Pearson Edexcel

Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE In Mathematics B (4MB1) Paper 02

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

November 2020
Publications Code 4MB1_02_2011_MS

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 the final answer is wrong 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. Eg. 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, then award the lowest mark, unless the subsequent working makes clear the method that has been used.

  If there is no answer achieved then check the working for any marks appropriate from the mark scheme.

- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.

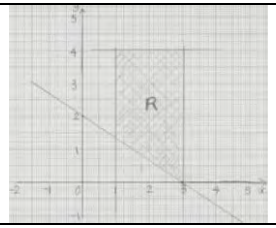
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

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

Question		Working	Answer	Mark	Notes
1	(a)	$\cos x = \frac{5}{9.3}$ [0.537…]		2	M1 A fully correct method to find the value of x eg $\sin x = \frac{\sqrt{9.3^2 - 5^2}}{9.3}$ **or** $\tan x = \frac{\sqrt{9.3^2 - 5^2}}{5}$ **or** $90 - \sin^{-1}\left(\frac{5}{9.3}\right)$ **or** $\cos x = \frac{9.3^2 + 5^2 - \sqrt{9.3^2 - 5^2}}{2 \times 9.3 \times 5}$
			57.5		A1 awrt to 57.5
	(b)	$\frac{\sin 124}{10.8} = \frac{\sin y}{5}$ oe		3	M1 A fully correct method to find the value of y
		$y = \sin^{-1}\left(\frac{5 \sin 124}{10.8}\right)$ oe			M1dep on previous method mark being awarded. For rearranging to find a value of y or $\sin y = \frac{5 \times \sin 124}{10.8}$ Allow $\sin y$ = awrt 0.38 or $y = \sin^{-1}(\text{awrt } 0.38)$ oe
			22.6		A1 awrt 22.6
					Total 5 marks

Question		Working	Answer	Mark	Notes
2	(a)			3	M1 for the intention to draw the line $2x + 3y = 6$ correctly. Line must go through at least one of (0, 2) or (3, 0)
					M1 for lines $x = 1$, $x = 3$ and $y = 4$ drawn correctly.
			Correct region indicated		A1 correct area only. Both method marks need to be awarded.
	(b)		(2, 1),(2, 2),(2, 3)	2	B2 all 3 correct coordinates and no extras, B1 for 2 correct coordinates and no extras or 3 correct. coordinates and all correct integer boundary coordinates stated. (1,2) (1,3) (1,4) (2,4) (3,0) (3,1) (3,2) (3,3) (3,4) **SC** If no marks are awarded using the main scheme in part (b) and at least one M1 awarded in part (a) and the area identified is bounded by "their 4 lines drawn", award B1ft if all correct integer coordinates from their graph are stated with no extras.
					Total 5 marks

Question		Working	Answer	Mark	Notes
3		eg $\times \dfrac{x+3}{(5x+6)(5x-6)}$		4	M1 use of reciprocal and factorising using the difference of 2 squares. These two steps may occur at different stages.
		eg $\dfrac{(x+2)(x+3)-(5x+6)}{(5x+6)(x+2)}$ or $\dfrac{[(5x-6)(x+3)(x+2)]-[(5x+6)(5x-6)]}{(5x-6)(5x+6)(x+2)}$			M1 for clear intention to get a common denominator by multiply all terms by $(5x+6)(x+2)$ or $(25x^2-36)(x+2)$ (allow multiples of these). May be expressed as a single fraction or two fractions subtracted. Allow equivalent eg $\dfrac{[(5x-6)(x+3)(x+2)]-(25x^2-36)}{(5x-6)(25x^2-36)}$ Can be implied by correct expansions.
		eg $\dfrac{x^2+5x+6-5x-6}{(5x+6)(x+2)}$ or $\dfrac{5x^3-6x^2}{(x+2)(25x^2-36)}$ oe			M1 dep on 2nd M1 being awarded. For correct expansion of terms including dealing correctly with negative sign on the numerator. This needs to be in a single fraction. Allow $\dfrac{5x^3+10x^2+9x^2+18x-18x-36-25x^2+36}{(x+2)(25x^2-36)}$ oe
			$\dfrac{x^2}{(5x+6)(x+2)}$		A1 oe eg $\dfrac{x^2}{5x^2+16x+12}$ dep on two M marks awarded.
					Total 4 marks

