Pearson Edexcel

Mark Scheme (Results)

Summer 2023

Pearson Edexcel International GCSE
In Mathematics A (4MA1) Paper 1FR

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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.
- **Types of mark**
    - M marks: method marks
    - A marks: accuracy marks
    - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
    - cao – correct answer only
    - ft – follow through
    - isw – ignore subsequent working
    - SC – special case
    - oe – or equivalent (and appropriate)
    - dep – dependent

- indep – independent
- awrt – answer which rounds to
- eeoo – each error or omission

- **No working**

  If no working is shown, then correct answers normally score full marks.

  If no working is shown, then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams) and award any marks appropriate from the mark scheme.

  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

  If a candidate misreads a number from the question. E.g. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.

  If there is no answer on the answer line, then check the working for an obvious answer.

- **Parts of question**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another,

International GCSE Maths				
Apart from Questions 9, 10, 17, 18b, 28 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		Tuesday	1	B1 accept Tues, Tue, Tu Allow 11 362
(b)		Nine thousand six hundred and fifty three	1	B1
(c)		8930	1	B1 cao
(d)		9 hundreds	1	B1 accept 100(s), hundred(s), 900, nine hundred(s)
(e)		17 391	1	B1 cao
				Total 5 marks

2 (a)		unlikely	1	B1
(b)		× at 0	1	B1
(c)		1 odd number and 2 even numbers	1	B1
				Total 3 marks

3	(a)		Pentagon	1	B1	
	(b)		7.6	1	B1	accept 7.4 – 7.8
	(c)		*T* marked at interior angle *E* **or** exterior angle *C*	1	B1	must be the interior angle at *E* or exterior angle at *C*. Allow both angles to be marked but no others. Allow *t*
						Total 3 marks

4	(a)		16 squares shaded	1	B1	cao
	(b)		70	1	B1	cao
	(c)		0.049, 0.14, 0.4, 0.459, 0.49	1	B1	oe
						Total 3 marks

5	(a)		Correct explanation	1	B1	eg ‘she added 4’, ‘add 4’, +4, rule is $4n - 2$, goes up by 4, $4 \times 5 - 2$ (= 18)
	(b)	**Acceptable answers** 1. (the) sequence is even 2. (217) is odd or not even 3.‘nth term is $4n - 2$ which will always be even’ 4. ‘sequence goes 214, 218’ 5. (the) 54^{th} term is 214 6. it would be 218 (not 217) 7. $4n - 2$ so n is not an integer/whole number 8. 219 ÷ 4 oe (= 54.75) not an integer/whole number 9. not 2 less than a multiple of 4 10. does not end with 0, 2, 4, 6 and 8 (must have all 5 numbers) 11. each digit has an even digit at the end/does not end in an even number **Not acceptable answers** 1. adding 4 each time will not lead to 217 2. it goes past 217 3. 217 ÷ 4 (= 54.25) not an integer/whole number	Correct explanation	1	B1	
						Total 2 marks

6	eg 9.25 × 1000 (= 9250) **or** 750 ÷ 1000 (= 0.75)		4	M1	for a correct conversion	M2 for 750 × 13 (= 9750)
	eg "9250" ÷ 750 (= 12(.333…) or 13) **or** 9.25 ÷ "0.75" (= 12(.333…) or 13) **or** 750 × 12 (= 9000) **or** 0.75 × 12 (= 9) **or** eg 750, 1500, 2250, ……., 9000 or 0.75, 1.5, 2.25, …….., 9 **or** 9250, 8500, 7750, ……., 250 or 9.25, 8.5, 7.75, ……., 0.25			M1	for a method to calculate the number of bags required. Ft incorrect conversion **or** for repeated addition to at least 9000 or 9 (allow one error) **or** for repeated subtraction to at least 250 or 0.25 (allow one error)	
	eg "13" × 58			M1	for a complete method. Ft incorrect conversion – an attempt must have been made at a conversion to gain this mark. "13" must come from a number that is rounded up **or** ft subtraction/addition method to find the number of bags allowing only one error "13" must come from a number that is rounded up	
	Correct answer scores full marks (unless from obvious incorrect working)	754		A1	cao SCB1 for 9.25 ÷ 750 (= 0.123(333……))	
						Total 4 marks

