Assignment 1

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1) 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
   a) $\Pr(2)$
   b) $\Pr(1 \text{ or } 3)$
   c) $\Pr(\text{not } 3)$

   Solution: The given information is summarized in the following table 1

RV	Description	Probability
$X = 1$	Die rolls to 1	$\frac{1}{3}$
$X = 2$	Die rolls to 2	$\frac{1}{2}$
$X = 3$	Die rolls to 3	$\frac{1}{6}$

TABLE 1: Random variable X

a)

$$\Pr(X = 2) = \frac{1}{2} \tag{0.0.1}$$

b)

$$X = 1 \text{ or } X = 3 \equiv X \in \{1, 3\} \tag{0.0.2}$$
$$X = 1 \text{ and } X = 3 \equiv X = \phi \tag{0.0.3}$$

$$\Pr(X \in \{1, 3\}) = \Pr(X = 1) + \Pr(X = 3) - \Pr(X = \phi) \tag{0.0.4}$$
$$= \frac{1}{3} + \frac{1}{6} \tag{0.0.5}$$
$$= \frac{1}{2} \tag{0.0.6}$$

c)

$$\Pr(X \neq 3) = 1 - \Pr(X = 3) \tag{0.0.7}$$
$$= 1 - \frac{1}{6} \tag{0.0.8}$$
$$= \frac{5}{6} \tag{0.0.9}$$