Question		Working	Answer	Mark	Notes
4	(a)	$9^2 - 5^2 \ (=56)$		3	M1 Implied by awrt 7.5 or $"\sqrt{56}"$ Allow for a correct method to find one of the angles of the triangle. Note $\angle A = 67.498 \ \ \angle B = \angle C = 56.251$
		$0.5 \times 10 \times "\sqrt{56}"$			M1dep on 1st M1 being awarded. Allow for correct use of $\frac{1}{2}ab\sin C$
			37.4 (cm^2)		A1 allow $10\sqrt{14}$ oe or awrt 37.4
	(b)	"37.4" × 7 [=261.9...]		5	M1 ft allow use of their part(a) or correct method if they start again. Condone 262.5 if they have given their answer to part (a) as 37.5
		$9 + 9 + 10 = 4.5 + 5.5 + EF + DG$ **or** $9+9+10 = 4.5+5.5+a$ **or** $9+9+10 = 4.5+5.5+2EF+\sqrt{10}$ **or** $9+9+10 = 4.5+5.5+2DG-\sqrt{10}$.			M1 $EF + DG = 18$ $a = 18$ $EF = \frac{18-\sqrt{10}}{2} = 7.4...$ $DG = \frac{18+\sqrt{10}}{2} = 10.58...$ Allow awrt 3.2 for $\sqrt{10}$ (=3.162…) Can be implied by a correct area for *DEFG* (= 40.5)or a correct volume of $("283.5" - "261.9...")$
		Area of $DEFG = \frac{1}{2} \times "18" \times 4.5$ (= 40.5) oe			M1 for $\frac{1}{2} \times "\text{their } EF + DG" \times 4.5$ *EF* and *DG* may come from their diagram. Can be implied by a correct volume of $("283.5" - "261.9...")$
		$0.5 \times 18 \times 4.5 \times 7 - "37.4" \times 7$ oe			M1 dep on 1st and 3rd M1 being awarded. Allow the use of their value of *EF* + *DG* ("18") or $\pm ("40.5" - "37.417...") \times 7$ or $\pm ("283.5" - "261.9...")$
			21.6 (cm^3)		A1 $\pm$(21– 21.7) inclusive Allow $\pm$ 21.6
					Total 8 marks

Question		Working	Answer	Mark	Notes
5	(a)	12.5 × 1.08 oe		2	M1
			(£)13.5(0)		A1
	(b)	378 ÷ (5 + 3 + 1) (= 42)		3	M1
		$5 \times \frac{378}{9} - \frac{378}{9}$ oe			M1 or 210 – 42
			168		A1
	(c)	(5 × "42") × $\frac{3}{14}$ oe eg 3 × 15		2	M1ft their 42 or their 210 in part(b) ie ("their 210") × $\frac{3}{14}$
			45		A1
	(d)	2.80 × 1.24 [=($)3.47(2)] or 3.20 ÷ 1.24 [(£)2.58...]		2	M1 Allow for 3.47… or 2.58… if working not shown. Allow n × 2.80 × 1.24 and n × 3.2 NB for n = 210 the figures are ($)729.12 and ($)672 Allow m × 3.20 ÷ 1.24 and m × 2.80 NB for m = 210 the figures are (£)541.94 and (£)588
			The coffee is more expensive from the kiosk		A1 dep oe must have a correct conversion **and** comparison in words. eg the difference is ($)0.27 or ($)57.12 the difference is (£)0.22 or (£)46.06 NB the difference must be correct for these 2 statements. coffee is more expensive in UK, coffee is cheaper in the USA etc.
	(e)	5.28 × 0.75 (= 3.96)		3	M1
		5.28 × 0.75 ÷ 1.24 or "3.96" ÷ 1.24			M1
			(£)3.19		A1 Ignore incorrect currency signs.
					Total 12 marks

