

PROBABILITY

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

1.

22	(a)	0.4, 0.4	P1	for process to find sum of unknown probabilities, eg $1 - 0.2 (= 0.8)$	Award mark for any two probabilities given that sum to 0.8, eg given in the table
			A1	oe	Accept any equivalent fraction or 40%
	(b)	60	P1	for complete process to find total number of cubes, eg $12 \div 0.2$ or 12×5 or $(“0.4” \div 0.2) \times 12 + (“0.4” \div 0.2) \times 12 + 12$	
				OR states $0.1 = 6$ or $0.4 = 24$	
			A1	cao	

Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Foundation Tier

2.

16	(a)(i)	B	B1	for B, accept 0.033 on the answer line	
	(ii)	C	B1	for C, accept $\frac{1}{3}$ on the answer line	
	(b)	Statement	C1	eg No with $(\frac{1}{3})$ and $\frac{2}{3}$ or No, probabilities would need to be $\frac{1}{2}$ or No since $\frac{1}{3} + \frac{1}{3}$ does not equal 1 or No since tails is 67% (or 0.67)	Accept rounded conversions seen to decimals or percentages if the reasoning is correct
	(c)	132	M1	for 4000×0.033	
				OR $\frac{132}{4000}$	
			A1	cao	132 out of 4000 is an acceptable answer

Pearson Edexcel - Tuesday 12 June 2018 - Paper 3 (Calculator) Foundation Tier

3.

24	(a)	8	P1	for process to find sum of unknown probabilities, eg $1 - 0.45 - 0.25 (= 0.3)$ OR to find the total number of counters in the bag, eg $\frac{18}{0.45} (= 40)$ OR to find the number of yellow counters, eg $\frac{0.25}{0.45} \times 18 (= 10)$	Award mark for any two probabilities given that sum to 0.3 eg given in the table.
			P1	for process to find $P(\text{red}) = 0.2$ oe or $P(\text{white}) = 0.1$ oe OR for process to find the total number of red and white counters, eg $“40” - 18 - “10” (= 12)$ OR for process to derive an equation in x , eg $2x + x = 1 - 0.45 - 0.25$ or $2x + x = “0.3”$ or $x = 0.1$	Award P2 for $P(\text{red})$ or $P(\text{white})$ (could be shown in table)
			P1	for a complete process to find the number of red counters, eg $\frac{2 \times 0.1}{0.45} \times 18$ or $\frac{2}{3} \times “12”$ or $0.2 \times “40”$ or $\frac{0.2}{0.025}$	Equations could be given as written statements or working but must be fully equivalent.
			A1	cao	
	(b)	Explanation	C1	for explanation eg 0.5 multiplied by an odd number will never be a whole number, for half of a number to be an integer that number must be even, you can't have half a marble	

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4.

19		$\frac{1}{11}$	P1	for starting the process, eg by writing down a correct ratio or using a given number of cubes for one relationship, eg 2B 1Y or B:Y = 2:1 or 4G 1B or G:B = 4:1 or 8G, 1Y or G:Y = 8:1 oe or yellow = 2, blue = 4, or states 2:1:8 oe in any order (can be algebraic)
			P1	for complete process to find possible number of each colour or equivalent ratio, eg 8G 2B 1Y or G:B:Y = 8:2:1 oe or yellow = 2, blue = 4, green = 16 oe (can be algebraic)
			A1	$\frac{1}{11}$ oe

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Foundation Tier

5.

26	(a)	Mel (supported)	B1	Mel with reference to greatest number of throws
	(b)	$\frac{2}{9}$	M1	selects overall total and multiplies P(point up)×P(point down) eg $\frac{50}{150} \times \frac{100}{150}$ oe (accept $\frac{14}{45} \times \frac{31}{45}$ or $\frac{27}{80} \times \frac{53}{80}$ or $\frac{9}{25} \times \frac{16}{25}$)
			A1	for $\frac{2}{9}$ oe

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

6.

21	a	$\frac{1}{6} \times \frac{1}{5} \times 30 \times 5 = 5$ $(\frac{5}{6} \times \frac{1}{5} + \frac{1}{6} \times \frac{4}{5} + \frac{1}{6} \times \frac{1}{5}) \times 30 = 10$ $30 \times 1 - 5 - 10 \times 2$	5	P1 for identifying correct process to find probabilities for winning scores. May include use of tree diagram or sample space P1 for correct process to find prize money P1 for completing correct process to find profit A1 cao
	b		Explanation	C1 for appropriate comment to interpret result eg probability so only likelihood not certainty, other than 30 may play, £5 is small difference.

