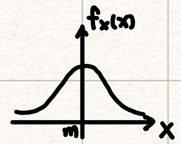
X is an exponential RV. $P(X > t+h \mid X > t) = e^{-\lambda h}$ Memory-less

Gaussian

$X \sim N(m, \sigma^2)$

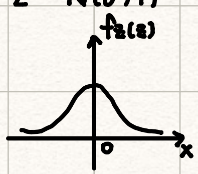


pdf: $f_X(x) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(\frac{-(x-m)^2}{2\sigma^2}\right)$

CDF: $F_X(x) = \frac{1}{\sqrt{2\pi\sigma^2}} \int_{-\infty}^{x} e^{-\frac{(x-m)^2}{2\sigma^2}} dx$

$E[X] = m$, $VAR(X) = \sigma^2$

$Z \sim N(0,1)$



$\Phi_Z(z) = F_Z(z)\Big|_{Z \sim N(0,1)} = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{z} e^{-\frac{z^2}{2}} dz$

$\Phi(-z) = 1 - \Phi(z)$ $\quad Q(z) = 1 - \Phi(z)$

$\mathrm{erf}(z) = \frac{2}{\sqrt{\pi}} \int_{0}^{z} e^{-z^2} dz$

$X \sim N(m, \sigma^2)$ $\quad P((X-m) < \sigma) = \cdots = \Phi(1) = 84.1\%$

$P(|X-m| < \sigma) = P(-\sigma < X-m < \sigma) = \Phi(1) - Q(1) = 68\%$

$P((X-m) < 2\sigma) = 95.7\%$ $\quad P(|X-m) < 3\sigma) = 99.7\%$