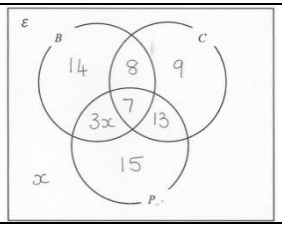
Question		Working	Answer	Mark	Notes
6		$x^2+(9-2x)^2=26$ or $\left(\frac{9-y}{2}\right)^2+y^2=26$		6	M1 for substituting a correct linear equation into the quadratic equation.
		$x^2+(81-18x-18x+4x^2)=26$ or $\left(\frac{81-9y-9y+y^2}{4}\right)+y^2=26$			M1 correct expansion of brackets, condone one **sign** error .
		$5x^2-36x+55\,(=0)$ or $5y^2-18y-23\,(=0)$			A1 dependent on M1(one of the 2 above) for a correct expression .
		eg $(5x-11)(x-5)(=0)$ or $\frac{36\pm\sqrt{(36)^2-4\times5\times55}}{2\times5}$ or $(5y-23)(y+1)(=0)$ or $\frac{18\pm\sqrt{(18)^2-4\times5\times(-23)}}{2\times5}$			M1 dependent on M1(one of the 2 above). Method may be implied by 2 correct solutions. Solving their 3 term quadratic equation using any correct method - if factorising, allow brackets which expanded give 2 out of 3 terms correct. If using formula or completing the square allow one sign error. We will condone some simplification as their first step but no further than $\frac{36\pm\sqrt{1296-1100}}{10}$ oe accept $(-36)^2$ or$(36)^2$ for 1296 or eg $\left(x-\frac{18}{5}\right)^2-1\frac{24}{25}$ oe Working must be shown if their quadratic is incorrect to gain this method mark.
		$x = 2.2$ oe and $x = 5$ or $y = 4.6$ oe and $y = -1$			A1 both x values correct or both y values correct or one pair of correct values.
			$x = 2.2$, $y = 4.6$ $x = 5$, $y = -1$		A1 dependent on 2 method marks being awarded. It must be clear which value of x goes with which value of y
					Total 6 marks

Question		Working	Answer	Mark	Notes
7		eg $\overrightarrow{AP} = \mu(6\mathbf{b} - 4\mathbf{a})$		6	M1 A correct expression, in terms of **a** and **b**. for $\overrightarrow{AP}$ or $\overrightarrow{OP}$ or $\overrightarrow{BP}$ or $\overrightarrow{CP}$ which involves a variable eg μ
		eg $\overrightarrow{AP} = -4\mathbf{a} + \lambda(4\mathbf{a} + 10\mathbf{b})$ & $\overrightarrow{AP} = \mu(6\mathbf{b} - 4\mathbf{a})$			M1 Two correct expressions for $\overrightarrow{AP}$ or $\overrightarrow{OP}$ or $\overrightarrow{BP}$ or $\overrightarrow{CP}$ which involves a different variable eg λ such that one vector involves a multiple of $\pm(4\mathbf{a} - 6\mathbf{b})$ and the other vector has to involve a multiple of $\pm(4\mathbf{a} + 10\mathbf{b})$ or $\frac{4}{10} = \frac{4 - 4\mu}{6\mu}$ oe
		eg $6\mu = 10\lambda$ **and** $-4\mu = -4 + 4\lambda$ **oe**			M1 dep on 2nd M being awarded. For equating coefficients for **a** **and** for vector **b** or $24\mu = 40 - 40\mu$
		eg $\lambda = \frac{3}{8}$ oe			A1 a correct value for μ or λ oe
		eg $\overrightarrow{PC} = (4\mathbf{a} + 10\mathbf{b}) - \frac{3}{8}(4\mathbf{a} + 10\mathbf{b})$			M1 dep on 3rd M1 being awarded and a value for one of their variables being found. Stating any correct path for $\overrightarrow{PC}$ in terms of **a** and **b** which involves a correct value for μ or λ
			$\frac{5}{2}\mathbf{a} + \frac{25}{4}\mathbf{b}$		A1 oe $\frac{5}{2}\left(\mathbf{a} + \frac{5}{2}\mathbf{b}\right)$ Accept equivalent fractions eg $\frac{5}{4}(2\mathbf{a} + 5\mathbf{b})$
					NB award 6 marks if the final answer is correct.
					Total 6 marks

