PROBABILITY

Pearson Edexcel - Tuesday 19 May 2020 - Paper 1 (Non-Calculator) Foundation Tier

1.

6	(a)	cross at ½	B1	Cross (or mark) at ½	Accept any mark near to ½ if the intention is clear; do not accept if any additional marks are shown
	(b)	cross at 0	B1	Cross (or mark) at 0	Accept any mark near to 0 if the intention is clear; do not accept if any additional marks are shown

Pearson Edexcel - Monday 8 June 2020 - Paper 3 (Calculator) Foundation Tier

2.

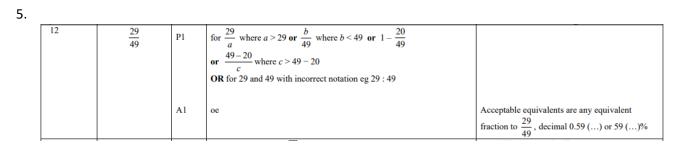| 16	(a)	$\dfrac{5}{11}$	M1	for $\dfrac{5}{n}$ where $n > 5$ or $\dfrac{m}{"11"}$ where $m < 11$	where "11" comes from 5+2+4
			A1	for $\dfrac{5}{11}$ oe	Accept any equivalent fraction, decimal form 0.45(45...) or percentage form 45(.45...)%
	(b)	0.7	B1	for 0.7 oe	Accept any equivalent fraction eg $\dfrac{7}{10}$ or percentage form eg 70%

3.

27	(a)	$\dfrac{1}{3},\dfrac{2}{3}$ $\dfrac{1}{3},\dfrac{2}{3},\dfrac{1}{3},\dfrac{2}{3}$	B2	six fully correct probabilities	Accept any equivalent fraction, decimal form 0.33(3...) and 0.66(6...) or 0.67 or percentage form 33(.3...)% and 66(.6...)% or 67%
			(B1	at least 2 correct probabilities)	
	(b)	$\dfrac{2}{9}$	M1	for $\dfrac{1}{3}\times\dfrac{2}{3}$ oe or ft probabilities from diagram	
			A1	for $\dfrac{2}{9}$ oe	Accept any equivalent fraction, decimal form 0.22(2...) or percentage form 22(.2...)%

Pearson Edexcel - Tuesday 21 May 2019 - Paper 1 (Non-Calculator) Foundation Tier

4.

17	(i)	Maxine with bigger number of trials	C1	for Maxine with reason **Acceptable examples** She throws the coin more times than Stuart **Not acceptable examples** Maxine throws it 50 times She gets more Tails Stuart (he) ……	
	(ii)	$\dfrac{37}{60}$	B1	for $\dfrac{37}{60}$ oe	

Pearson Edexcel - Thursday 8 November 2018 - Paper 2 (Calculator) Foundation Tier

5.

12	$\dfrac{29}{49}$	P1	for $\dfrac{29}{a}$ where $a > 29$ **or** $\dfrac{b}{49}$ where $b < 49$ **or** $1 - \dfrac{20}{49}$ **or** $\dfrac{49-20}{c}$ where $c > 49 - 20$ **OR** for 29 and 49 with incorrect notation eg 29 : 49	
		A1	oe	Acceptable equivalents are any equivalent fraction to $\dfrac{29}{49}$, decimal 0.59 (…) or 59 (…)%

Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Foundation Tier

6.

6	(a)	Cross at $\dfrac{1}{2}$	B1	cross at $\dfrac{1}{2}$	Accept any other marks near to ½ if the intention is clear; do not accept if any other marks are shown.
	(b)	$\dfrac{2}{6}$	B1	$\dfrac{2}{6}$ oe	Acceptable equivalents are equivalent fractions to $\dfrac{2}{6}$ eg $\dfrac{1}{3}$ decimal 0.33(…) or 33(..)%

Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Foundation Tier

7.

14	(a)	0.3	B1	for 0.3 oe	Acceptable equivalents are 3/10 or 30% Answer on answer line takes precedence
	(b)	4	B1	4 or ft their (a)	Do not accept a statement of probability (eg 0.1)
	(c)	12	M1	for 0.2 × 60 oe	Do not accept the use of any other probability
			A1	cao	

Pearson Edexcel - Thursday 24 May 2018 - Paper 1 (Non-Calculator) Foundation Tier

8.

