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
$\Pr(n)$		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 $\Pr(n) = \frac{{}^{q}C_{n}}{{}^{N}C_{n}}$

1.1.1 a : one ticket

$$(n_1 = 1) \implies \Pr(n_1) = \frac{{}^{q}C_{n1}}{{}^{N}C_{n_1}} = \frac{{}^{9990}C_1}{{}^{10000}C_1} = 0.9990 \tag{1}$$

1.1.2 b : two ticket

$$(n_2 = 2) \implies \Pr(n_2) = \frac{{}^{q}C_{n_2}}{{}^{N}C_{n_2}} = \frac{{}^{9990}C_2}{{}^{10000}C_2} = 0.9980 \tag{2}$$

1.1.3 c : 10 ticket

$$(n_3 = 10) \implies \Pr(n_3) = \frac{{}^{q}C_{n_3}}{{}^{N}C_{n_3}} = \frac{{}^{9990}C_{10}}{{}^{10000}C_{10}} = 0.9901 \tag{3}$$