

Expected Value and Variance of Standard Normal Z

$$E(Z) = \int_{-\infty}^{\infty} z \frac{1}{\sqrt{2\pi}} e^{-z^2/2} dz = 0$$

$$V(Z) = \int_{-\infty}^{\infty} z^2 \frac{1}{\sqrt{2\pi}} e^{-z^2/2} dz = 1$$

$$\int_{-1.96}^{1.96} \frac{1}{\sqrt{2\pi}} e^{-z^2/2} dz = .95 \quad P(-1.96 < Z < 1.96) = .95$$

$$\int_{-2.576}^{2.576} \frac{1}{\sqrt{2\pi}} e^{-z^2/2} dz = .99 \quad P(-2.576 < Z < 2.576) = .99$$