7	(a)	D	B1	cao	
	(b)	B	B1	cao	
	(c)	Shown	M1	for number of green counters, eg $12 - (3+1+2) = 6$ **OR** for $\dfrac{3}{12}$ oe **or** $\dfrac{1}{12}$ oe **or** $\dfrac{2}{12}$ oe linked to the appropriate colour	This is awarded for a correct first step
			M1	for $1 - ("\dfrac{3}{12}" + "\dfrac{1}{12}") (= \dfrac{8}{12})$ or $"\dfrac{2}{12}" + "\dfrac{6}{12}" (= \dfrac{8}{12})$ **OR** for method to find $\dfrac{2}{3}$ of 12, eg. $12 \div 3 \times 2 (= 8)$	This is awarded for a fully correct method from which the correct answer of $\dfrac{2}{3}$ can be found Sight of $\dfrac{8}{12}$ gets M2
			C1	for correct conclusion supported by accurate figures, eg $\dfrac{8}{12} = \dfrac{2}{3}$ **or** $\dfrac{2}{3}$ of 12 = 8 **and** number of yellow + green = 2 + 6 = 8	

Pearson Edexcel - Thursday 7 June 2018 - Paper 2 (Calculator) Foundation Tier

9.

13		$\dfrac{338}{350}$	M1	for 350 − 12 (=338) **or** $\dfrac{y}{350}$ oe where $y < 350$ **and** $y \neq 12$ **or** $1 - \dfrac{12}{350}$ oe	For the method mark probability fractions can be expressed as equivalent expressions, even if not correct probability notation eg. 338 : 350 scores M1 A0
			A1	oe	Using correct probability notation Allow 0.96 to 0.97 or 96% to 97%

Pearson Edexcel - Thursday 2 November 2017 - Paper 1 (Non-Calculator) Foundation Tier

10.

17		$\dfrac{4}{9}$	M1	for listed outcomes (allow 1 error eg omission or repeat) **or** fractions $\frac{1}{3}\times\frac{2}{3} + \frac{2}{3}\times\frac{1}{3}$
			A1	for $\frac{4}{9}$ oe

Pearson Edexcel – Specimen 2 - Paper 1 (Non-Calculator) Foundation Tier

11.

7	a		$\dfrac{1}{4}$	M1	For $\dfrac{x}{24}$ with $x < 24$ or $\dfrac{6}{y}$ with $y > 6$
				A1	for $\dfrac{6}{24}$ oe
	b		PP PM PW MM MW WW	M1 A1	At least 3 correct combinations Fully correct list with no extras or permutations

Pearson Edexcel – Specimen 2 - Paper 2 (Calculator) Foundation Tier

12.

19	(a)		Table complete	B1	cao
	(bi)		$\dfrac{1}{10}$	B1	for $\frac{1}{10}$ oe or ft from table
	(bii)		$\dfrac{7}{10}$	B1	for $\frac{7}{10}$ oe or ft from table

Pearson Edexcel – Specimen 1 - Paper 2 (Calculator) Foundation Tier

13.

13	(a)		12| 3 5 9 13| 0 3 3 5 7 8 14| 7 7 8 9 15| 0 1 Key: 12|3 represents 123	C1 C1 C1	for an unordered diagram with just one error or for an ordered diagram with no more than two errors for a fully correct diagram for a correct key (units may be omitted but must be correct if included)
	(b)		$\dfrac{6}{15}$	M1 A1	for correct interpretation from their diagram (or from original information) of the number over 140 or for $\dfrac{n}{15}$, $n < 15$ for $\dfrac{6}{15}$ oe or ft their diagram

Pearson Edexcel – Sample Paper 1 (Non-Calculator) Foundation Tier

14.

6	(i)		$\times$ at $\dfrac{1}{2}$	B1	
	(ii)		$\times$ at $\dfrac{4}{6}$	B1	

Pearson Edexcel – Sample Paper 1 (Non-Calculator) Foundation Tier

15.

9		$\dfrac{1}{4}$	B1	$\dfrac{1}{4}$ oe

Pearson Edexcel – Sample Paper 1 (Non-Calculator) Foundation Tier

16.

11		6	M1 A1	for starting to list combinations cao

OCR – Tuesday 03 November 2020- Morning - Paper 1 (Calculator) Foundation Tier

17.

6	(a)		Arrow at half way	1		In all parts allow indication other than arrow. To be within 2mm by eye of the line

OCR Thursday 05 November 2020- Morning (Non-Calculator) Foundation Tier

18.

13		0.28 and 0.14	5	B4 for 0.14 identified as white or for 0.28 and 0.14 reversed or M1 for 1 – (0.34 + 0.24) A1 for 0.42 M1 for *their* 0.42 ÷ (1 + 2) A1 for 0.14	Allow equivalent fractions or percentages Condone lack of % sign for M marks A1 Implies previous M1 or may be implied by *their* y + *their* w = 0.42

19.

