1) $\Omega = \{1, \dots, 20\}$ $\#\Omega = 20$ lancio di un dado

$A = \{3, 6, 9, 12, 15, 18\}$ $\#A = 6$ multiplo di 3

$$P(A) = \frac{\#A}{\#\Omega} = \frac{\cancel{6}^{3}}{\cancel{20}_{10}} = \frac{3}{10}$$

2) $\Omega = \{1, \dots, 20\}$ $\#\Omega = 20$ lancio di un dado

$P(\text{pari}) = \frac{1}{15}$

$P(\text{dispari}) = \frac{1}{30}$

(i)

$A = \{3, 6, 9, 12, 15, 18\}$ $\#A = 6$ multiplo di 3

$$P(A) = \frac{\#A}{\#\Omega} = \frac{\cancel{6}^{3}}{\cancel{20}_{10}} = \frac{3}{10}$$

(ii)

$B = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\}$ $\#B = 10$ dispari

$P(B) = \frac{10}{30} = \frac{1}{3}$ $\longrightarrow$ Perché la probabilità di estrarne uno dispari è $\frac{1}{30}$

$$P(A \cap B) = \underbrace{P(A) \cdot P(B)}_{\text{Dato che A e B sono indipendenti}} = \frac{3}{10} \cdot \frac{1}{\cancel{3}} = \frac{1}{10}$$

3) $\Omega = \{0, \dots, 9\}$ $\#\Omega = 10$

$$P = 1 \cdot \frac{9}{10} \cdot \frac{8}{10} = \frac{\cancel{72}^{36}}{\cancel{100}_{50}}^{18}_{25} = \frac{18}{25}$$

4) $\Omega = \{(1,1,1), \dots, (6,6,6)\}$ $\#\Omega = 6^3$

$A = \{(4,5,6), (4,6,5), (5,4,6), (5,6,4), (6,4,5), (6,5,4),$
$(6,6,3), (6,3,6), (3,6,6), (5,5,5)\}$ $\#A = 10$

$P(A) = \frac{\#A}{\#\Omega} = \frac{\cancel{10}^{5}}{\cancel{216}_{108}} = \frac{5}{108}$

5) $\Omega = \{$ tre estrazioni su 20 numeri $\}$ $\#\Omega = 20 \cdot 19 \cdot 18 = ???$

$A = \{(1,2,\_), (1,\_,2), (\_,1,2), (2,1,\_), (2,\_,1), (\_,2,1)\}$
$\#A = 6$

$P(A) = \frac{\#A}{\#\Omega} = \frac{\cancel{6}^{3}}{\cancel{380}_{190}} = \frac{3}{190}$

6) $A = \{$ Applicazioni iniettive da $\{1, \dots, m\}$ a $\{1, \dots, 365\}\}$ $\#A = \frac{365!}{(365-m)!}$

$\frac{m!}{(m-k)!}$

$\Omega = \{$ Estrazioni di m numeri in $\{1, \dots, 365\}$ $\#\Omega = 365^m$

$P(A) = \frac{\#A}{\#\Omega} = \frac{365!}{(365-m)!}$ $\quad P(A^c) = 1 - \frac{365!}{(365-m)!}$

7) $P = \underset{10}{\overset{S}{\frac{2}{}}} \cdot \underset{9}{\overset{T}{\frac{2}{}}} \cdot \underset{8}{\overset{O}{\frac{2}{}}} \cdot \underset{7}{\overset{C}{\frac{2}{}}} \cdot \underset{6}{\overset{A}{\frac{1}{}}} \cdot \underset{5}{\overset{S}{\frac{1}{}}} \cdot \underset{4}{\overset{T}{\frac{1}{}}} \cdot \underset{3}{\overset{I}{\frac{1}{}}} \cdot \underset{2}{\overset{C}{\frac{1}{}}} \cdot \overset{O}{1} = \frac{1}{226800}$