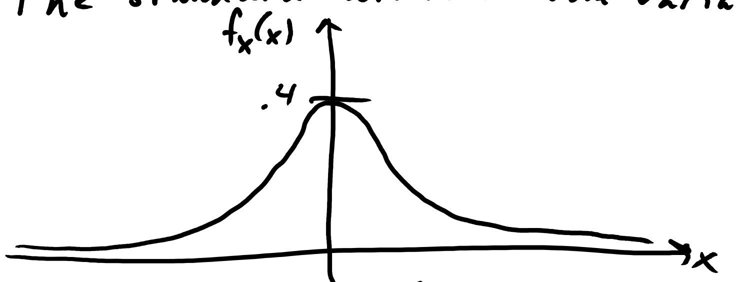
Normal Random Variables One of the most used random variables in probability theory, largely because of the central limit theorem, but also because we want to measure have distributions that are approximately normal distributed.

Say X is a Normal Random Variable with mean μ_X and variance σ_X^2 by writing $X \sim N(\mu_X, \sigma_X^2)$.

In particular, when $\mu_X = 0$ and $\sigma_X^2 = 1$ we say X is a <u>standard normal</u> random variable. This is the kind of random variable for which we provide a chart of the values of the CDF. Any other kind of normal random variable must be converted to standard normal before we can use such a chart.

The standard normal random variable density is $f_X(x) = \frac{1}{\sqrt{2\pi}} e^{-x^2/2}$ for all x.



More generally, if X is any normal random variable with mean μ_X and variance σ_X^2, then X has density $f_X(x) = \dfrac{e^{-(x-\mu_X)^2/(2\sigma_X^2)}}{\sqrt{2\pi\sigma_X^2}}$, for all real x.

Notice when $\mu_X = 0$ and $\sigma_X^2 = 1$, this simplifies to the form mentioned earlier.