Pearson Edexcel – Specimen 2 - Paper 3 (Calculator) Foundation Tier

7.

19	(a)		0.05	B1 cao
	(b)		24	M1 for 120×0.2 oe A1 cao

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

8.

22		0.22	P1 A1	begins process of subtraction of probabilities from 1 oe
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9.

25	(a)		Sharif	B1	Sharif with mention of greatest total throws
	(b)		Decision (supported)	P1 A1 P1	starts working with proportions Conclusion: correct for Paul, but not for the rest; or ref to just Paul's results selects Sharif or overall and multiplies P(heads)×P(heads) eg $\frac{3}{4} \times \frac{3}{4}$
	(c)	Tot: H 300 T 100	$\frac{9}{16}$	A1	oe

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

10.

19			68	4	B3 for 36 and 32 nfwv OR B1 for [silver =] 0.18 or 18% and M2 for <i>their</i> $0.18 \times 200 + 0.16 \times 200$ oe implied by <i>their</i> 0.34×200 or M1 for <i>their</i> 0.18×200 implied by 36 or 0.16×200 implied by 32 or <i>their</i> $0.18 + 0.16$ implied by 0.34	May be in table
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OCR November 09 November 2020- Morning (Calculator) Foundation Tier

11.

9			Incorrect oe supported by full correct evidence and $\frac{1}{3}$ or Incorrect oe supported by full correct evidence and $\frac{2}{3}$ not equal $\frac{2}{6}$ oe	3	M2 for GB, GG, GR, RB, RG, RR oe only and $\frac{2}{6}$ or M1 for 5 or 6 correct pairs shown [and one wrong or repeat] or [There are] six pairs [with] two matching [so $P = \frac{1}{3}$] oe	oe correct, annotated tree diagram isw attempt to cancel once $\frac{2}{6}$ seen For M1 ignore any fractions and mark only lists
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OCR Monday 11 November 2019 – Afternoon (Calculator) Foundation Tier

12.

7	(a)		$\frac{28}{100}$ oe or 0.28 or 28%	1		Do not accept ratio or in words Ignore attempts to change to decimals or cancel once correct answer seen
	(b)	(i)	Blue	1		
		(ii)	Yellow is [a sector] on the spinner oe or Yellow is a possible outcome oe	1		Anything saying the spinner can land on yellow or yellow is on the spinner. Contradictory statements score 0.

13.

21			$\frac{1}{27}$	3	<p>M2 for $\frac{2}{6} \times \frac{2}{6} \times \frac{2}{6}$ soi by $\frac{8}{216}$ oe or $0.037[\dots]$ or $3.7[\dots]\%$</p> <p>or</p> <p>B1 for $\frac{2}{6}$ oe</p> <p>If 0 scored then SC1 for $(\text{their } (\frac{2}{6}))^3$ oe</p>	$0 < \text{their } (\frac{2}{6}) < 1$
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OCR Thursday 6 June 2019 – Morning (Non-Calculator) Foundation Tier

14.

8	(a)	(i)	C	1		Mark answer line
		(ii)	A	1		
		(iii)	E	1	If all 3 answer lines are blank SC1 for all 3 colours correctly placed on the diagram	
	(b)		6 nfw	3	<p>M2 for $\frac{20+16}{2} - 8$</p> <p>or M1 for $\frac{20+16}{2}$</p>	<p>M2 may be implied by 10 [either 10 more blue or 10 total red] but nfw</p> <p>M1 may be implied by 18 [total blue]</p>

OCR Tuesday 11 June 2019 – Morning (Calculator) Foundation Tier

15.

19	a		Correct answer based on angle or area/arc length	1	<p>The angle [for black]</p> <ul style="list-style-type: none"> • is too small oe or • is less than a fifth oe or • should be 72 oe <p>The area/arc length [for black]</p> <ul style="list-style-type: none"> • is too small oe or • is less than a fifth oe 	<p>Accept 26 to 30 for "the angle"</p> <p>Accept "not equal to" for "too small" or "less than"</p> <p>See appendix</p>
	b		Any comment recognising limitations in range of the vertical scale	1		<p>EG It does not start at zero or It starts at 113</p> <p>See appendix</p>

16.