NB: There are many ways to solve this question. You will need to check their working carefully.
Alternative – using similar triangles.

M1 for stating that *OBP* and *ACP* are similar (triangles). Implied by a correct ratio.
M1 for (lengths) *OP* : *PC* = 6:10 oe (ratio statement).
M1 for 3/5 *PC* = *OP* oe "vector" equation.
A1 for reaching 3/5 $\overrightarrow{PC}$ + $\overrightarrow{PC}$ = 4**a** +10**b** or another correct equation involving point *P*.
M1 for $\overrightarrow{PC}$ = (4**a** + 10**b**) ÷ 8/5 oe
A1 for 2.5**a** + 6.25**b** oe

Question		Working	Answer	Mark	Notes
8	(a)		Kite *B* correctly drawn	2	B2 (B1 for a kite reflected in $y = k$ or for 3 correct points or for kite *A* reflected in $x = -1$)
	(b)(i)		Kite *C* correctly drawn	2	B2 (B1 for "*C*" drawn using $\begin{pmatrix} -8 \\ n \end{pmatrix}$ or $\begin{pmatrix} m \\ -6 \end{pmatrix}$ from kite *A*)
	(ii)		(0, −4)	1	B1 Condone answer in incorrect form $\begin{bmatrix} 0 \\ -4 \end{bmatrix}$
	(c)	$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 4 & 6 & 4 & 2 \\ 1 & 3 & 4 & 3 \end{pmatrix}\left[= \begin{pmatrix} -1 & -3 & -4 & -3 \\ 4 & 6 & 4 & 2 \end{pmatrix}\right]$ or $\begin{pmatrix} 0 & -1 \\ -2 & 0 \end{pmatrix}\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}\left[= \begin{pmatrix} -1 & 0 \\ 0 & 2 \end{pmatrix}\right]$		4	M1 The result of the matrix product is not needed. The coordinates of the kite can be in any order.
		$\begin{pmatrix} 0 & -1 \\ -2 & 0 \end{pmatrix}$"$\begin{pmatrix} -1 & -3 & -4 & -3 \\ 4 & 6 & 4 & 2 \end{pmatrix}$"$\left[= \begin{pmatrix} -4 & -6 & -4 & -2 \\ 2 & 6 & 4 & 2 \end{pmatrix}\right]$ or "$\begin{pmatrix} -1 & 0 \\ 0 & 2 \end{pmatrix}$"$\begin{pmatrix} 4 & 6 & 4 & 2 \\ 1 & 3 & 4 & 3 \end{pmatrix}\left[= \begin{pmatrix} -4 & -6 & -4 & -2 \\ 2 & 6 & 8 & 6 \end{pmatrix}\right]$			M1ft dep The coordinates of the kite can be in any order. The result of the matrix product is not needed.
			$\begin{pmatrix} -4 & -6 & -4 & -2 \\ 2 & 6 & 8 & 6 \end{pmatrix}$		A1 at least 2 points correct. This is not implied by 2 points on the diagram .The coordinates of the kite can be in any order.
			Kite *D* correctly drawn		A1 NB If the kite is drawn correctly award 4 marks.
	(d)		2	1	B1
					Total 10 marks