17	(a)		Correctly completes table $\qquad$ 7 $\qquad$ 6 $\qquad$ 7	1		
17	(b)	(i)	$\frac{13}{25}$ oe	2	B1FT for *their* correct numerator B1 for fraction with denominator 25	In (b)(i) and (ii), not ratio or words, isw eg $\frac{13}{25}$, likely but not $\frac{13}{25}$, unlikely isw cancelling/conversion to other forms FT numerator 12 + any evens in *their* (a)
17	(b)	(ii)	$\frac{14}{25}$ oe	2	FT their correct numerator / 25 B1FT for *their* correct numerator but denominator incorrect	FT numerator 13 + any multiples of 3 or 4 in *their* (a)

OCR Tuesday 5 November 2019 – Morning (Calculator) Foundation Tier

20.

8	a		9	2	M1 for 379 ÷ 45 soi by 8.4...	Allow M1 for repeated addition or subtraction if method shown. If only numbers listed addition must reach 360 45, 90, 135, 180, 225, 270, 315, 360. subtraction must reach 19 334, 289, 244, 199, 154, 109, 64, 19
	b	i	Shows $\frac{35}{50}$ [= 0.7] or $\frac{15}{50}$ = 0.3, 1 – 0.3 [= 0.7]	2	M1 for 35 Or M1 for $\frac{10}{50} + \frac{5}{50}$ oe or $\frac{15}{50}$	Allow 35 ÷ 50 Allow 15 ÷ 50
		ii	States or gives a reason why past games may not be representative/relevant to this game	1		eg Past opponents may be a different standard eg Past games may have been played at home eg Best players may now be injured

OCR Tuesday 21 May 2019 – Morning (Calculator) Foundation Tier

21.

5	(a)		L N M, M L N, M N L, N M L, N L M	2	No repeats for 2 marks **B1** for 4 or more additional entries including no more than 1 error or repeat or 3 additional entries with no errors or repeats
	(b)		$\frac{4}{6}$ oe isw	1	**FT** *their* table if at least 2 more entries

OCR Thursday 8 November 2018 – Morning (Non-Calculator) Foundation Tier

22.

16	(a)		36 and 45	1		
	(b)		Even and prime are not mutually exclusive oe	1		e.g. 2 is both prime and even 2 is counted twice One number is prime and even
			$\frac{8}{12}$ oe	1		Do not accept there are only 2 prime numbers

OCR Monday 12 November 2018 – Morning (Calculator) Foundation Tier

23.

5	(a)		Unlikely cao	1		
	(b)		A, B, B	2	**M1** for $\frac{2}{5}$ or 2 out of 5 or $\frac{3}{5}$ or 3 out of 5	Accept in any order but must be one letter only per line in diagram

OCR Thursday 7 June 2018 – Morning (Non Calculator) Foundation Tier

24.

10	a	i	2	2	M1 for 29 – (13 + 5 + 9) oe	
		ii	18	1		
		iii	$\frac{9}{29}$	1		Do not accept a ratio Do not accept eg 9 in 29
	b		0	1		Accept none, zero, nil

OCR Tuesday 12 June 2018– Morning (Calculator) Foundation Tier

25.

7	(a)	(i)	[A K Q] A Q K K A Q K Q A Q A K Q K A	2	B1 for 4 or 5 correct with repeats and/or errors or B1 for 2 or 3 correct with no repeats and/or errors	
		(ii)	$\frac{their\ 2}{their\ 6}$ oe isw	1FT	**Strict FT dep on at least 4 correct orders seen in (i)**	Must be *their* total QK ÷ *their* total orders Ignore attempts to cancel or convert to decimal/percentage Accept [0].33[3...] or 33[.3...]% or *their* correct decimal to 2sf Do not accept ratios
	(b)		$\frac{4}{6}$ oe with supporting evidence	4	Mark from one method only B3 for 5 more correct outcomes only or B2 for 4 more correct outcomes and up to one error or omission or B1 for 3 more correct outcomes and up to two errors or omissions OR B2 for [2 × 3 =] 6 outcomes B1 for [two above 8] 10 and 9 or [four below] 2, 4, 6, 7 If 0 scored **SC1** for $\frac{4}{6}$ without working or $\frac{their\ 4}{their\ 6}$ from some working	Do not accept ratios Accept $\frac{2}{3}$, 0.66 to 0.67, 66% to 67% Mark fraction and ignore attempt to change form or cancel A complete list of outcomes is 3 – 1 = 2 or 2 3 × 2 = 6 or 6 3 + 4 = 7 or 7 5 – 1 = 4 or 4 5 × 2 *or 10* Given in text 5 + 4 = 9 or 9 Accept 5 × 2 and 5 + 4 etc *Their* 4 from partial list, *their* 6 from partial list or stated total outcomes

OCR Thursday 2 November 2017– Morning (Calculator) Foundation Tier

26.

