

Qu	Scheme	Marks	AO										
5(a)	$P(X = 4) = P(X = 2)$ so $P(X = 4) = 0.35$ $P(X = 1) = P(X = 3)$ and $P(X = 1) + P(X = 3) = 1 - 0.7$ So	M1	2.1										
	<table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>$P(X = x)$</td><td>0.15</td><td>0.35</td><td>0.15</td><td>[0.35]</td></tr></table>	x	1	2	3	4	$P(X = x)$	0.15	0.35	0.15	[0.35]	A1	1.1b
	x	1	2	3	4								
	$P(X = x)$	0.15	0.35	0.15	[0.35]								
		(2)											
	(b) Let A = number of spins that land on 4 $A \sim B(60, "0.35")$	B1ft	3.3										
	$[P(A > 30) =] \quad 1 - P(A \leq 30)$	M1	3.4										
	$= 1 - 0.99411\dots = \text{awrt } 0.00589$	A1	1.1b										
		(3)											
	(c) $Y - X \leq 4 \Rightarrow \frac{12}{X} - X \leq 4$ or $12 - X^2 \leq 4X$ (since $X > 0$) o.e.	M1	3.1a										
i.e. $0 \leq X^2 + 4X - 12 \Rightarrow 0 \leq (X + 6)(X - 2)$ so $X \geq 2$	M1	1.1b											
$P(Y - X \leq 4) = P(X \geq 2) = 0.35 + 0.15 + 0.35 = \underline{0.85}$	A1	3.2a											
	(3)												
	(8 marks)												
	Notes												
(a)	M1 for using the given information to obtain $P(X = 4)$ Award for statement $P(X = 4) = P(X = 2)$ or writing $P(X = 4) = 0.35$ A1 for getting fully correct distribution (any form that clearly identifies probs) e.g. can be list $P(X = 1) = 0.15, P(X = 3) = \dots$ etc or as a probability function [Condone missing $P(X = 2)$ as this is given in QP] $P(X = x) = \begin{cases} 0.15 & x = 1, 3 \\ 0.35 & x = 2, 4 \end{cases}$												
(b)	B1 for selecting a suitable model, sight of $B(60, \text{their } 0.35)$ o.e. in words f.t. their $P(X = 4)$ from part (a). Can be implied by $P(A \leq 30) = \text{awrt } 0.9941$ or final answer = awrt 0.00589 M1 for using their model and interpreting "more than half" Need to see $1 - P(A \leq 30)$. Can be implied by awrt 0.00589 Can ignore incorrect LHS such as $P(A \geq 30)$ A1 for awrt 0.00589												
(c)	1 st M1 for translating the prob. problem into a <u>correct</u> mathematical inequality Just an inequality in 1 variable. May be inside a probability statement.												
ALT	Table of values: <table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Y</td><td>12</td><td>6</td><td>4</td><td>3</td></tr></table> or values of $Y - X = 11, 4, 1, -1$			X	1	2	3	4	Y	12	6	4	3
X	1	2	3	4									
Y	12	6	4	3									
	2 nd M1 for solving the inequality leading to a range of values, allow 1 or 2 slips May be a quadratic or cubic but must lead to a set of values of X or $Y - X$												
ALT	Table or values: They must state clearly which values are required Both Ms can be implied by a correct answer (or correct ft of their distb'n)												
	A1 for interpreting the inequality and solving the problem i.e. 0.85 cao												