

## Conditional Probability, Independent Events and Bayes Theorem Assignment/Worksheet

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### 13. Probability

#### (Conditional Prob. Independent Events and Bayes Theorem)

QUESTION 1 : The events  $A$  and  $B$  are such that

$$P(A) = 0.2, P(B) = 0.6, P(A|B) = 0.3$$

Find:  $P(A' \cap B')$

QUESTION 2 : The events  $A$  and  $B$  are such that:  $P(A) = 0.5, P(A \cup B) = 0.7$   
Determine the value of  $P(B)$  in each of the cases when:

- (a)  $A$  and  $B$  are mutually exclusive.
- (b)  $A$  and  $B$  are independent.
- (c)  $P(B|A) = 0.3$

QUESTION 3 :

Suppose two balls are removed from a bag containing three green and two red balls and that the first ball is not replaced before the second is removed. What is the probability that the balls are the same colour?

QUESTION 4:

Two balls are removed from a bag containing three green and two red balls. The first ball is not replaced before the second is removed. If the second ball is red, what is the probability that the first ball was green?

QUESTION 5: Consider a company with 60 employees (45 males and 15 females).

There are three types of employee:

A                      B                      C

- A full time - 10 employees

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- B part time - 20 employees
- C casual - 30 employees

M

7	15	23
3	5	7

F

If the employee chosen is full time, what is the probability that the employee is a female?

**QUESTION 6:** Two cards are drawn from a deck of 52 cards without replacement.

(a) What is the probability of drawing a face card on the first draw and an ace on the second draw? (b) What is the probability of getting a face card and an ace from the two draws?

**QUESTION 7:** The probability that a student entering a university will graduate is 0.4. Find the probability that out of 3 students of the university:

- none will graduate,
- only one will graduate,
- all will graduate.

(a)

**QUESTION 8:** A company has two plants to manufacture motorcycles. 70% motorcycles are manufactured at the first plant, while 30% are manufactured at the second plant. At the first plant, 80% motorcycles are rated of the standard quality while at the second plant, 90% are rated of standard quality. A motorcycle, randomly picked up, is found to be of standard quality. Find the probability that it has come out from the second plant.

**QUESTION 9:** Two dice are rolled once. Find the probability that

- the numbers on two dice are different
- the total of numbers on the two dice is at least 4.
- Let  $X$  = total of the numbers on the two dice

**QUESTION 10:** A card is drawn at random from a well shuffled pack of 52 cards. Find the probability that it is neither an ace nor a king.

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**QUESTION 11:** An urn contains 7 red and 4 blue balls. Two balls are drawn at random with replacement. Find the probability of getting (a) 2 red balls (b) 2 blue balls (c) one red and one blue ball.

**QUESTION 12:** Probability of solving specific problem independently by A and B are  $\frac{1}{2}$  and  $\frac{1}{3}$  respectively. If both try to solve the problem independently, find the probability that the problem is solved .

**QUESTION 13:** A die is tossed thrice. Find the probability of getting an odd number at least once.

**QUESTION 14:** In a factory which manufactures bulbs, machines X, Y and Z manufacture respectively 1000, 2000, 3000 of the bulbs. Of their outputs, 1%, 1.5% and 2% are respectively defective bulbs. A bulb is drawn at random from the product and is found to be defective. What is the probability that it is manufactured by the machine X ?

**QUESTION 15:** . What is the probability of picking a spade from a normal pack of cards and rolling an odd number on a die?