| Question Number | Scheme | Marks |
|---|---|---|
| 6 | | |
| (a) | $200(1-p)$ | B1 |
| | | (1) |
| (b) | $(z=)\pm\dfrac{179.5-200}{"\sqrt{200(1-p)}"}$ | M1M1 A1ft |
| | $z=(\pm)1.87$ | B1 |
| | $\dfrac{179.5-200}{\sqrt{200(1-p)}}=-1.87$<br>$*\sqrt{200(1-p)}=\dfrac{-20.5}{-1.87}=10.962...*$ | A1*cso |
| | | (5) |
| (c) | $1-p=0.600889...$ or<br>$200-200p=\dfrac{75076}{625}(=120.1216)\Rightarrow 200p=\dfrac{49924}{625}\ (=79.8784)$ | M1 |
| | $p=0.39911...$<br>awrt $p=0.40$ | A1 |
| | | (2) |
| | **Notes** | **Total 8** |

| | | |
|---|---|---|
| (a) | **B1** | $200(1-p)$ oe as variance. Must be seen in (a). isw if they subsequently square root to find sd or multiply out and make errors |
| (b) | **M1** | attempt at continuity correction, sight of 179.5 or 180.5 may be implied by 19.5 or 20.5 imp. by a correct equation. |
| | **M1** | standardisation using their Normal distribution $N(200, (a))$ (Note could use 220.5 for 179.5 and $z = 1.87$) implied by a correct equation. Condone use of 180 for this mark.<br>Allow use of $200(1-p)$ in (b) if (a) is incorrect. |
| | **A1ft** | for correct standardisation, ft their variance. Must have scored M1M1. |
| | **B1** | awrt $\pm 1.87$ calculator gives -1.8706 |
| | **A1*** | cso for achieving awrt 10.963 following a correct equation i.e. when their standardised expression is equated to $\pm 1.87$ the signs must be compatible otherwise A0*<br>If using a calculator to find the z-value look for awrt 10.959 |
| | | $\dfrac{179.5-200}{\sqrt{200(1-p)}}=-1.87$ oe scores M1M1A1ftB1 |
| (c) | **M1** | for rearranging the given answer to part (b) to $1-p=$ awrt $0.6$ oe or $200p=$ awrt $80$ oe using the correct order of operations. Implied by awrt 0.4. May also rearrange to $p=\dfrac{10.96^2-200}{-200}$ or equivalent which implies this mark. |
| | **A1** | awrt 0.40 , use of 10.96 gives 0.399392 |