Question		Working	Answer	Mark	Notes
9	(a)			3	B3 for all correct entries. B2 for 5, 6 or 7 correct entries. B1 for 3 or 4 correct entries. Allow $24 - x$ instead of $3x$ Allow a sum that gives the required number. eg 20 – 7 for the 13 Allow 6 and 18 instead of x and $3x$ respectively.
	(b)	"$14 + 8 + 9 + 7 + 13 + 15 + 3x + x$" = 90 oe		2	M1ft For an equation equivalent to $4x + 66 = 90$ or $3x = 24 - x$ **or** for the sum of their 8 values from their Venn diagram = 90 Do not ft if one of the 8 values is blank. **SC:** Award M1 for an equation equivalent to $\frac{4}{3}x + 66 = 90$
			6		A1cao This is not implied by 6 on the diagram.
	(c) (i)		22	1	B1ft "their 9" + "their 13" Condone n("their 22") Do not ft if **either** required area is blank. Ft their x in part (b) Allow in terms of x
	(ii)		84	1	B1ft 90 – "their part(b)" or 90 – "their x from the diagram" or adding their values in the circles. Condone n("their 84") Do not ft if **any** of the required areas are blank. Ft their x in part (b) Allow in terms of x
	(iii)		8	1	B1ft "their 8" Condone n("their 8") Do not ft if **the** required area is blank. Ft their x in part (b) Allow in terms of x
					SC: If the numbers are listed rather than added or written as a fraction eg 22/90. Award B0 for the first fully correct list/fraction following through from their diagram. The following B marks can then be awarded for a correct list/fraction following through from their diagram.
	(d)		$\frac{20}{37}$	2	B2 Allow awrt 0.54 B1 for $\frac{20}{m}$ where $m \geq 20$ or $\frac{n}{37}$ where $n \leq 37$. This should be their final answer and not be in part of a calculation. Ignore cancelling. **SC**: B1ft for $\frac{"20"}{m}$ with "their 20" ie "their 7" + "their 13" as long as neither blank where $m \geq 20$ Ignore cancelling.
					Total 10 marks

Question		Working	Answer	Mark	Notes
10	(a)		3	1	B1 Accept $x = 3$ or $x \neq 3$
	(b)		$h \geq 4$	1	B1 allow $y \geq 4$ or $h(x) \geq 4$ or $[4,\infty]$ or $]4,\infty]$ or $[4,\infty)$ or $]4,\infty)$ Allow missing bracket at the infinity end. Do not allow $x \geq 4$ or ≥ 4 or range ≥ 4
	(c)		85	1	B1
	(d)	$g(5) = 6$		2	M1 Allow $\frac{4(45-6\times5+5^2)}{(5-3)^2}$ or $\left(\frac{12}{5-3}\right)^2+4$ oe
			40		A1
	(e)	$y=\frac{12}{x-3}$ and $y(x-3)=12$ or $x-3=\frac{12}{y}$ or $x=\frac{12}{y-3}$ and $x(y-3)=12$ or $y-3=\frac{12}{x}$		2	M1 Implied by a correct answer in terms of any letter.
			$\left[g^{-1}: x \mapsto\right]\frac{12+3x}{x}$		A1 $\frac{12+3x}{x}$ oe must be in terms of x
	(f)	$\left(\frac{12}{x-3}\right)^2+4$ oe		4	M1 A correct expression. May be implied by the 2nd M1
		$\frac{144}{(x-3)^2}+4$			M1 accept $\frac{12^2}{(x-3)^2}+4$
		$\frac{144+4(x-3)^2}{(x-3)^2}$ oe			M1 dep on 1st M1 Correct method to reduce to a single fraction.
		$\frac{144+4x^2-24x+36}{(x-3)^2}$ oe leading to	$\frac{4(45-6x+x^2)}{(x-3)^2}$		A1 dep on all 3 method marks being awarded Multiply out brackets correctly followed by the given answer.
	(g)	$\frac{4(45-6x+x^2)}{(x-3)^2}=5$ or $\left(\frac{12}{x-3}\right)^2+4=5$ oe		3	M1 equating correct equation to 5
		$x^2-6x-135(=0)$ or $12^2=(x-3)^2$ oe			M1 rearranging to get a correct 3 term quadratic.
			$x = 15$ or -9		A1
					Total 14 marks

