Q	Marking Instructions	AO	Mark	Typical Solution
13 (a)(i)	Obtains correct mean	1.1b	B1	6
13 (a)(ii)	Obtains correct variance	1.1b	B1	4.8
13 (b)(i)	Uses the Binomial formula with $n = 30$, $p = 0.2$ or $P(X \leq 10) - P(X \leq 9)$ **PI** by correct answer	1.1a	M1	$P(X = 10) = \binom{30}{10} 0.2^{10} 0.8^{20}$ $= 0.0355$
	Obtains correct probability **AWFW** [0.035, 0.036]	1.1b	A1	
13 (b)(ii)	Calculates either $P(X \leq 4) = 0.255$ or $P(X \leq 5) = 0.4275$ using the Binomial distribution	3.1b	M1	$P(X \leq 4) = 0.255$ $P(X \geq 5) = 1 - P(X \leq 4)$ $= 1 - 0.255$ $= 0.745$
	States $P(X \geq 5) = 1 - P(X \leq 4)$ or subtracts their stated value of $P(X \leq 4)$ from 1	1.1b	M1	
	Obtains correct probability **AWFW** [0.74, 0.75]	1.1b	A1	
13 (c)(i)	Raises their 0.745 to power of 5	3.1b	M1	$0.745^5 = 0.229$
	Obtains their correct probability **FT** their 0.745 **AWRT** their 0.229	1.1b	A1F	
13 (c)(ii)	Gives a valid reason that probability/likelihood/chances may change/increase/decrease as a result of external factor change over 5 day period or Patrick improves	3.5b	E1	Probability may change as Patrick improves
	Total		**10**	