Q4

1 Point

Suppose Y has a χ^2_k distribution. What's the limiting distribution of $(Y-k)/\sqrt{2k}$ as $k \to +\infty$? Show details.

$Y \sim \chi_k^2 (k, 2k)$

$\chi_k^2 = \sum_1^k Z_i^2$, $Z_i \sim N(0,1)$

$E(Z_i^2) = \mu$, $Var(Z_i^2) = \sigma^2$ (both finite)

$$\frac{Y-k}{\sqrt{2k}} = \frac{Y-\mu}{\sigma} \longrightarrow N(0,1) \text{ when } k \to \infty$$