Question Number	Scheme	Marks
5 (a)	**Complaints** received are independent or occurring at a constant rate or singly	B1
		(1)
(b)(i)	$\left[\mathrm{P}\left(X<3 \middle\vert X \sim \mathrm{Po}(6)\right)=\right]0.0620$ awrt 0.062	B1
(ii)	$\left[\mathrm{P}\left(X \geqslant 6\right)=\right]1-\mathrm{P}\left(X \leqslant 5\right)$ or 1 – 0.4457 = 0.5543 awrt 0.554	M1A1
		(3)
(c)	$\mathrm{H}_0 : \lambda = 6 \quad \mathrm{H}_1 : \lambda > 6$	B1
	$\mathrm{P}(X \geqslant 12) = 1-\mathrm{P}(X \leqslant 11) = [1-0.9799]$ or $\mathrm{P}(X \geqslant 11) = 1-\mathrm{P}(X \leqslant 10) = [1-0.9574]$	M1
	$= 0.0201$ or CR $\geqslant 11$	A1
	Reject H_0/In the CR/Significant	M1
	There is sufficient evidence to suggest that the mean **number** of **complaints** received is **greater** than 6 per week	A1ft
		(5)
(d)	$\mathrm{H}_0 : \lambda = 6 \quad \mathrm{H}_1 : \lambda < 6$	B1
	6 week period is Po(36) $\Rightarrow$ N(36, 36)	B1
	$\mathrm{P}\left(Y \leqslant 26\right) \approx \mathrm{P}\left(Y < 26.5\right) = P\left(Z < \dfrac{26.5-36}{6}\right)$ or $\dfrac{x+0.5-36}{\sqrt{36}} < -1.6449$	M1 M1
	$\left[P\left(Z < -1.583...\right)\right] = 0.0571$ (Calculator 0.05667…) or $x < 25.63...$ awrt 0.057 awrt 25.6	A1
	Do not reject H_0/Not in the CR/Not significant	M1
	There is insufficient evidence to suggest that the mean **number** of **complaints** received after the changes made is **less** than 6 per week	A1ft
		(7)

	Notes	**Total 16**
(a)	**B1**	A correct assumption. Must be in context so need 'complaints' and then independent/random or constant rate or singly
(b)(i)	**B1**	awrt 0.062
(ii)	**M1**	For writing or using $1-\mathrm{P}(X \leqslant 5)$ May be implied by awrt 0.554
	A1	awrt 0.554
(c)	**B1**	Both hypotheses correct. Must be attached to H_0 and H_1 in terms of λ or μ
	M1	For writing or using $1-\mathrm{P}(X \leqslant 11)$ or $1-\mathrm{P}(X \leqslant 10)$
	A1	For 0.0201 or CR $\geqslant 11$
	M1	A correct statement – no context needed but do not allow contradicting non contextual comments
	A1ft	Correct conclusion in context with the words highlighted in bold
(d)	**B1**	Both hypotheses correct. Must be attached to H_0 and H_1 in terms of λ or μ Allow use of 36 rather than 6
	B1	For writing or using N(36, 36)
	M1	For standardising using 25.5/26/26.5, their mean and their standard deviation or standardising using x–0.5/x/x + 0.5, their mean and their standard deviation and setting equal to –1.6449
	M1	For a correct continuity correction written or used e.g. 26.5 or x + 0.5
	A1	awrt 0.057 (NB Poisson used gives 0.0512685… and scores M0M0A0) or CR < awrt 25.6 (Allow $\leqslant$)
	M1	A correct statement – no context needed but do not allow contradicting non contextual comments
	A1ft	Correct conclusion in context with the words in bold (Allow The mean **number** of **complaints** has **stayed the same/not changed** oe)