7			0.38 oe	2	M1 for 1 – (0.4 + 0.05 + 0.17)	If answer line blank check table $\frac{0.38}{1}$ scores **M1**

OCR Monday 6 November 2017– Morning (Calculator) Foundation Tier

27.

1	a	B		1		
	b	E		1		
	c	D		1		

Pearson Edexcel – Sample Papers - Paper 1 (Non-Calculator) Foundation Tier

28.

6	(i)		$\times$ at $\dfrac{1}{2}$	B1	
	(ii)		$\times$ at $\dfrac{4}{6}$	B1	

29.

9		$\dfrac{1}{4}$	B1	$\dfrac{1}{4}$ oe

Pearson Edexcel –Sample Papers - Paper 2 (Calculator) Foundation Tier

30.

5		⅔	B1	oe

Pearson Edexcel – Sample Papers - Paper 3 (Calculator) Foundation Tier

31.

15	$25 \div 5 \times 2 = 10$ $32 \div 2 = 16$ $\dfrac{10}{10 + 16}$	$\dfrac{10}{26}$	P1 P1 A1	Process to find number of boys walking and number of girls walking Complete process to find probability $\dfrac{10}{26}$ oe

32.

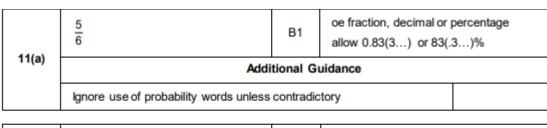| 9	(a)	(i)	ACB, BAC, BCA, CAB, CBA	2 2 AO1.3a	**B1** for at least three more ways of seating listed	
		(ii)	$\frac{2}{3}$ **oe**	1 1 AO2.1b	**FT** on answer to part **(a)(i)**	
		(iii)	$\frac{1}{6}$ **oe**	1 1 AO2.1b	**FT** on answer to part **(a)(i)**	
	(b)		2 nights	4 1 AO1.3b 2 AO3.1d 1 AO3.3	**M1** for $\frac{500}{50} = 10$ **M1** for £40 **M1** for *their* '12.5' – 10 and rounding **down**	12.5 can be implied from $\frac{500}{their\,'40'}$

33.

Q	Answer	Mark	Comments
19(a)	$\dfrac{2}{5}$ or $\dfrac{30}{5}$ or $(30 \div 5 =)\,6$ or 5×6	M1	oe fraction, decimal or percentage implied by $2 \times \dfrac{30}{5}$ or 2×6
	12	A1	SC1 18

	Additional Guidance	
Accept a fully correct ratio build up method:		
eg 2 : 5, 4 : 10, 6 : 15, 8 : 20, 10 : 25, 12 : 30 with nothing on answer line	M1A0	
eg 2 : 3, 4 : 6, 6 : 9, 8 : 12, 10 : 15, 12 : 18 with nothing on answer line	M1A0	
$30 \div 5 = 6$ and $30 \div 3 = 10$ and $30 \div 2 = 15$ (choice)	M0A0	
6 must not come from 2×3		

Q	Answer	Mark	Comments
19(b)	$30 + 3$ or $35 - 2$ or 33 or $(1 -)\,\dfrac{2}{35}$	M1	oe
	$\dfrac{33}{35}$	A1	oe fraction, decimal or percentage

	Additional Guidance	
Ignore attempts to simplify or convert a correct fraction		
Ignore probability words		
Decimals or percentages to 2sf or better		
Condone 33 out of 35 or 33 in 35 with a correct fraction, decimal or percentage (together on answer line)	M1A1	
but do not accept 33 : 35 with a correct fraction, decimal or percentage (together on answer line)	M1A0	

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34.

11(a)	$\frac{5}{6}$	B1	oe fraction, decimal or percentage allow 0.83(3…) or 83(.3…)%
	Additional Guidance		
	Ignore use of probability words unless contradictory		

11(b)	2, 3, 4, 5 and 6 identified	M1	
	20	A1	
	Additional Guidance		
	Values are identified even if used in a wrong calculation eg 2 × 3 × 4 × 5 × 6 or answer 23 456		
	20 is M1A1 unless clearly obtained from wrong working		

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35.

