

E.g. Producer of a concert.

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

If it rains, lose \$12,000.

probability of raining is: 40%.

→ Find the expected profit.

values of X	\$20,000	-\$12,000
probability	0.6	0.4

$$\begin{aligned} \text{Expected profit} &= 0.6 \cdot (\$20,000) + \\ &\quad 0.4 \cdot (-\$12,000) \\ &= \$7,200 \end{aligned}$$

E.g. Car Insurance agency.

For a particular category of customers, the premium is \$2300.

For these customers

- No accident
- 0.007 probability of having big accident, insurance pays \$100,000
- 0.015 probability of having small accidents, insurance pays \$30,000

Find the expected profit of this policy for these customers.

values	\$2300	-\$97,700	-\$27,700
probability	0.98	0.007	0.015

$$E = (0.98) \cdot (\$2300) + (0.007) \cdot (-97,700) + (0.015) \cdot (-27,700) = \$1150$$

$$+(0.015) \cdot (-27,700) = \$1150$$

E.g. Expected Value for the single-number bet in Roulette

X = amount won or lost

values	\$35	-\$1
probability	$\frac{1}{38}$	$\frac{37}{38}$

$$E = \frac{1}{38} \cdot \$35 + \frac{37}{38} \cdot (-\$1)$$

$$E = -\$0.0526.$$

E.g. Odd/even bet. win $\rightarrow$ gain \$1
lose $\rightarrow$ lose \$1

Calculate the expected gain (or loss) of this strategy.

X	\$1	-\$1
P	$\frac{18}{38}$	$\frac{20}{38}$

$$E = \frac{18}{38} \cdot 1 + \frac{20}{38} \cdot (-1) = -\$0.0526$$

E.g. Combination of 4 #'s strategy.

win $\rightarrow$ gain \$8

lose $\rightarrow$ lose \$1

Find the expected gain/loss.

	\$8	-\$1
	$\frac{4}{38}$	$\frac{34}{38}$

$$E = \frac{4}{38} \cdot 8 + \frac{34}{38} \cdot (-1) = -\$0.0526.$$