

















































Expectation of Sum of 2 Dice








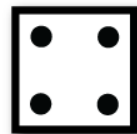

$p_2 =$	$P\{(X + Y) = 2\}$	=	$P\{(X + Y) = 12\}$	= p_{12}
$1/36$				$1/36$

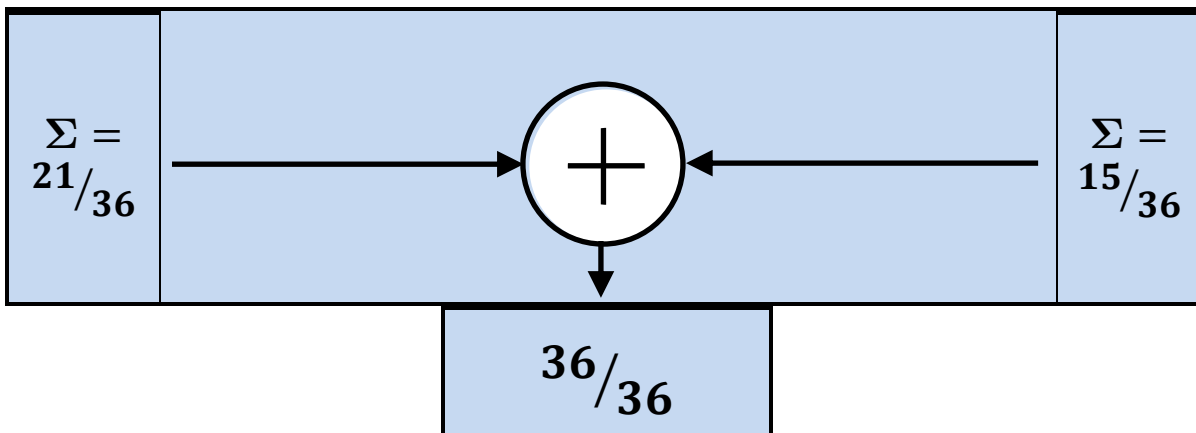
$p_3 =$	$P\{(X + Y) = 3\}$	=	$P\{(X + Y) = 11\}$	= p_{11}
$2/36$				$2/36$
				

$p_4 =$	$P\{(X + Y) = 4\}$	=	$P\{(X + Y) = 10\}$	= p_{10}
$3/36$				$3/36$
				
				

$p_5 =$	$P\{(X + Y) = 5\}$	$=$	$P\{(X + Y) = 9\}$	$= p_9$
$4/36$				
				
				
				

$p_6 =$	$P\{(X + Y) = 6\}$	$=$	$P\{(X + Y) = 8\}$	$= p_8$
$5/36$				
				
				
				
				

$p_7 =$	$P\{(X + Y) = 7\}$	$=$	$P\{(X + Y) = 7\}$
$6/36$			
			
			



$$E(X + Y) = \sum_{i=2}^{12} (p_i S_i)$$

where, $S_i \equiv X_j + Y_k = i$, for $j, k = 1, \dots, 6$

$$E(S_i) = \left(\frac{1}{36}\right)(2 + 12) + \left(\frac{2}{36}\right)(3 + 11) + \left(\frac{3}{36}\right)(3 + 10) \\ + \left(\frac{4}{36}\right)(5 + 9) + \left(\frac{5}{36}\right)(6 + 8) + \left(\frac{6}{36}\right)(7)$$

$$E(S_i) = \left(\frac{1}{36}\right)(14(1 + 2 + 3 + 4 + 5) + (6 * 7))$$

$$E(S_i) = \left(\frac{1}{36}\right)(14 * 15 + (6 * 7)) =$$

$E(S_i) = 7$

Note,

$$E(S_i) = E(X + Y) = E(X) + E(Y)$$

$$= 3.5 + 3.5 = 7$$
