Assignment-1

AI1110: Probability and Random Variables
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Question:

One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting

(i) a king of red colour (ii) a face card (iii) a red face card

(iv) the jack of hearts (v) a spade (vi) the queen of diamonds

Solution:

1) Probability of drawing a King of Red colour
Since there are two Suits of colour Red and each Suit has a King each,
No. of Red Kings = 2 = K_r
Total No. of cards in a deck = 52 = N

$$\Pr\left(Red\ King\right) = \frac{K_r}{N} = \frac{2}{52} = \frac{1}{26} \tag{1}$$

2) Probability of drawing a Face Card
Since each suit has 3 face cards and there are 4 suits,
No. of Face Cards = $3 \times 4 = 12 = F$

$$\Pr\left(Face\ Card\right) = \frac{F}{N} = \frac{12}{52} = \frac{3}{13} \tag{2}$$

3) Probability of drawing a Red Face Card
As there are only two red suits,
No. of Red Face Cards = $2 \times 3 = 6 = R_f$

$$\Pr\left(Red\ Face\ Card\right) = \frac{R_f}{N} = \frac{6}{52} = \frac{3}{26} \tag{3}$$

4) Probability of drawing the Jack of Hearts
No. of Jack of Hearts = 1 = J_h

$$\Pr\left(Jack\ of\ Hearts\right) = \frac{J_h}{N} = \frac{1}{52} \tag{4}$$

5) Probability of drawing a spade
No. of spades = 13 = s

$$\Pr\left(S\,pade\right) = \frac{s}{N} = \frac{13}{52} = \frac{1}{4} \tag{5}$$

6) Probability of drawing the Queen of Diamonds
No. of Queen of Diamonds = 1 = Q_d

$$\Pr\left(Queen\ of\ Diamonds\right) = \frac{Q_d}{N} = \frac{1}{52} \tag{6}$$