STAT 4033

Exam 2 Notes Name: Cooper Morris

C2S4:

Random Variable: X, assigns a numeric value to outcomes in a sample space.

Discrete Random Variable: Possible values are countable, sum of two dice.

Continuous Random Variable: Possible values continuous, weight of random person.

Probability Mass Function: $P(X = x) = p(x)$

Cumulative Distribution Function: $P(X \leq x)$

Denoted by $F(x)$

$0 \leq p(x) \leq 1$

$\sum_x p(x) = 1$

Support: the set of values such that $f(x) > 0$

Percentile: x_p such that $P(X \leq x_p) = \frac{p}{100}$

$F(x_p) = \int_{-\infty}^{x_p} f(x)\,dx = \frac{p}{100}$

Discrete Random Variables:

$\mu_x = \mathbb{E}[X] = \sum_x x \cdot p(x)$

$\sigma^2 = \sum_x x^2 \cdot p(x) - \mu_x^2$

$\mathbb{E}[g(X)] = \sum_x g(x) \cdot p(x)$

Continuous Random Variables:

$P(a \leq X \leq b) = \int_a^b f(x)\,dx$

$\mu_x = \mathbb{E}[X] = \int_{-\infty}^{\infty} x \cdot f(x)\,dx$

$\sigma^2 = \int_{-\infty}^{\infty} x^2 \cdot f(x)\,dx - \mu_x^2$

$\mathbb{E}[g(X)] = \int_{-\infty}^{\infty} g(x) \cdot f(x)\,dx$

$(\mu \pm k\sigma_x)$

$P(|X - \mu_x| > k\sigma_x) = \frac{1}{k^2}$