7	(a)		12*ac*	1	B1	
	(b)		5*d* – 2*e*	2	B2	for 5*d* – 2*e* oe (B1 for 5*d* or – 2*e*)
	(c)	4*x* = 23 + 7 **or** 4*x* = 30 oe **or** $x - \frac{7}{4} = \frac{23}{4}$ **or** (23 + 7) ÷ 4 **or** 30 ÷ 4		2	M1	for a correct first step **or** a correct calculation for *x*
		Correct answer scores full marks (unless from obvious incorrect working)	7.5		A1	oe eg $\frac{15}{2}$, $7\frac{1}{2}$, $\frac{30}{4}$
						Total 5 marks

8	(a)		97	1	B1	
	(b)		43	1	B1	
	(c)	16 **or** 125		2	M1	for sight of 16 **or** 125
		Correct answer scores full marks (unless from obvious incorrect working)	2000		A1	
						Total 4 marks

9	eg (8 + 8) + (8 + 4) + (8 + 8 + 6) + (8 + 8 + 2) (= 68) **or** 16 + 12 + 22 + 18 (= 68) **or** 8.5 × 8 (= 68)		4	M2 (M1	for a method to find the total cars sold in April with at least 3 out of 4 correct and intention to add **or** sight of 68 for a method to find the totals for each employee with at least 3 out of 4 correct **OR** method to find the totals for 2 employees and intention to add)
	eg 60 × 0.15 (= 9) oe **or** 60 × 1.15 (= 69) oe			M1	(indep) for a method to increase 60 by 15% or 15% of 60 or sight of 69 or 9 Allow $\frac{\text{"68"}}{1.15}(=59.1...)$
	Working required	68 and 69 or 68 and 1 more needed		A1	Suitable conclusion e.g 59.1 v 60
					Total 4 marks

10	*BCD* = 108		5	M1	for angle *BCD* = 108 can be seen on diagram
	eg 360 – (“108” + 135 + 54) (= 63) or 360 – 297 (= 63)			M1	for method to find angle *BAD* can be seen on diagram (63 or 297 implies the previous M1)
	Correct answer scores full marks (unless from obvious incorrect working)	117		A1	for 117 can be seen on diagram
	(i) Vertically opposite angles are equal Vertically opposite angles are equal (ii) Angles in a quadrilateral sum to 360^{o} or angles in a quadrilateral sum to 360° Accept “4-sided shape” (iii) Angles on a straight line add to 180° or angles on a straight line add to 180°			B2 (B1	(dep on M1) for two correct reasons for their method (dep on M1) for 1 correct reason for their method)
					Total 5 marks

11	(a)		5	1	B1	
	(b)		3	1	B1	
	(c)	eg 0 × 3 + 1 × 7 + 2 × 6 + 3 × 11 + 4 × 1 + 5 × 2 (= 66) **or** 0 + 7 + 12 + 33 + 4 + 10 (= 66)		3	M1	for at least 5 correct products and intention to add
		“66” ÷ 30			M1	
		Correct answer scores full marks (unless from obvious incorrect working)	2.2		A1	oe
						Total 5 marks

12	(−1, 6) (0, 4) (1, 2) (2, 0) (3, −2) (4, −4)	For a correct line between $x = -1$ and $x = 4$	3	B3 For a correct line between $x = -1$ and $x = 4$ B2 For a correct straight line segment through at least 3 of (−1, 6) (0, 4) (1, 2) (2, 0) (3, −2) (4, −4) **OR** for all of (−1, 6) (0, 4) (1, 2) (2, 0) (3, −2) (4, −4) plotted but not joined **OR** for a line drawn with a negative gradient through (0, 4) and clear intention to use a gradient of −2 B1 For at least 2 correct points stated (may be in a table) **OR** for a line drawn with a negative gradient through (0, 4) **OR** for a line with a gradient of −2
	Correct answer scores full marks (unless from obvious incorrect working)			**Total 3 marks**