	Alternative Method 1		
21	Lists at least 5 correct combinations or at least 5 correct outcomes or constructs correct two-way table eg 17 and 12 or 29 17 and 23 or 40 17 and 15 or 32 17 and 16 or 33 12 and 23 or 35 12 and 15 or 27 12 and 16 or 28 23 and 15 or 38 23 and 16 or 39 15 and 16 or 31 or *(two-way table with headers 17, 12, 23, 15, 16 across top and 17, 12, 23, 15, 16 down side, all cells empty)*	M1	outcomes may be seen in the two-way table ignore additional combinations such as 17 and 17 for M1 ignore any totals in a correctly constructed two-way table 17 and 12 & 12 and 17 are accepted as two different combinations
	Fully correct list or two-way table eg 29, 40, 32, 33, 35, 27, 28, 38, 39, 31 or 40, 32, 33, 35, 38, 39, 31 or *(two-way table below)*	A1	accept ticks/crosses with correct pairs instead of values in the two-way table, it is acceptable to have only one set of ten cells completed (top right or bottom left) if all correct accept ticks and/or crosses in cells do not accept incorrect combinations such as 17 and 17 for A1

	17	12	23	15	16
17		29	40	32	33
12	29		35	27	28
23	40	35		38	39
15	32	27	38		31
16	33	28	39	31	

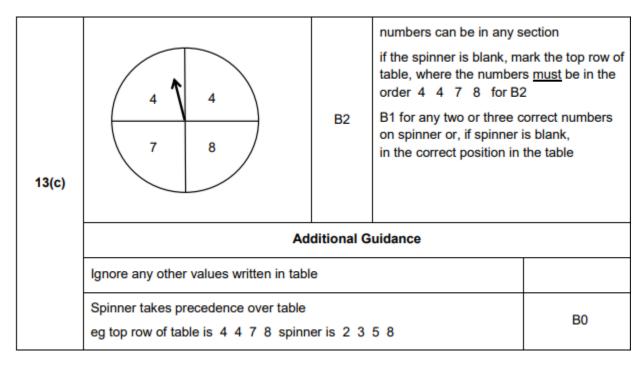|			
	$\frac{7}{10}$ or 0.7 or 70%	A1ft	oe ft their list or two-way table with M1 scored and a probability > 0 and < 1
	Alternative Method 2		
21cont	States that outcomes of 30 or under may only be achieved by using the 12	M1	oe
	Lists the three (or six) combinations which give outcomes of 30 or under 12 and 15 (15 and 12) 12 and 16 (16 and 12) 12 and 17 (17 and 12) or Lists the three outcomes of 30 or under (may be repeated) 27 28 29	A1	
	$\frac{7}{10}$ or 0.7 or 70%	A1ft	oe ft their list with M1 scored and a probability > 0 and < 1 eg if only 27 and 28 found and answer 0.8 given score M1A0A1ft

The Additional Guidance for Q21 is on the next page

Correct answer with no incorrect working	M1A1A1
If work is crossed out, this may be the removal of totals not above 30 and these should still be considered if appropriate	

This example shows that the answer 0.7 may not score full marks.

	17	12	23	15	16
17		29	40	32	33
12	29		36	27	28
23	40	36		37	39
15	32	27	37		31
16	33	28	39	31	

and answer of 0.7

M1A0A1ft

This is an example of following through from their table to give A1ft.

	17	12	23	15	16
17		29	40	32	33
12	29		35	27	28
23	40	36		38	39
15	32	27	37		21
16	33	28	39	21	

and answer of 0.6

M1A0A1ft

Ignore use of probability words unless contradictory	

21cont

36.

	All values correct	B2	B1 one correct row or one correct column

<table>
<tr><td rowspan="2">**13(a)**</td><td colspan="3">**Additional Guidance**</td></tr>
<tr><td>

	2	2	3	5
1	2	2	3	5
2	0	0	3	5
4	4	4	4	5
6	6	6	6	6

</td></tr>
</table>

	$\frac{5}{16}$	B1ft	oe fraction, decimal or percentage ft their table if at least 8 values

Additional Guidance

13(b)	Answer must match their table, if table blank, accept $\frac{5}{16}$ (oe) for B1	
	5 out of 16, 5 in 16, 5 : 16	B0
	$\frac{5}{16}$ (matches their table) = $\frac{1}{4}$	B1ft (ignore further work)

13(c)		B2	numbers can be in any section if the spinner is blank, mark the top row of table, where the numbers <u>must</u> be in the order 4 4 7 8 for B2 B1 for any two or three correct numbers on spinner or, if spinner is blank, in the correct position in the table

Additional Guidance	
Ignore any other values written in table	
Spinner takes precedence over table eg top row of table is 4 4 7 8 spinner is 2 3 5 8	B0

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37.