20		expected profit is £] 80 with 200 and 120 seen	4	<p>B1 for [£] 200 or 20 000[p] AND M2 for $0.1 \times 400 \times 3$ soi 120 or M1 for 0.1×400 soi 40</p> <p>Alternative method B1 for [£] 200 or 20 000[p] M1 for $\frac{\text{their } 200 - 100}{3}$ [prizes] soi 33[.3...] M1 for 0.1×400 soi 40 A1 for she is giving away too many prizes oe</p> <p>Alternative method B1 for [£] 200 or 20 000[p] M1 for $\frac{\text{their } 200 - 100}{3}$ [prizes] soi 33[.3...] M1 for $\frac{\text{their } 33[.3...]}{400}$ spi 0.08[3...] A1 for the probability of winning the game is too great oe</p>	Apply scheme to consistent working in pence rather than £.
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17.

21		108 nfww	4	<p>B3 for $\frac{108}{300}$ OR M3 for $(300 - \frac{23}{50} \times 300) \div 3 \times 2$ oe or M2 for $300 - \frac{23}{50} \times 300$ soi 162 or M1 for $\frac{23}{50} \times 300$ oe soi 138</p> <p>Alternative method M1 for $[p(\text{white or red}) =] 1 - \frac{23}{50}$ soi $\frac{27}{50}$</p> <p>M1 for their $\frac{27}{[50]} \div 3 \times 2$ soi $\frac{18}{[50]}$</p> <p>M1 for their 18×6 or their $\frac{18}{50} \times 300$</p>	<p>May use percentages or decimals for M marks</p> <p>May use 23 : 18 : 9 for M2</p>
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OCR Monday 24 May 2018 – Morning (Calculator) Foundation Tier

18.

16		0.58 oe	4	<p>M3 for $0.3 \times 0.4 + 0.3 \times 0.6 + 0.7 \times 0.4$ or $1 - (0.7 \times 0.6)$ Or M2 for two correct products or 0.42 Or M1 for one correct product Or B1 for 0.7 and 0.6 seen (may be on a tree diagram oe)</p>	<p>implied by $0.12 + 0.18 + 0.28$ allow equivalent fractions</p> <p>0.42 cannot be one of the 2 products as it's a different method</p>
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OCR Thursday 7 June 2018 – Morning (Non Calculator) Foundation Tier

19.

18	a		[0].35 oe	2	M1 for $1 - (0.2 + 0.45)$ oe	isw conversion to other forms M1 implied by answer 0.53
	b		40	3	M2 for $10 \div (0.45 - 0.2)$ oe or M1 for $0.45 - 0.2$ soi	e.g. 0.25 oe associated with 10 [games] then 4×10 soi Allow with algebra, eg for M1 $0.45x - 0.2x = 10$

OCR Thursday 8 June 2017 – Morning (Non - Calculator) Foundation Tier

20.

7			For candidates who have not added the erratum "The coin is put back" to their script you must use mark scheme in APPENDIX A [1p] 6 [2p] 8 [5p] 5 and [10p] 1	1 1 2	M1 for 5p and 10p coins total value being 35p soi or $57 - \text{their } 6 \times 1 - \text{their } 8 \times 2$ Or Following 0 marks SC1 for a total of 20 coins or a total of 57p	eg M1 implied by [5p] 1 and [10p] 3 from values given in the answer spaces
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OCR Tuesday 13 June 2017 – Morning (Calculator) Foundation Tier

21.

6	(a)	(i)	certain	1		
		(ii)	evens	1		
	(b)	(i)	6	1		
		(ii)	$\frac{21}{55}$ oe	1		Condone correct probability and unlikely for 1 mark Accept [0].3818 to [0].382 or 38.18% to 38.2% but not ratio or in words
		(iii)	$\frac{28}{55}$ oe	1		Condone correct probability and likely for 1 mark Accept [0].509 to [0].51 or 50.9% to 51% but not ratio or in words

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22.

