

Question	Scheme	Marks	AOs										
4(a)	Two of: $P(N = 2) = \frac{p}{3}, P(N = 3) = \frac{p}{9}, P(N = 4) = \frac{p}{27}$	M1	2.1										
	Fully correct distribution in terms of p <table><tr><td>n</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>$P(N = n)$</td><td>p</td><td>$\frac{p}{3}$</td><td>$\frac{p}{9}$</td><td>$\frac{p}{27}$</td></tr></table>	n	1	2	3	4	$P(N = n)$	p	$\frac{p}{3}$	$\frac{p}{9}$	$\frac{p}{27}$	A1	1.1b
	n	1	2	3	4								
	$P(N = n)$	p	$\frac{p}{3}$	$\frac{p}{9}$	$\frac{p}{27}$								
		(2)											
(b)	$p + \frac{p}{3} + \frac{p}{9} + \frac{p}{27} = 1$ Or $\frac{40p}{27} = 1$	M1	1.1b										
	So, $p = \frac{27}{40} *$	A1cso*	1.1b										
		(2)											
(c)	$P\left(N > \frac{7}{3}\right) = P(N = 3, 4)$ Or <table><tr><td>$3n - 2$</td><td>1</td><td>4</td><td>7</td><td>10</td></tr><tr><td>$P(N = n)$</td><td>$\frac{27}{40}$</td><td>$\frac{9}{40}$</td><td>$\frac{3}{40}$</td><td>$\frac{1}{40}$</td></tr></table>	$3n - 2$	1	4	7	10	$P(N = n)$	$\frac{27}{40}$	$\frac{9}{40}$	$\frac{3}{40}$	$\frac{1}{40}$	M1	3.1a
	$3n - 2$	1	4	7	10								
	$P(N = n)$	$\frac{27}{40}$	$\frac{9}{40}$	$\frac{3}{40}$	$\frac{1}{40}$								
	And selecting $P(3N - 2 = 7, 10)$												
	$\frac{3}{40} + \frac{1}{40} = \frac{1}{10}$ 0.1 o.e.	A1	1.1b										
	(2)												

(6 marks)

Notes:		
(a)	M1: A1:	Two correct probabilities associated with the correct outcome (not including $P(N = 1) = p$) Fully correct with correct notation and probabilities in terms of p Allow fully defined probability function $P(N = n) = \begin{cases} p\left(\frac{1}{3}\right)^{n-1} & n = 1, 2, 3, 4 \\ 0 & \text{otherwise} \end{cases}$
(b)	M1: A1cso*:	For clear use of sum of probabilities = 1 (all terms) Fully correct with no incorrect working seen. Must have clear evidence of the M1 scored before final answer.
(c)	M1: A1:	Simplifying the inequality to reach $P\left(N > \frac{7}{3}\right)$, and selecting $N = 3, 4$ Or Forming a correct distribution for $3n - 2$ and selecting $3N - 2 = 7, 10$ 0.1 or equivalent