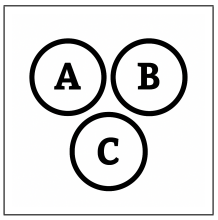
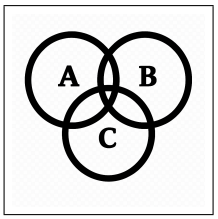
C Expected Value - Variable C



$X = \{1,2,3,4,5,6\}$

$P(1) = P(2) = P(3) = P(4) = P(5) = P(6) = \frac{1}{6}$

$E[X] = ?$



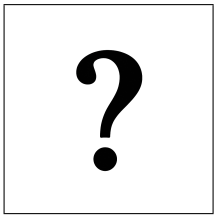
$E[X] = \sum xP(X = x)$

$E[X] = \frac{1}{6}(1 + 2 + 3 + 4 + 5 + 6)$

$E[X] = \frac{1}{6}(21)$

$E[X] = \frac{21}{6}$

$E[X] = 3.5$



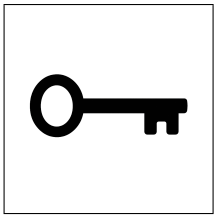
$\Omega = \{(i,j) : i,j \in \{1,2,3,4,5,6\}\} \rightarrow |\Omega| = 36$

$X = \{(i,j) \in \Omega : i + j = 7\} \rightarrow |X| = 6$

$X^C = \{(i,j) \in \Omega : i + j \neq 7\} \rightarrow |X^C| = 30$

$E(X) = ?$

C Expected Value - Variable C



$\Omega = \{(i,j) : i,j \in \{1,2,3,4,5,6\}\} \rightarrow |\Omega| = 36$

$X = \{(i,j) \in \Omega : i + j = 7\} \rightarrow |X| = 6$

$X^C = \{(i,j) \in \Omega : i + j \neq 7\} \rightarrow |X^C| = 30$

$E(X) = ?$

$P(X = 8) = P(X) = \frac{|X|}{|\Omega|} = \frac{6}{36} = \frac{1}{6}$

$P(X = -2) = P(X^c) = \frac{|X^C|}{|\Omega|} = \frac{30}{36} = \frac{5}{6}$

$E(X) = \sum_x xP(X = x)$

$E(X) = 8 \times P(X = 8) + (-2) \times P(X = -2)$

$E(X) = 8 \times \frac{1}{6} + (-2) \times \frac{5}{6}$

$E(X) = \frac{8}{6} - \frac{10}{6}$

$E(X) = -\frac{2}{6}$

$E(X) = -\frac{1}{3}$