13	eg 7.5 × 5 (= 37.5) oe **or** 8 × (10 – 7.5) (= 20) oe **or** 10 × 5 (= 50) oe **or** (10 – 7.5) × (8 – 5) (= 7.5) oe **or** 10 × 8 (= 80) oe **or** 7.5 × (8 – 5) (= 22.5) oe	eg 8 ÷ 0.5 (= 16) **or** (10 – 7.5) ÷ 0.5 (= 5) **or** (8 – 5) ÷ 0.5 (= 6) **or** 10 ÷ 0.5 (= 20) **or** 5 ÷ 0.5 (= 10) **or** 7.5 ÷ 0.5 (= 15)		5	M1	for a method to find a relevant area **OR** a method to find the number of tiles along one 'row'
	eg "37.5" + "20" (= 57.5) oe **or** "50" + "7.5" (= 57.5) oe **or** "80" – "22.5" (= 57.5) oe	eg "16" × "5" (= 80) **or** "10" × "15" (= 150) **or** "5" × "6" (= 30) **or** "10" × "20" (= 200)			M1	for a method to find the total area of the shape **OR** a method to find the number of tiles needed for one rectangle
	"57.5" ÷ 0.5^2 (= 230) oe or "575 000" ÷ 10 000 ÷ 0.5^2 oe or "57.5" ÷ "0.25" (= 230) oe or "57.5" ÷ ("2500" ÷ 10 000) (= 230) oe	eg "80" + "150" (= 230) **or** "30" + "200" (= 230)			M1	dep on M1 for a method to find the total number of tiles required (consistent units)
	"230" × 4 (= 920)				M1	dep on previous M1 for multiplying the total number of tiles by 4
	Correct answer scores full marks (unless from obvious incorrect working)		15 hours 20 minutes		A1	SCB1 for 0.5 × 0.5 (= 0.25) if no other marks are awarded
						Total 5 marks

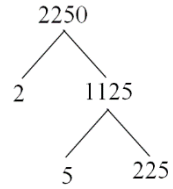
13 **ALT**	eg 750 × 500 (= 375 000) oe **or** 800 × (1000 – 750) (= 200 000) oe **or** 1000 × 500 (= 500 000) oe **or** (1000 – 750) × (800 – 500) (= 75 000) oe **or** 1000 × 800 (= 800 000) oe **or** 750 × (800 – 500) (= 225 000) oe	eg 800 ÷ 50 (= 16) **or** (1000 – 750) ÷ 50 (= 5) **or** (800 – 500) ÷ 50 (= 6) **or** 1000 ÷ 50 (= 20) **or** 500 ÷ 50 (= 10) **or** 750 ÷ 50 (= 15)		5	M1	for a method to find a relevant area **OR** a method to find the number of tiles along one 'row'
	eg "375 000" + "200 000" (= 575 000) oe **or** "500 000" + "75 000" (= 575 000) oe **or** "800 000" – "225 000" (=575 000) oe	eg "16" × "5" (= 80) **or** "10" × "15" (= 150) **or** "5" × "6" (= 30) **or** "10" × "20" (= 200)			M1	for a method to find the total area of the shape **OR** a method to find the number of tiles needed for one rectangle
	"575 000" ÷ 50^2 (= 230) oe or "57.5" × 10 000 ÷ 50^2 oe or "575 000" ÷ "2500" (= 230) or oe "575 000" ÷ ("0.25" × 10 000) (= 230) oe	eg "80" + "150" (= 230) **or** "30" + "200" (= 230)			M1	dep on M1 for a method to find the total number of tiles required (consistent units)
	"230" × 4 (= 920)				M1	dep on previous M1 for multiplying the total number of tiles by 4
	Correct answer scores full marks (unless from obvious incorrect working)		15 hours 20 minutes		A1	SCB1 for 50 × 50 (= 2500) if no other marks are awarded
						Total 5 marks

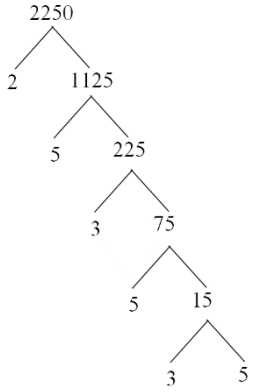
14		$F = 2r + 7h$	3	B3	for $F = 2r + 7h$ oe
				(B2	for $2r + 7h$ **or** $F = 2r + ah$ **or** $F = br + 7h$ **or** $F = 2h + 7r$)
				(B1	for $2r + ah$ **or** $br + 7h$ **or** $2h + 7r$ **or** $F = 2r$ **or** F = $7h$ **or** for F = an incorrect expression in r and h)
	Correct answer scores full marks (unless from obvious incorrect working)				**Total 3 marks**

