

# Assignment 1

## AI1110: Probability and Random Variables

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**11.16.3.4:** A card is selected from a pack of 52 cards.

- (a) How many points are there in the sample space?
- (b) Calculate the probability that the card is an ace of spades.
- (c) Calculate the probability that the card is (i) an ace and (ii) black card.

**Solution:**

Given a pack of 52 cards ,

$A$  is an event where card chosen is an ace ,  $\Pr(A) = 1/13$

$B$  is an event where card chosen is spade ,  $\Pr(B) = 1/4$

$C$  is an event where card chosen is black card ,  $\Pr(C) = 1/2$

- (a) Since no.of cards in the pack is 52 ,

$$\text{So Number of points in sample space} = 52. \quad (1)$$

- (b) The probability when the card chosen is an ace of spades ,

$$\Pr(AB) = \Pr(A)\Pr(B) \quad (2)$$

$$= \left(\frac{1}{13}\right)\left(\frac{1}{4}\right) \quad (3)$$

$$= \frac{1}{52} \quad (4)$$

- (c) The probability when the card chosen is (i) an ace and (ii) black card ,

$$\Pr(A) = \frac{1}{13} \quad (5)$$

$$\Pr(C) = \frac{1}{2} \quad (6)$$