



Expected Value

- X is a discrete RV with a set of possible values *D* and pmf p(x).
- The **expected value** denoted by E(X), μ_{X} , or μ is given by:

$$E(X) = \mu_X = \sum_{x \in D} x \cdot p(x)$$

• Also called the **population mean**



Example: AC Units								
Weekly Air Conditioning Units Ordered								
U	nits ordered X	0	1	2	3	4	5	
Pr	obability	0.05	0.15	0.27	0.33	0.13	0.07	
Calculate the expected number of units ordered weekly.								



Example: Car Insurance

- The small car insurance company charged a \$200 premium to all customers that year.
- Let X = Monetary claim of a random customer. Reminder:
 - 2% claimed \$2000, 5% claimed \$1000
 - 10% claimed \$500, 83% claimed \$0
- Let Y = h(X) = 200 X be the company's profit associated with claim X
- Calculate E(Y), the company's expected profit.



Variance of X

- X is a discrete RV with a set of possible values D, pmf p(x), and expected value μ.
- The **variance** of X is denoted by V(X) or σ^2 is given by:

$$V(X) = \sigma^{2} = \sigma_{X}^{2} = \sum_{x \in D} (x - \mu)^{2} \cdot p(x) = E[(X - \mu)^{2}]$$

• Also called the **population variance**.







