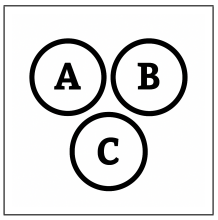
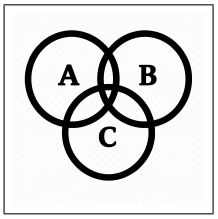
D Uniform Variable D



$X = \{2, 4, 6, 8\}$



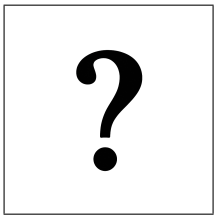
$P(X = x) = \frac{1}{4}$

$E(X) = \sum_x xP(X = x) = \frac{1}{4}(2 + 4 + 6 + 8) = \frac{20}{4} = 5$

$E(X^2) = \sum_x x^2P(X = x) = \frac{1}{4}(2^2 + 4^2 + 6^2 + 8^2) = \frac{1}{4}(4 + 16 + 36 + 64) = \frac{120}{4} = 30$

$\text{Var}(X) = E(X^2) - [E(X)]^2 = 30 - 25 = 5$

$E(3X - 1) = 3E(X) - 1 = 3(5) - 1 = 14$



$X = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21\}$

$X = \{a, 3, 5, 7, 9, 11, 13, 15, 17, 19, b\}$

$a = 1$

$b = 21$

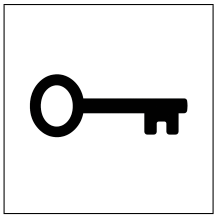
$d = 2$

$N = \frac{b-a}{d} + 1 = \frac{21-1}{2} + 1 = 10 + 1 = 11$

$E[X] = ?$

$\text{Var}(X) = ?$

D Uniform Variable D



$X = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21\}$
$X = \{a, 3, 5, 7, 9, 11, 13, 15, 17, 19, b\}$
$a = 1$
$b = 21$
$d = 2$
$N = \frac{b-a}{d} + 1 = \frac{21-1}{2} + 1 = 10 + 1 = 11$
$E[X] = ?$
$\text{Var}(X) = ?$

$E[X] = \frac{a+b}{2} = \frac{1+21}{2} = 11$

$\text{Var}(X) = \frac{(N^2-1)\,d^2}{12}$
$\text{Var}(X) = \frac{(11^2-1)\cdot 2^2}{12}$
$\text{Var}(X) = \frac{(121-1)\cdot 4}{12}$
$\text{Var}(X) = \frac{120\cdot 4}{12}$
$\text{Var}(X) = 40$