		Additional Guidance	
25(a) cont		Accept $\dfrac{108}{180}$ as one of the probabilities	
		Mark the answer line if it has two answers ignoring any incorrect probabilities in the working lines	
		Ignore any incorrect cancelling or change of form (fraction, decimal or percentage)	
		If the answer line only has one answer, check the working lines for a second answer for B2. Ignore any extra probabilities, unless incorrect, in which case award B1 max	
		eg Working lines $\dfrac{15}{20}$ Answer line $\dfrac{54}{90}$	B2
		eg Working lines $\dfrac{15}{20}$, $\dfrac{5}{15}$ Answer line $\dfrac{54}{90}$	B1
		If the answer line is blank, check the working lines for answers for B1 or B2. Ignore any extra probabilities, unless incorrect, in which case award B1 max	
		eg Working lines $\dfrac{15}{20}$, $\dfrac{22}{30}$, $\dfrac{54}{90}$ Answer line blank	B2
		eg Working lines $\dfrac{15}{20}$, $\dfrac{5}{15}$, $\dfrac{54}{90}$ Answer line blank	B1
		Probabilities must not be given as ratios	
		Do not accept the average of the given probabilities as answer	

Alternative method 1 (ft their part (a))			
Their probability with the greater number of trials and valid reason eg More throws	B1ft	ft their two different probabilities from part (a) both probabilities must have a denominator based on throws	
Alternative method 2 (independent of part (a))			
$\dfrac{54}{90}$ and valid reason eg Total throws	B1	oe	

<table>
<tr><td colspan="2" align="center">Additional Guidance</td></tr>
<tr><td>Accept any unambiguous indication of their probability eg the day</td><td></td></tr>
<tr><td>Using ratios</td><td>B0</td></tr>
<tr><td>Ignore any non-contradictory statements</td><td></td></tr>
<tr><td>60% and It's for all three days</td><td>B1</td></tr>
<tr><td>$\dfrac{54}{90}$ and It takes into account more throws</td><td>B1</td></tr>
<tr><td>$\dfrac{17}{40}$ (with $\dfrac{22}{30}$ also in (a)) and Because he threw it more on Wednesday</td><td>B1ft</td></tr>
<tr><td>$\dfrac{54}{90}$ and Shows the overall probability</td><td>B1</td></tr>
<tr><td>$\dfrac{54}{90}$ and Probability over total throws</td><td>B1</td></tr>
<tr><td>$\dfrac{54}{90}$ (with Wednesday probability in (a)) and It's the average total days, not just Wednesdays</td><td>B1ft</td></tr>
</table>

25(b)

Additional guidance continues on the next page

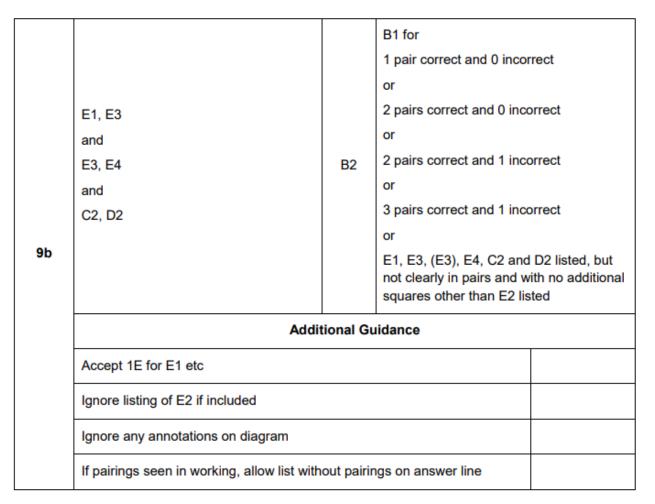|		
	Correct ft probability or $\frac{54}{90}$ and It's more reliable	B0
	$\frac{54}{90}$ and There's a lot of data	B0
25(b) cont	Correct ft probability or $\frac{54}{90}$ and He may get better with more throws	B0
	$\frac{54}{90}$ and He throws 90 times	B0
	Correct ft probability or $\frac{54}{90}$ and More hits	B0

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38.

	0.8	B1	
20	**Additional Guidance**		

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39.