15	eg $\frac{21}{35}$ and $\frac{10}{35}$ **or** $\frac{21n}{35n}$ and $\frac{10n}{35n}$		2	M1	for finding a common denominator with at least one fraction correct
	$\frac{21}{35}+\frac{10}{35}=\frac{31}{35}$ $\frac{21n}{35n}+\frac{10n}{35n}=\frac{31n}{35n}=\frac{31}{35}$	Shown		A1	dep on M1, for a complete correct method leading to $\frac{31}{35}$
	Working required				**Total 2 marks**

16	1700 ÷ 2 (= 850)	M2 for eg 1700 × $\frac{7}{2}$ (= 5950) **or** 1700 × $\frac{5}{2}$ (= 4250)		4	M1	for finding the value of one share	M2 for a complete method to find the cost of Seiso's share **or** the total of Roland and Seiso's share
	"850" × 5 (= 4250) **or** "850" × (2 + 5) (= 5950) or 1700 + "4250" (= 5950)				M1	for finding the cost of Seiso's share **or** the total of Roland and Seiso's share	
	eg 1700 + "4250" + (1700 + 2150) **or** "5950" + (1700 + 2150) **or** "5950" + 3850				M1	for a complete method	
	Correct answer scores full marks (unless from obvious incorrect working)		9800		A1	SCB1 for 1700 ÷ 5 (= 340) or 1700 ÷ 7 (= 242(.85…) or 243) or 2150 ÷ 7 (= 307(.14…)) or 2150 ÷ 2 (= 1075) or 2150 ÷ 5 (= 430)	
							Total 4 marks

<table>
<tr>
<td>17</td>
<td>e.g.
$2 \times 5 \times 225$ or
$5 \times 5 \times 90$ or $5^2 \times 90$
$3 \times 5 \times 150$ or
$3 \times 3 \times 250$ or $3^2 \times 250$

e.g.
<table><tr><td>2</td><td>2250</td></tr><tr><td>5</td><td>1125</td></tr><tr><td></td><td>225</td></tr></table>
e.g.
 
</td>
<td></td>
<td>3</td>
<td>M1</td>
<td>for 2 correct stages in prime factorisation with 0 incorrect stages
or at least 3 stages in prime factorisation with no more than 1 incorrect stage.
Each stage gives 2 factors – may be in a factor tree or a table or listed eg 2, 2, 225
(see LHS for examples of the amount of work needed for the award of this mark).
Example of 3 stages with 1 incorrect stage:
$2250 = 225 \times 100 = 3 \times 5 \times 15 \times 100$
or $225 = 3 \times 5 \times 15$</td>
</tr>
<tr>
<td></td>
<td>e.g. $2 \times 3 \times 3 \times 5 \times 5 \times 5$

e.g.
<table><tr><td>2</td><td>2250</td></tr><tr><td>5</td><td>1125</td></tr><tr><td>3</td><td>225</td></tr><tr><td>5</td><td>75</td></tr><tr><td>3</td><td>15</td></tr><tr><td>5</td><td>5</td></tr><tr><td></td><td>(1)</td></tr></table>
e.g.
 
</td>
<td></td>
<td></td>
<td>M1</td>
<td>for 2, 3, 3, 5, 5, 5 or
$2 \times 3 \times 3 \times 5 \times 5 \times 5$ or
$2 , 3^2 , 5^3$ oe or
$2 + 3^2 + 5^3$

(ignore 1s)

(may be a fully correct factor tree or ladder)</td>
</tr>
<tr>
<td></td>
<td>Working required</td>
<td>$2 \times 3^2 \times 5^3$</td>
<td></td>
<td>A1</td>
<td>dep on M2
can be any order (allow $2 . 3^2 . 5^3$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td colspan="2">Total 3 marks</td>
</tr>
</table>

18	(a)(i)	7, 11, 13, 5	5, 7, 11, 13	1	B1	
	(ii)	5, 15, 10, 6, 8, 12, 14	5, 6, 8, 10, 12, 14, 15	1	B1	
	(b)		Correct reason	1	B1	eg 9 is not a member of *C* **or** 9 is not in *C* **or** *C* only contains 6, 8, 10, 12, 14 **or** 9 is outside of *C* there must be no contradictory or incorrect statements
						Total 3 marks