20	(a)	(i)	<table><tr><td>×</td><td>1</td><td>2</td><td>2</td><td>3</td><td>4</td></tr><tr><td>1</td><td>1</td><td>2</td><td>2</td><td>3</td><td>4</td></tr><tr><td>2</td><td>2</td><td>4</td><td>4</td><td>6</td><td>8</td></tr><tr><td>2</td><td>2</td><td>4</td><td>4</td><td>6</td><td>8</td></tr><tr><td>3</td><td>3</td><td>6</td><td>6</td><td>9</td><td>12</td></tr><tr><td>4</td><td>4</td><td>8</td><td>8</td><td>12</td><td>16</td></tr></table>	×	1	2	2	3	4	1	1	2	2	3	4	2	2	4	4	6	8	2	2	4	4	6	8	3	3	6	6	9	12	4	4	8	8	12	16	2	B1 for table completed with no more than 5 errors or omissions	Ignore negative signs
×	1	2	2	3	4																																					
1	1	2	2	3	4																																					
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2	2	4	4	6	8																																					
3	3	6	6	9	12																																					
4	4	8	8	12	16																																					
		(ii)	$\frac{9}{25}$ oe	2	B1FT for <i>their</i> correct numerator B1 for fraction with denominator 25	Ignore attempts to convert form or simplify Accept [0].36 or 36% but not ratio or in words																																				
	(b)		Spinner completed with 3 negative numbers and 2 positives or 2 negatives and 3 positives	3	M1 for $\frac{12}{25}$ soi eg by 12 [out of 25] B1 for spinner with 5 numbers inserted, at least one negative	Do not accept 0 for 3 marks Not just 12 as a number on the spinner Condone 0 (as positive) for B1																																				

OCR Sample Question Paper 1 – Morning/Afternoon (Calculator) Foundation Tier

23.

4	(a)	(i)	5	1 1 AO1.1		
		(ii)	1	1 1 AO1.1		
		(iii)	Any number apart from 1, 3 or 5	1 1 AO1.1		
	(b)		Three different numbers only 6 appears most More even numbers than odd	3 3 AO2.1a	B1 for each of the three properties	

24.

21			0.82 oe	4 1 AO1.3a 3 AO3.1d	M3 for $0.7 \times 0.4 + 0.7 \times 0.6 + 0.3 \times 0.4$ or $1 - 0.18$ Or M2 for two correct products Or M1 for one correct product or 0.3 and 0.6 seen (may be on a tree diagram or equivalent)	
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OCR Sample Question Paper 2 – Morning/Afternoon (Non - Calculator) Foundation Tier

25.

2	(a)		0.1	2 2 AO1.3a	M1 for 0.4 + 0.2 + 0.3 soi or 1 – <i>their</i> '0.9'	
	(b)		0.7	2 2 AO1.3a	M1 for 0.4 and 0.3 identified	

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

26.

10(a)	$\frac{1}{5}$ or 0.2 or 20%	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore further working with any description of probability eg $\frac{1}{5}$ unlikely	B1	
	1 : 5 in working with $\frac{1}{5}$ on answer line	B1	
	1 : 5 on answer line	B0	
	1 out of 5 without $\frac{1}{5}$ in working	B0	

10(b)	$\frac{1}{5}$ or 0.2 or 20%	B1	oe fraction, decimal or percentage
	Additional Guidance		
	Ignore further working with any description of probability eg $\frac{1}{5}$ unlikely	B1	
	1 : 5 in working with $\frac{1}{5}$ on answer line	B1	
	1 : 5 on answer line	B0	
	1 out of 5 without $\frac{1}{5}$ in working	B0	

10(c)	$85 \times \frac{2}{5}$ or $85 \div 5 \times 2$ or 85×0.4 or $\left(\frac{2}{5} = \right) \frac{34}{85}$	M1	
	34	A1	
	Additional Guidance		
	34 out of 85 on answer line	M1A1	

27.

27(a)	$\frac{31}{50}$ or 0.62 or 62%	B1	oe fraction, decimal or percentage
	Additional Guidance		
	31 or 62		B0
	31 : 50		B0
	31 out of 50 or 31 in 50		B0
	Ignore subsequent attempts to simplify $\frac{31}{50}$ or convert it to a decimal or percentage, eg $\frac{31}{50} = 0.6$		B1
	$\frac{31}{50} = 0.5$ oe is considered as choice		B0

27(b)	Valid reason	B1ft	eg 31 is more than 19 (12) more heads than tails 31 is more than 25 31 \neq 25 (6) more than expected it should be 25 times heads and tails should be (roughly) equal it landed on heads more than half the times relative frequency/probability is more than 0.5 ft if their 0.62 > 0.5 0.62 > 0.5 ft if their 0.62 > 0.5
	Additional Guidance		
	ft is only available if comparing their relative frequency to 0.5, and their relative frequency must be greater than 0.5		
	Condone the probability given as 50/50 in otherwise correct reasons eg Probability is 50/50 so there should be 25 heads		B1
	There were only 19 tails		B1
	There weren't enough tails		B1
	Because it landed on heads 31 times and it should be 25/25		B1
	It should be $\frac{1}{2}$		B1
	The probability should be $\frac{1}{2}$ but it lands on heads 31 times		B1
	There were 31 heads		B0
	There were 19 tails		B0
	There were 31 heads and 19 tails		B0
	The coin could be fixed		B0
	Incorrect statement eg 31 is 22 more than 19		B0

AQA Thursday 8 June 2017– Morning (Calculator) Foundation Tier

28.

