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## Assignment 1

## Jaswanth Chowdary Madala

- 1) A die is thrown, find the probability of following events:
  - a) A prime number will appear
  - b) A number greater than or equal to 3 will appear
  - c) A number less than or equal to one will appear
  - d) A number more than 6 will appear
  - e) A number less than 6 will appear

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

RV	Description	Probability
X = 1	Die rolls to 1	$\frac{1}{6}$
X = 2	Die rolls to 2	$\frac{1}{6}$
X = 3	Die rolls to 3	<u>1</u>
X = 4	Die rolls to 4	<u>1</u> 6
X = 5	Die rolls to 5	<u>1</u> 6
X = 6	Die rolls to 6	<u>1</u> 6

TABLE 1: Random variable X

equal to 1 just contains 1

$$Pr(X \in \{1\}) = Pr(X = 1)$$
 (0.0.6)  
=  $\frac{1}{2}$  (0.0.7)

d) The set of possible numbers more than 6 is a null set

$$\Pr(X \in \phi) = 0$$
 (0.0.8)

e) The set of possible numbers less than 6 contains 1,2,3,4,5

$$Pr(X \in \{1, 2, 3, 4, 5\}) = 1 - Pr(X \in \{6\})$$

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

$$(0.0.10)$$

a) The set of possible prime numbers in a die roll contains 2,3,5

$$Pr(X \in \{2, 3, 5\}) = Pr(X = 2) + Pr(X = 3) + Pr(X = 5)$$

$$(0.0.1)$$

$$= \frac{1}{2}$$

$$(0.0.2)$$

b) The set of possible numbers greater than or equal to 3 contains 3,4,5,6

$$Pr(X \in \{3, 4, 5, 6\}) = 1 - Pr(X \in \{1, 2\})$$

$$= 1 - (Pr(X = 1) + Pr(X = 2))$$

$$= \frac{2}{3}$$

$$(0.0.5)$$

c) The set of possible numbers less than or