Assignment: Probability

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Problem: A die has two faces each with number '1', three faces each with number '2' and one face with number '3'. If die is rolled once, determine

(i) $\Pr(2)$

(ii) $\Pr(1 or 3)$

(iii) $\Pr(not 3)$

Solution: Total number of faces = 6
Let the faces of die 1,2,3 be the random variables as $X_1, X_2 and X_3$.
Probability $\Pr = \frac{Total number of favourable outcomes}{Total number of Possible outcomes}$.

Probability	**Value**
$\Pr(X_1)$	$\frac{1}{3}$
$\Pr(X_2)$	$\frac{1}{2}$
$\Pr(X_3)$	$\frac{1}{6}$

Table 2: Probabilities of $X_1, X_2 and X_3$.

(i) $\Pr(X_2) = \frac{1}{2}$

(ii)

$$\Pr(X_1 + X_3) = \Pr(X_1) + \Pr(X_3) - \Pr(X_1 X_3) \quad (1)$$

$$= \frac{1}{3} + \frac{1}{6} (\because \Pr(X_1 X_3) = 0) \quad (2)$$

$$= \frac{3}{6} \quad (3)$$

$$\Pr(X_1 + X_3) = \frac{1}{2} \quad (4)$$

(iii)

$$\Pr(X_3)\prime = 1 - \Pr(X_3) \tag{5}$$

$$= 1 - \frac{1}{6} \tag{6}$$

$$= \frac{5}{6} \tag{7}$$