20(a)	$\frac{1}{10}$ or 10% or 0.1	B1	oe
	Additional Guidance		
	Ratio eg 1 : 10 or 1 : 9		B0
	$\frac{1}{10}$ seen and answer 1 : 10		B1
	Expressed only in words eg 1 out of 10		B0
	1 out of 10 and $\frac{1}{10}$		B1
	$\frac{1}{10}$ seen with change to incorrect decimal or incorrect percentage eg $\frac{1}{10}$ and answer 0.01		B1
	Ignore chance words if $\frac{1}{10}$ seen eg $\frac{1}{10}$ and answer Unlikely		B1

20(b)	$\frac{1}{4}$ or 0.25 or 25%	B1	oe
	Additional Guidance		
	Ratio eg 1 : 4 or 1 : 3		B0
	$\frac{1}{4}$ seen and answer 1 : 4		B1
	Expressed only in words eg 1 out of 4		B0
	1 out of 4 and $\frac{1}{4}$		B1
	$\frac{1}{4}$ seen with change to incorrect decimal or incorrect percentage eg $\frac{1}{4}$ and answer 0.4		B1
	Ignore chance words if $\frac{1}{4}$ seen eg $\frac{1}{4}$ and answer Likely		B1

AQA Tuesday 13 June 2017 Morning– Morning (Calculator) Foundation Tier

29.

25(a)	$\frac{2}{3} \times 720$ or $\frac{3}{5} \times 700$	M1	oe Accept use of 0.66... or 0.67
	480 or 420	A1	
	900	A1	Ignore fw
	Additional Guidance		
	900 with no working		M1A1A1
	900 out of 1420 or $\frac{900}{1420}$ (ignore fw)		M1A1A1
	$\frac{480}{720}$ (480 boys out of 720) or $\frac{420}{1420}$ (420 girls out of 1420 students)		M1A1A0

25(b)	Alternative method 1		
	720 + 700 or 1420 or 720 + 700 – their 900 or 520	M1	oe
	$\frac{520}{1420}$ or $\frac{26}{71}$	A1ft	oe fraction, decimal or percentage 0.36(6...) or 0.37 36.(6...) % or 37% ft their part (a) Ignore fw
	Alternative method 2		
	720 + 700 or 1420 or $\frac{1}{3} \times 720$ or 240 or $\frac{2}{5} \times 700$ or 280 or 240 + 280 or 520	M1	oe
	$\frac{520}{1420}$ or $\frac{26}{71}$	A1	oe fraction, decimal or percentage 0.36(6...) or 0.37 36.(6...) % or 37% Ignore fw
	Alternative method 3		
	720 + 700 or 1420 or $\frac{900}{1420}$ or $\frac{45}{71}$ or $\frac{\text{their } 900}{1420}$	M1	oe fraction, decimal or percentage 0.63... or 0.63 63.(...) % or 63%
	$\frac{520}{1420}$ or $\frac{26}{71}$	A1ft	oe fraction, decimal or percentage 0.36(6...) or 0.37 36.(6...) % or 37% ft their part (a) Ignore fw

Additional Guidance continues on the next page

25(b) cont	Additional Guidance	
	$\frac{520}{1420}$ followed by incorrect simplification of fraction	M1A1

AQA Sample Paper 2– Morning (Calculator) Foundation Tier

30.

23(a)	Two of $\frac{6}{50}$ $\frac{28}{100}$ $\frac{34}{150}$	B2	oe fraction, decimal, percentage B1 One of $\frac{6}{50}$ $\frac{28}{100}$ $\frac{34}{150}$ with at most one incorrect answer
23(b)	Chooses their probability from the larger number of trials and reason given that more trials are involved	B1ft	Must have two probabilities in (a)

AQA Sample Paper 3– Morning (Calculator) Foundation Tier

31.

27	$9 + 3x + x - 5 + 2x$ or $6x + 4$ or $3x + x - 5 + 2x$ or $6x - 5$	M1	oe
	their $(6x + 4) = 100$ or their $6x - 5 = 91$ or $6x = 96$	M1	oe $\frac{9}{\text{their } (6x + 4)} = \frac{9}{100}$
	$x = 16$	A1	
	$\frac{11}{100}$	B1ft	ft their 16