# Assignment Probability

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# 1 Problems

1. Q:11,16.4,4
   (a) one ticket
   (b) two tickets
   (c) 10 tickets

## 1.1 Problem

**Q1: In a certain lottery 10,000 tickets are sold and ten equal prizes are awarded.What is the probability of not getting a prize if you buy (a) one ticket (b) two tickets (c) 10 tickets ?**
**solution:**

| Variable | Value | Description |
|---|---|---|
| N | 10000 | Total number of tickets sold |
| k | 10 | Total number of prizes awarded |
| n | {0,1,2,...,N} | Number of tickets purchased |
| P | | probability of not wining a prize |
| q | N-k | number of tickets with no prize |

Table 2: variable description

total number of possible outcomes = ${}^{N}C_n$
total number of favourable outcomes = ${}^{q}C_n$
probability = P = $\frac{{}^{q}C_n}{{}^{N}C_n}$

### 1.1.1 a : one ticket

$$probability = P(n=1) = \frac{{}^{9990}C_1}{{}^{10000}C_1} = 0.9990 \tag{1}$$

### 1.1.2 b : two ticket

$$probability = P(n=2) = \frac{{}^{9990}C_2}{{}^{10000}C_2} = 0.9980 \tag{2}$$

#### 1.1.3 c : 10 ticket

$$probability = P(n = 10) = \frac{^{9990}C_1}{^{10000}C_1} = 0.9901 \tag{3}$$