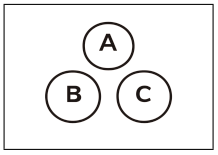
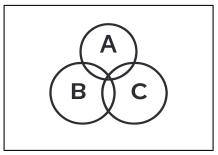
D Hyper-geometric Random Variable D



$N = 5$
$K = 2$
$n = 2$
$k = 1$



$$P(X = k) = \frac{\binom{K}{k}\binom{N-K}{n-k}}{\binom{N}{n}}$$

$$P(X = 1) = \frac{\binom{2}{1}\binom{3}{1}}{\binom{5}{2}} = \frac{2 \times 3}{10} = \frac{6}{10} = \boxed{0.6}$$

$$E[X] = n\frac{K}{N}$$

$$\text{Var}(X) = n\frac{K}{N}\left(1 - \frac{K}{N}\right)\frac{N-n}{N-1}$$

$N = 20$
$K = 4$
$n = 10$
$k = 3$
$P(X = 3) = ?$

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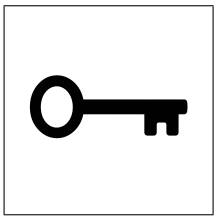

$N = 20$
$K = 4$
$n = 10$
$k = 3$
$P(X = 3) = ?$

$$P(X = k) = \frac{\binom{K}{k}\binom{N-K}{n-k}}{\binom{N}{n}}$$

$$P(X = k) = \frac{\binom{4}{3}\binom{16}{7}}{\binom{20}{10}}$$

$$P(X = 3) = \frac{4 \times 11,440}{184,756}$$

$$P(X = 3) = \frac{45,760}{184,756}$$

$$P(X = 3) \approx \boxed{0.25}$$