Question	Scheme	Marks	AOs
1(a)(i)	$P(X=3)=0.2462$ awrt 0.246	B1	1.1b
(a)(ii)	$P(X \geqslant 6)$	M1	3.4
	$P(X \geqslant 6)=0.1072$ awrt 0.107	A1	1.1b
		(3)	
(b)	$H_0 : p = 0.36 \quad H_1 : p < 0.36$	B1	2.5
	$X \sim B(25, 0.36)$ seen or used	M1	3.3
	$P(X \leqslant 4)=0.025487...$ awrt 0.0255	A1	1.1b
	[$0.0255 < 0.05$, reject H_0 o.e.] Sufficient evidence to suggest the **coach's new system** has reduced the proportion of matches in which the team commits **serious disciplinary offences**	A1	2.2b
		(4)	

(c)	One assumption from:
	     • **Serious offences** are committed in matches **independently**
	     ➢ E.g. Unlikely to be valid as a player may be banned or withdrawn by the coach for a serious offence in a previous game.
	     • **Probability** of a **serious offence** being committed in a match is the **same for all matches**
	     ➢ E.g. Unlikely to be valid as may depend on tougher opposition/different referees/different player selection
	     • There are **only two states**: the team committing a **serious offence** in a match or not
	     ➢ E.g. Likely to be valid as seriousness of offences can be categorised by an objective measure such as any incidents resulting in certain levels of sanctions from officials.
	 Accept other plausible reason in context to support assumptions
		B1
		 dB1
			1.2
			 2.4

		(2)	
		(9 marks)	

Notes:		
(a)(i) **(ii)**	**B1:** **M1:** **A1:**	awrt 0.246 Writing or indicating that the required outcomes needed $X \geqslant 6$ awrt 0.107
(b)	**B1:** **M1:** **A1:** **A1:**	For both hypotheses correct and in p or π Writing the correct distribution, or evidence of using it awrt 0.0255 Correct statement including **new system** and **serious disciplinary offences** Do not allow contradictory statements
(c)	**B1:** **dB1:**	A correct contextual statement linking **serious offences** and either: independence, constant probability, or two outcomes A sensible corresponding contextual comment on the validity of their statement