19	(a)	eg $\frac{9.6}{6}$ (= 1.6 oe) **or** $\frac{6}{9.6}$ (= 0.625 oe) **or** $\frac{("GH")}{6} = \frac{4}{9.6}$ oe		2	M1	for a correct scale factor accept ratio notation eg 9.6 : 6 (can be seen near the diagram)
		Correct answer scores full marks (unless from obvious incorrect working)	2.5		A1	oe allow 2,5
	(b)	eg 5.7 × "1.6" **or** 5.7 ÷ "0.625" **or** $5.7 \times \frac{4}{"2.5"}$ **or** $5.7 \div \frac{"2.5"}{4}$ **or** $\frac{("BC")}{9.6} = \frac{5.7}{6}$		2	M1	ft their scale factor from (a)
		Correct answer scores full marks (unless from obvious incorrect working)	9.12		A1	oe ft their scale factor from (a) allow 9,12
						Total 4 marks

20	eg $\left(AB^2 =\right)6^2+6^2(=72)$ **or** $\sin 45=\frac{6}{(AB)}$ **or** $\cos 45=\frac{6}{(AB)}$ **or** **or** $\left(AB^2 =\right)6^2+6^2-2\times6\times6\times\cos 90$		5	M1	for a correct start to the method to find *AB*
	eg $(AB=)\sqrt{6^2+6^2}\left(=\sqrt{72}\text{ or }6\sqrt{2}\text{ or }8.48...\right)$ **or** $(AB=)\frac{6}{\sin 45}\left(=\sqrt{72}=6\sqrt{2}=8.48...\right)$ **or** $(AB=)\frac{6}{\cos 45}\left(=\sqrt{72}=6\sqrt{2}=8.48...\right)$ **or** $(AB=)\sqrt{6^2+6^2-2\times6\times6\times\cos 90}$			M1	for a complete method to find the length of *AB*
	eg $\pi\times6(=6\pi\text{ or }18.8...)$ **or** $\pi\times6\div2(=3\pi\text{ or }9.42...)$ **or** $\pi\times\text{"8.48..."}(=26.6...)$ **or** $\pi\times\text{"8.48..."}\div2\ (=13.3...)$			M1	(indep) for a method to find the circumference of one whole circle **or** the arc length of one semicircle seen (may be embedded)
	eg $2\times\text{"}3\pi\text{"}+\text{"13.3..."}$ **or** "9.42" + "9.42" + "13.3" **or** "18.8" + "13.3"			M1	for a complete correct method to find the perimeter of the shape
	Correct answer scores full marks (unless from obvious incorrect working)	32.2		A1	accept answers in the range 32.1 – 32.3
					Total 5 marks

21	eg 0.74 × 300 (= 222) **or** 1 − 0.74 (= 0.26) seen **or** $\frac{78}{300}$		2	M1	for a method to work out an estimate for the number of games Evie will win **or** the probability that Evie will lose **or** an answer of $\frac{78}{300}$
	Correct answer scores full marks (unless from obvious incorrect working)	78		A1	cao
					Total 2 marks

22	(a)		m^7	1	B1	
	(b)		8	1	B1	Allow k^8
	(c)		$9x^{12}y^{16}$	2	B2	B1 for a product in the form ax^py^q where 2 from a , p or q are correct eg $3x^{12}y^{16}$ (Allow $9x^{12}$ or $9y^{16}$ or $x^{12}y^{16}$ so as long as not added to any other terms)
						Total 4 marks

23	(a)		$4x^2 - 20x$	1	B1	or $-20x + 4x^2$
	(b)	$(y \pm 5)(y \pm 4)$ or $(5 \pm y)(4 \pm y)$ or $y(y-4)-5(y-4)$ or $y(y-5)-4(y-5)$		2	M1	for $(y \pm 5)(y \pm 4)$ **or** $(5 \pm y)(4 \pm y)$ **or** for $(y + a)(y + b)$ where $ab = 20$ or $a + b = -9$
		Correct answer scores full marks (unless from obvious incorrect working)	$(y - 5)(y - 4)$		A1	oe Allow any letter for y Accept $(5 - y)(4 - y)$
						Total 3 marks

24	(a)		0.0056	1	B1	
	(b)	20 000 000 oe eg 20×10^6 or 0.2×10^8 **or** 2×10^n $n \neq 7$ **or** $\frac{6\times10^{(3+5)}}{21+9}$ **or** $\frac{6\times10^8}{30}$ **or** $\frac{6\times10^3}{3\times10^{-4}}$ **or** $\frac{6000}{0.0003}$ **or** $\frac{6000}{3\times10^{-4}}$		2	M1	
		Correct answer scores full marks (unless from obvious incorrect working)	2×10^7		A1	
						Total 3 marks

