

2. $X = \text{profit}$

x	$P(X=x)$	$X \cdot P(X=x)$
10	$\frac{1}{6}$	$\frac{10}{6}$
5	$\frac{2}{6}$	$\frac{10}{6}$
-6	$\frac{3}{6}$	$-\frac{18}{6}$

↓ add

$$\mu = \frac{2}{6} = 0.33$$

4.

	X	$P(X=x)$	$X \cdot P(X=x)$
win	130	$\frac{4}{100}$	5.2
lose	-20	$\frac{96}{100}$	-19.2

$$\mu = -14$$

Binomial Probability Distribution

Binomial experiment:

- ① Fixed number of trials (n)
- ② Every trial is independent.
- ③ Every trial has two possible outcomes: success/failure
- ④ The probability of success (p) + failure (q) remain constant from trial to trial.

$$P(X=x) = \frac{n!}{x!(n-x)!} p^x q^{n-x} \quad \text{binomial probability formula}$$

example: Toss a coin 5 times. Let $X = \text{number of tails}$.

X	$P(X=x)$
0	<u>0.03125</u>
1	<u>0.15625</u>
2	<u>0.3125</u>
3	<u>0.3125</u>
4	<u>0.15625</u>
5	<u>0.03125</u>

$\leftarrow P(X=1) = \frac{5!}{1!(5-1)!} \cdot (0.5)^1 (0.5)^{5-1}$
 $\leftarrow P(X=2) = \frac{5!}{2!(5-2)!} (0.5)^2 (0.5)^{5-2}$

$$P(X=1) = \text{binompdf}(5, 0.5, 1) = 0.15625$$

What is the probability that you toss a coin 5 times and get 3 or fewer tails?

$$\textcircled{1} P(X \leq 3) = 0.03125 + 0.15625 + 0.3125 + 0.3125 = 0.8125$$

