

E.g. Expected # of claims for the insurance example

X	0	1	2	3
P_x	0.72	0.22	0.05	0.01

$$E(X) = 0.35$$

In general, if X is a R.V. whose probability distribution is given by the table:

X	x_1	x_2	x_3		x_n
P_x	p_1	p_2	p_3		p_n

Then the expected value of X is:

$$\begin{aligned}
 E(X) &= p_1 \cdot x_1 + p_2 \cdot x_2 + p_3 \cdot x_3 + \dots + p_n \cdot x_n \\
 &= \sum_{i=1}^n p_i \cdot x_i
 \end{aligned}$$

E.x. Researcher study a fatal disease.

R.V. X = the year following the diagnosis
in which a patient dies.

→ Distribution table:

Year of a death	1	2	3	4	5
P_x	0.53	0.25	0.12	0.07	0.03

Find the expected year a death for a randomly selected patient with this disease.

$$E(X) = 1.82$$

Ex. 1. Producer of concert.

If it does not rain, make \$20,000 profit

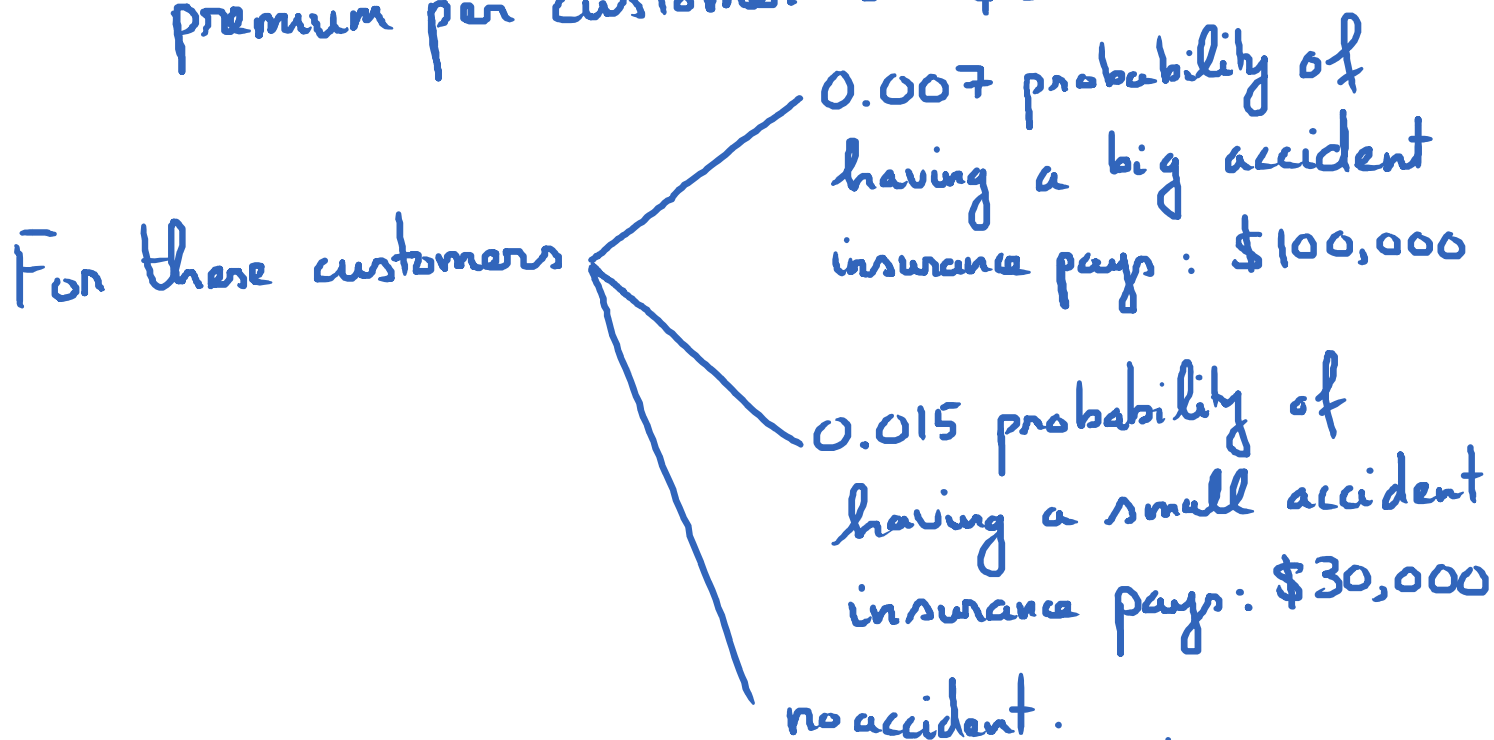
If it rains, lose \$12,000.

probability of rain is 40%

→ Calculate the expected profit.

Ex. 2. Car Insurance Agency.

For customers in a particular category, the premium per customer is \$2300.



Q: Calculate the expected profit per customer.

①

X	\$20,000	-\$12,000
P_x	0.6	0.4

$$E(X) = (0.6)20,000 + 0.4(-12,000)$$

$$= 7200$$

②

X	-97,700	-27,700	2300
P_x	0.007	0.015	0.98

$$E = 1150.$$