

Exercise Number: 4.5.3

Proposition. Let X and Y be two general random variables with finite means, and let $Z = X + Y$.

1. $Z^+ - Z^- = X^+ - X^- + Y^+ - Y^-$.
2. $\mathbb{E}(Z) = \mathbb{E}(X) + \mathbb{E}(Y)$
3. The general definition of expectation is finitely linear, for general random variables with finite means.

Proof. Proven in the order presented.

1. Follows by definition of expectation.
- 2.

□