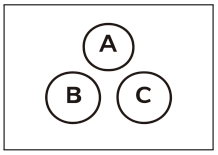
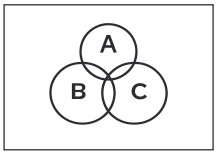
18 Discrete Distribution Uniform Variable H



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



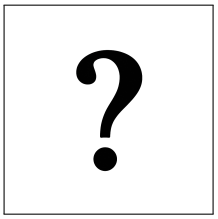
$P(X = x) = \frac{1}{4}$

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

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

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

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



$X = \{a, \ldots, b\}$

$E(X) = 6.5$

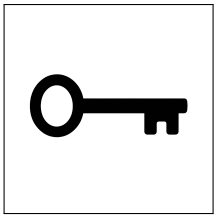
$Var(X) = 5.25$

$a + b = 13$

$a = ?$

$b = ?$

18 Discrete Distribution Uniform Variable H



$X = \{a, \dots, b\}$
$E(X) = 6.5$
$Var(X) = 5.25$
$a + b = 13$
$a = ?$
$b = ?$

$E[X] = \frac{a+b}{2} = 6.5$
$a + b = 13$

$N = b - a + 1$
$\text{Var}(X) = \frac{N^2-1}{12} = 5.25$
$N^2 - 1 = 5.25 \times 12 = 63$
$N^2 = 64$
$N = 8.$

$N = b - a + 1$
$b - a + 1 = 8$
$b - a = 7$
$a + b = 13$
$b - a = 7$
$2b = 20$
$b = 10$
$a = 13 - b = 3$