25	0.12 × 700 000 oe (= 84 000) **or** 0.88 × 700 000 oe (= 616 000) **or** 700 000 × 0.88^2 oe (= 542 080)		3	M1	for finding 12% **or** 88% of 700 000	M2 for 700 000 × 0.88^3 **or** 700 000 × 0.88^4 (= 419 786.75)
	0.88 × "616 000" oe (= 542 080) **and** 0.88 × "542 080" oe (= 477 030.4)			M1	for completing method to find the value of the car	
	Correct answer scores full marks (unless from obvious incorrect working)	477 030		A1	accept 477 030 – 477 031	
					SC: if no other marks gained award M1 for 0.36 × 700 000 oe **or** 252 000 **or** 0.64 × 700 000 oe **or** 448 000 accept (1 − 0.12) as equivalent to 0.88 throughout	
						Total 3 marks

26		Triangle with vertices (3, 6) (3, 9) (5, 6)	2	B2 (B1	for a fully correct shape with correct orientation and in the correct position. for a shape of correct size and orientation **or** 2 or 3 points plotted correctly)
					Total 2 marks

27	$(V=)\frac{1950}{7.8}(=250)$ **or** $7.8=\frac{1950}{w\times5\times4}$ or $7.8=\frac{1950}{w\times20}$		3	M1	for correct method to find volume using mass ÷ density **or** a correct equation with correct expression for volume (may be embedded in another calculation)
	eg $w=\frac{1950}{7.8\times5\times4}$ **or** $20w=\frac{1950}{7.8}$ **or** $20w$ = "250" **or** $4\times5\times w$ = "250" **OR** eg $\frac{1950}{5\times4\times7.8}$ **or** 1950 ÷ (20 ×7.8) **or** 1950 ÷ 156 **or** "250" ÷ 20			M1	for a fully correct equation in w **or** a fully correct calculation to find the value of w (may be labelled eg x or L)
	Correct answer scores full marks (unless from obvious incorrect working)	12.5		A1	
					Total 3 marks

28	(a)	eg $x + 0.15 + 0.5 + y + 0.13 + 0.03 = 1$ oe **or** $x + y = 1 - 0.15 - 0.5 - 0.13 - 0.03$ oe **or** $x + y + 0.81 = 1$ oe **or** $x + y = 1 - 0.81$ oe **or** $1 - 0.15 - 0.5 - 0.13 - 0.03 = 0.19$ oe **or** $1 - 0.81 = 0.19$ oe			2	M1	for setting up an equation in x and y using the sum of probabilities equals 1 **or** for showing that probabilities add up to 1
		Working required		Shown		A1	correctly rearranges to $x + y = 0.19$ (must be shown from a correct method) **or** a clear statement that $x + y = 0.19$
	(b)	$x + y = 0.19$ $3x - y = 0.09$ Adding ($x + 3x = 0.19 + 0.09$ or $4x = 0.28$) **or** $3x - (0.19 - x) = 0.09$ or $x + 3x - 0.09 = 0.19$	$3x + 3y = 0.57$ $3x - y = 0.09$ Subtracting ($3y - - y = 0.57 - 0.09$ or $4y = 0.48$) **or** $3(0.19 - y) - y = 0.09$ or $\left(\frac{0.09 + y}{3}\right) + y = 0.19$		3	M1	for a correct method to eliminate x or y: coefficients of x or y the same **and** correct operator to eliminate selected variable (condone any one arithmetic error in multiplication) **or** writing x or y in terms of the other variable and correctly substituting (condone missing brackets)

	"0.07" + y = 0.19 or 3 × "0.07" – y = 0.09 **or** y = 0.19 – "0.07" or y = 3 × "0.07" – 0.09	3x + 3 × "0.12" = 0.57 or 3x – "0.12" = 0.09 **or** x = 0.19 – "0.12" or $x = \left(\frac{0.09 + "0.12"}{3}\right)$			M1	dep on first M1for a correct method to find other variable by substitution of found variable into one equation **or** for repeating the above method to find the second variable.
	Working required		x = 0.07 and y = 0.12		A1	oe dep on M1
						Total 5 marks

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