The First Fundamental Mystery of Probability

Let X and Y be a pair of random variables, let c be a constant and let $E(X)$ denote the expected value of X. Then we have

$$E(X + Y) = E(X) + E(Y)$$

$$E(cX) = cE(X)$$

The Second Fundamental Mystery of Probability

Let X and Y be independent random variables, let c be a constant and let $V(X)$ denote the variance of X. Then we have

$$V(X + Y) = V(X) + V(Y)$$

$$V(cX) = c^2 V(X)$$

The Third Fundamental Mystery of Probability

Let X and Y be independent random variables and let $E(X)$ denote the expected value of X. Then we have

$$E(XY) = E(X)E(Y)$$