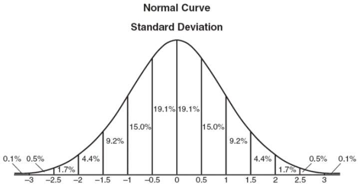
Sept. 26 — Desired outcomes from last class

Students will be able to:

- give p.d.f. of a standard normal r.v.
- write normal r.v. in terms of standard normal r.v.

Sept. 26 — 3.5 Gaussian Random Variables



Approximately 19.1% of normally distributed data is located between the mean (the peak) and 0.5 standard deviations to the right (or left) of the mean. (The percentages are represented by the area under the curve.)

http://www.regentsprep.org/Regents/math/algtrig/ATS2/NormalLesson.htm

http://en.wikipedia.org/wiki/Normal_distribution

Sept. 26 — 3.5 Gaussian Random Variables

$$P(a \le X \le b) = \Phi\left(\frac{b-\mu}{\sigma}\right) - \Phi\left(\frac{a-\mu}{\sigma}\right)$$

Quiz 3.5 on page 122 ...

Sept. 26 — 3.5 Gaussian Random Variables

Notation in the book Gaussian (μ, σ)
Standard notation Normal (μ, σ^2) or $X \sim N(\mu, \sigma^2)$.
Example: Suppose X is the Gaussian $(61, 10)$ random variable.
What is $P(X \le 46)$
Find a and b such that $P(X \le a) = 0.025$, $P(X \ge b) = 0.025$

Exercise: Suppose $X \sim N(6, 25)$.

- $P(6 \leq X \leq 12)$
- $P(-2 < X \leq 0)$
- $P(|X - 6| < 5)$
- $P(|X - 6| < 15)$

- If $Z \sim N(0, 1)$, then $Z^2 \sim \chi^2(1)$.
- If $X \sim N(\mu, 1)$, then $(X - \mu)^2 \sim \chi^2(1)$.
- If $Y \sim N(\mu, \sigma^2)$, then $\left(\frac{Y-\mu}{\sigma}\right)^2 \sim \chi^2(1)$.

Students will be able to:

- write the density function for a normal (μ, σ^2) random variable.
- derive the mean and variance of a normal random variable
- Compute probabilities using normal tables
- write mean of Chi-square r.v.