Question		Working	Answer	Mark	Notes
11	(a)		−6, 5, 4, 3	3	B3 for all 4 correct values (B2 for 3 correct, B1 for 2 correct)
	(b)		A single smooth curve passing through all their points	3	B3 ft A single smooth curve passing through all the correct points **or** all "their points" from the table. B2 ft For a single curve going through at least 8 points from "their table". B1 ft straight lines joining points rather than a curve going through at least 8 points from" their table" **or** all points from "their table" plotted but not connected. NB accuracy is ±1 small square
	(c)			2	M1 clear tangent drawn at $x = 2$ Must touch their graph.
			17-25		A1 dep on M1
	(d)		$-2.2 < x < 0.5$ and $1.7 < x \leq 2.5$	2	M1ft drawing the line $y = 5x$ from $x = -2$ to $x = +2$ A1ft dep on M1. "−2.2" < x < "0.5" and "1.7" < $x \leq$ "2.5" Allow use their values ± 0.1 or ("−2.2, 0.5") brackets can be square or round.[allow use of < or ≤]
					Total 10 marks

Question		Working	Answer	Mark	Notes
12	(a)		$\frac{3}{15}, \frac{4}{15}$ $\frac{3}{10}, \frac{2}{10}, \frac{5}{10}$ $\frac{3}{10}, \frac{2}{10}, \frac{5}{10}$ $\frac{3}{10}, \frac{2}{10}, \frac{5}{10}$	3	B3 for all correct branches (B2 for 3 of 4 sets of branches correct, B1 for 2 out of 4 sets of branches correct) Allow equivalent fraction or decimals.
	(b)	[RO+RG =] $\left("\frac{8}{15}"\times"\frac{2}{10}"+"\frac{8}{15}"\times"\frac{5}{10}"\right)$ or $\left("\frac{8}{15}"\times"\frac{7}{10}"\right)$ [OR+OG =] $\left("\frac{3}{15}"\times"\frac{3}{10}"+"\frac{3}{15}"\times"\frac{5}{10}"\right)$ or $\left("\frac{3}{15}"\times"\frac{8}{10}"\right)$ [YR+YO+YG =] $\left("\frac{4}{15}"\times"\frac{3}{10}"+"\frac{4}{15}"\times"\frac{2}{10}"+"\frac{4}{15}"\times"\frac{5}{10}"\right)$ or $\left("\frac{4}{15}"\times 1\right)$		3	M1ft their tree diagram. For one of these 4 correct. The probabilities are $\left[=\frac{28}{75}\right]\left[=\frac{24}{150}\right]\left[=\frac{4}{15}\right]\left[=\frac{1}{5}\right]$ May be implied by for $1-\left("\frac{8}{15}"\times"\frac{3}{10}"+"\frac{3}{15}"\times"\frac{2}{10}"\right)$
		(RO+RG)+(OR+OG)+(YR+YO+YG) or 1 – (RR+OO) $\left("\frac{8}{15}"\times"\frac{7}{10}"\right)+\left("\frac{3}{15}"\times"\frac{8}{10}"\right)+\left("\frac{4}{15}"\times 1\right)$ or $1-\left("\frac{8}{15}"\times"\frac{3}{10}"+"\frac{3}{15}"\times"\frac{2}{10}"\right)$oe			M1ft their tree diagram. For all correct products added or = $1-"\text{their}\frac{1}{5}"$
			$\frac{4}{5}$		A1 Allow equivalent fraction or decimals.
	(c)	$"\frac{8}{15}"\times"\frac{3}{10}"\times\frac{10}{x+10}+"\frac{3}{15}"\times"\frac{2}{10}"\times\frac{x}{x+10}=\frac{1}{15}$		4	M2ft for a complete equation (ft their tree diagram) (M1ft for one product (RRR or OOO)
		$15(240 + 6x) = 150(x + 10)$ oe			M1 Fully correct equation with no denominators.
			35		A1
					Total 10 marks