	$\frac{3}{25}$ or 0.12 or 12%	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Do not accept ratios		
9a	Ignore use of words eg 3 out of 25 = $\frac{3}{25}$		B1
	eg 3 in 25 (only)		B0
	12		B0
	Ignore attempts to simplify $\frac{3}{25}$ eg $\frac{3}{25} = \frac{1}{8}$ (attempt to simplify)		B1
	$\frac{3}{25} = 0.03$ (attempt to convert to a decimal)		B1
	$\frac{3}{25} = 3:25$ (choice)		B0

			B1 for
	E1, E3 and E3, E4 and C2, D2	B2	1 pair correct and 0 incorrect or 2 pairs correct and 0 incorrect or 2 pairs correct and 1 incorrect or 3 pairs correct and 1 incorrect or E1, E3, (E3), E4, C2 and D2 listed, but not clearly in pairs and with no additional squares other than E2 listed
9b			

Additional Guidance		
Accept 1E for E1 etc		
Ignore listing of E2 if included		
Ignore any annotations on diagram		
If pairings seen in working, allow list without pairings on answer line		

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40.

1 − 0.1 − 0.6 or 1 − (0.1 + 0.6) or 1 − 0.7	M1	oe
0.3	A1	oe eg 30% or $\frac{3}{10}$

Additional Guidance

13

1 − 0.1 + 0.6 = 0.3 (recovered)	M1A1
1 − 0.1 + 0.6 = 1.5 (not recovered)	M0A0
0.6 ÷ 2 = 0.3 (incorrect method)	M0A0
Embedded, correct answer, eg 0.3 + 0.1 + 0.6 = 1	M1A0
$\frac{0.3}{1}$ unless 0.3 already seen	M1A0

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41.

21a

K	L	M
84	54	62
0.42	0.27	0.31

	oe
B2	B1 0.27 oe for relative frequency of L
	or
	0.31 oe for relative frequency of M
	or
	B1ft ft their 62 ÷ 200 for relative frequency of M

Additional Guidance

K	L	M
84	54	68
0.42	0.2	0.34

B1ft

	Alternative method 1			
	500×0.42 or $84 \times \dfrac{500}{200}$ or $84 \times 2 + 84 \div 2$ or $168 + 42$		M1	oe
	210		A1	
	Alternative method 2			
	$300 \times 0.42 + 84$ or $126 + 84$		M1	oe
21b	210		A1	
	Additional Guidance			
	$\dfrac{210}{500}$			M1A0
	Embedded answer eg $210 \div 500 = 0.42$, answer 0.42			M1A0
	Misread of working out L or M (must see method) eg L: $500 \times$ their 0.27 or $54 \times \dfrac{500}{200}$ eg M: $500 \times$ their 0.31 or their $62 \times \dfrac{500}{200}$			M1A0
	Build up steps must be correct or have fully correct method shown for any incorrect steps eg1 $200 = 84$, $400 = 164$, $100 = 42$, Answer 206 eg2 $200 = 84$, $400 = 84 \times 2 = 164$, $100 = 42$, Answer 206			M0A0 M1A0

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42.

2	$\dfrac{2}{6}$	B1	

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43.

11	A in two sections	B1	
	B and C have equal number of sections and 12 sections labelled using only A, B, C or D	B1	P(B) = P(C) ≠ 0
	D in twice as many sections as A	B1	
	Additional Guidance		
	2As, 3Bs, 3Cs, 4Ds		B1B1B1
	2As, 5Bs, 5Cs B and C have equal number of sections and 12 sections labelled using only A, B, C or D		B1B1B0
	2As, 4Bs, 4Cs, 2Ds		B1B1B0
	2As, 2Bs, 4Cs, 4Ds		B1B0B1
	2As, 4Ds		B1B0B1
	2As, 4Bs, 4Cs only 10 sections labelled		B1B0B0
	2As, 3Bs, 4Cs, 3Ds		B1B0B0
	1A, 2Bs, 2Cs, 7Ds		B0B1B0
	1A, 2Bs, 2Cs, 3Ds only 8 sections labelled		B0B0B0

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44.

	Alternative method 1		
	40	B1	May be implied $$\text{eg } \frac{2}{40}$$
	$2 + x + 2x + 5 = $ their 40 or $3x + 7 = $ their 40 or (their $40 - 2 - 5) \div 3$ or $33 \div 3$	M1	oe equation eg $3x + 5 = 38$ (scores B1M1) their 40 must be an integer
25	$(x =)\ 11$	A1ft	ft B0M1 Does not have to be an integer Accept answer rounded or truncated to at least 2 sf
	$\frac{27}{40}$ or 0.675 or 67.5%	B1ft	Only ft evaluation of $\dfrac{2 \times \text{their integer } x + 5}{40}$ and $0 < $ answer < 1 Denominator must be 40 (may subsequently be simplified)
	Alternative method 2		
	$\dfrac{2}{2 + x + 2x + 5} = \dfrac{1}{20}$ or $\dfrac{x + 2x + 5}{2 + x + 2x + 5} = \dfrac{19}{20}$	M2	oe equation
	$(x =)\ 11$	A1	
	$\frac{27}{40}$ or 0.675 or 67.5%	B1ft	Only ft evaluation of $\dfrac{2 \times \text{their integer } x + 5}{40}$ and $0 < $ answer < 1 Denominator must be 40 (may subsequently be simplified)

