

11/14/25

< Brief review for exam 2 >

Review for variance in book:

Page 73, Proposition 2.39

(see Oct 25 class notes)

Page 71, Proposition 2.32

$$\text{Var}[X] = E[X^2] - (E[X])^2$$

(finite & discrete both work)

Page 84, Corollary 2.62

Geometric Series: $\sum_{k=0}^{\infty} ar^k = \frac{a}{1-r} \quad |r| < 1$

Taylor series for $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots + \frac{x^n}{n!}$

Theorem 2.80 (Method of Transformation)

Suppose X is a continuous r.v. with pdf $P_X(x)$ and I is an interval containing the range of X . Let $g: I \rightarrow \mathbb{R}$ be invertible and differentiable function such that $g'(x) \neq 0$ for all $x \in I$, and let h be the inverse of g . Then $g(X)$ is a continuous random variable with pdf

$$P_Y(y) = |h'(y)| P_X(h(y))$$

(just the same as the examples from last class)