M1 for an attempt to find $P(388 < A < 410)$ (correct numerical expression for 0.9793) or implied by 0.9793 Look out for valid attempts at using their part (a) and standardising to find $P(388 < A < 410)$ which can still score this mark. M1 dep on any 3 values of $X$ and 3 probs. For an expression for $E(X)$ using their value for $P(388 < A < 410)$ condone sign slips for this mark A1 for awrt 0.14 (so don't insist on 2dp). Condone awrt 14p Accept 0.13 if correct answer is seen beforehand	

Question Number	Scheme	Marks
7(a)	$P(A \cap B) = 0.4$ $P(A B) = \frac{0.4}{P(B)}$ $\frac{0.4}{P(B)} = \frac{2}{3}$ $P(B) = 0.6$	B1  M1  A1  (3)
(b)	$P(A'   B') = \frac{0.5 + 0.4 - 0.6}{0.4} = \frac{3}{4} \quad \text{or} \quad \frac{"0.24" + "0.06"}{0.4} = \frac{3}{4}$	M1A1  (2)
(c)	$P(B \cap C) = 0.6 \times 0.15$ $= 0.09$	M1 A1  (2)
(d)		M1 M1 M1 A1ft A1  (5)
		<b>Total 12</b>
<b>Notes</b>		
<b>Mark parts (a), (b), (c) and (d) together. If there is a contradiction between the Venn diagram and the relevant part then the answer stated in the relevant part takes precedence.</b>		
(a)	B1 $P(A \cap B) = 0.4$ oe may be implied by further work. May be seen on the Venn diagram in (d)  M1 sets $\frac{\text{their } 0.4}{P(B)} = \frac{2}{3}$ (must be numerical) May be implied by 0.6  A1 $[P(B) = ] 0.6$ oe (correct answer with no incorrect working seen 3/3)	

(b) M1 May attempt e.g.

$$\frac{P(A' \cap B')}{P(B')} = \frac{P(A') + P(B') - P((A \cap B)')}{P(B')} = \frac{1 - (P(A) + P(B) - P(A \cap B))}{P(B')}$$

OR  $\frac{P(C \cap B') + P((A \cup B \cup C)')}{P(B')}$

**Must see the values substituted in**

e.g.  $\frac{0.5 + \text{their } 0.4 - \text{their } 0.6}{1 - \text{their } 0.6}$  or  $\frac{1 - (0.5 + \text{their } 0.6 - \text{their } 0.4)}{\text{their } (0.1 + 0.24 + 0.06)}$   
 or  $\frac{\text{their } 0.24 + \text{their } 0.06}{\text{their } (0.1 + 0.24 + 0.06)}$

provided num < denom and both are probabilities

A1  $\frac{3}{4}$  oe (correct answer with no incorrect working seen scores 2/2)

(c) M1 their (a)  $\times 0.15$  (provided  $0 < \text{their (a)} < 1$ ) – may be implied by their 0.09. You may need to check this on your calculator.

A1 0.09 oe (correct answer with no incorrect working seen scores 2/2). Allow to be scored if seen on the Venn diagram in (d)

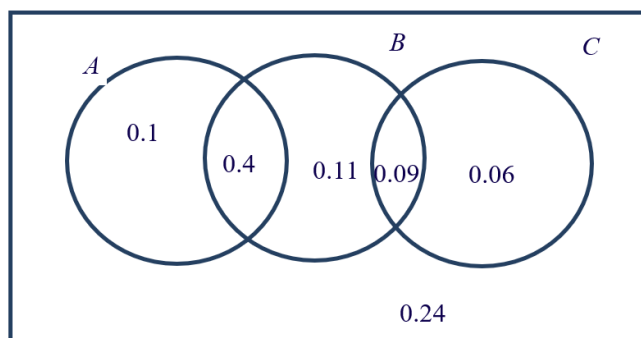
(d) M1 3 overlapping circles labelled *A*, *B* and *C* oe where  $P(A \cap C) = 0$  See main scheme diagram. May appear in a different order. Condone two of the circles to be labelled implying the labelling of the third.  
 M0 if one circle lies entirely inside another or if one is entirely separate (usually *C*) Do not allow blanks as zeros.

M1 for the two sections of *C* look for  $P(B \cap C) = \text{their } 0.09$  **and**  
 $P(C \cap B') = 0.15 - \text{their } 0.09$  from (c) both non-zero

M1 for the two sections of *A* look for  $P(A \cap B) = \text{their } 0.4$  from (a) and  
 $P(A \cap B') = 0.5 - \text{their } 0.4$  from (a) both non-zero

A1ft **dep on all previous method marks.** For 0.24 or prob outside so that all 6 probs add to 1 or ft on their diagram

A1 all correct including a box and all three labels.



Note: No labels allow access to 2nd and 3rd M1 marks ONLY