Alternative methods 3, 4 and Additional Guidance continue on the next two pages

	Alternative method 3		
	$3x \rightarrow 100\% - 5\% - 12.5\%$ or $3x \rightarrow 82.5\%$	M1	Using $2 \rightarrow 5\%$ and $5 \rightarrow 12.5\%$ oe
	$x \rightarrow 82.5\% \div 3$ or $x \rightarrow 27.5\%$	M1dep	oe
	$2x + 5 \rightarrow 2 \times 27.5\% + 12.5\%$	M1dep	oe
	$\dfrac{27}{40}$ or 0.675 or 67.5%	A1	
25 cont	**Alternative method 4**		
	$3x \rightarrow 1 - \dfrac{1}{20} - \dfrac{2.5}{20}$ or $3x \rightarrow \dfrac{16.5}{20}$	M1	Using $2 \rightarrow \dfrac{1}{20}$ and $5 \rightarrow \dfrac{2.5}{20}$ oe
	$x \rightarrow \dfrac{16.5}{20} \div 3$ or $x \rightarrow \dfrac{5.5}{20}$	M1dep	oe
	$2x + 5 \rightarrow 2 \times \dfrac{5.5}{20} + \dfrac{2.5}{20}$ or $2x + 5 \rightarrow \dfrac{13.5}{20}$	M1dep	oe
	$\dfrac{27}{40}$ or 0.675 or 67.5%	A1	

Additional Guidance continues on the next page

	Additional Guidance	
	(Alt 1) $x = 6$ (no working) Answer $\dfrac{17}{40}$ (first B1 implied)	B1M0A0B1ft
	(Alt 1) $2 + x + 2x + 5 = 20$ $x = \dfrac{13}{3}$ Answer $\dfrac{13.666}{20}$	B0M1 A1ftB0ft
	Answer $\dfrac{13.5}{20}$	B1M1A1B0
	11 by inspection or T & I scores the first 3 marks	
	Answer $\dfrac{2x+5}{40}$	B1M0A0B0
25 **cont**	Answer $\dfrac{2x+5}{3x+7}$	Zero
	Ratio eg 27 : 40	B1M1A1B0
	Expressed only in words eg 27 out of 40	B1M1A1B0
	27 out of 40 and $\dfrac{27}{40}$	B1M1A1B1
	$\dfrac{27}{40}$ seen with incorrect change of form or incorrect cancelling eg $\dfrac{27}{40}$ and answer 0.27	B1M1A1B1
	Ignore chance words if $\dfrac{27}{40}$ seen eg $\dfrac{27}{40}$ and answer Unlikely	B1M1A1B1

45.

12	$\frac{1}{4}$, $\frac{4}{10}$, 0.404, 44% with no incorrect conversions Accept values in any correct format	**B2**	**B1** two correct conversions to decimals or two correct conversions to percentages or two correct fractions with common denominators
	Additional Guidance		
	Condone missing percentage signs		
	0.25, 0.4, 0.404, 0.44		**B2**
	25%, 40%, 40.4%, 44%		**B2**
	25%, $\frac{2}{5}$, 0.404, 44% with no other working (all correct, even though in different formats)		**B2**
	$\frac{1}{4}$, $\frac{4}{10}$, 0.404, 44% with no working		**B2**
	$\frac{1}{4}$, $\frac{4}{10}$, 0.404, 44% with conversions to 25%, 40%, 40.04% (one incorrect conversion)		**B1**
	25%, 40%, 40.04% (two correct conversions)		**B1**
	44%, 0.404, $\frac{4}{10}$, $\frac{1}{4}$ (in reverse order) with no working for B1		**B1**

46.

			Allow one incorrect probability
6(a)	Box A → P(3) = $\frac{1}{6}$ and Box B → P(3) = $\frac{1}{3}$ and Box C → P(3) = $\frac{2}{5}$ and Box D → P(3) = $\frac{2}{4}$ or $\frac{1}{2}$	M1	
	(Box) D and all probabilities correct	A1	
6(b)	(Box) A and (Box) B	B1	