



## MATHS

### BOOKS - NCERT MATHS (ENGLISH)

### PROBABILITY

#### Short Answer Type Questions

1. For a loaded die, the probabilities of outcomes are given as under:

$$P(1) = P(2) = \frac{2}{10}, P(3) = P(5) = P(6) = \frac{1}{10} \text{ and } P(4) = \frac{3}{10}$$

The die is thrown two times. Let A and B be the events as defined below A=Getting same number each time, B=Getting a

total score of 10 or more. Determine whether or not A and B are independent events.



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2. Refer to question 1 above. If the die were fair, determine whether or not the events A and B are independent.



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3. The probability that atleast one of the two events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.3, evaluate  $P(\bar{A}) + P(\bar{B})$ .



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4. A bag contains 5 red marbles and 3 black marbles. Three marbles are drawn one by one without replacement. What is the probability that at least one of the three marbles drawn be black, if the first marble is red?



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5. Two dice are thrown together and the total score is noted. The event  $E$ ,  $F$  and  $G$  are a total 4, a total of 9 or more, and a total divisible by 5, respectively. Calculate  $P(E)$ ,  $P(F)$  and  $P(G)$  and decide which pairs of events, if any, are independent.



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6. Explain why the experiment of tossing a coin three times is said to have Binomial distribution.



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7. If A and B are two events such

$P(A) = \frac{1}{2}$ ,  $P(B) = \frac{1}{3}$  and  $P(A \cap B) = \frac{1}{4}$ , then find

(i)  $P(A/B)$ . (ii)  $P(B/A)$ .

(iii)  $P(A'/B)$ . (iv)  $P(A'/B')$ .



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8. Three events A, B and C have probabilities  $\frac{2}{5}$ ,  $\frac{1}{3}$  and  $\frac{1}{2}$ , respectively. If,  $P(A \cap C) = \frac{1}{5}$  and  $P(B \cap C) = \frac{1}{4}$ , then find the values of  $P(C/B)$  and  $P(A' \cap C')$

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9. Let  $E_1$  and  $E_2$  be two independent events such that  $P(E_1) = P_1$  and  $P(E_2) = P_2$ , describe in words of the events whose probabilities are

(i)  $P_1P_2$  (ii)  $(1 - P_1)P_2$

(iii)  $1 - (1 - P_1)(1 - P_2)$  (iv)  $P_1 + P_2 - 2P_1P_2$

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10. A discrete random variable  $X$  has the probability distribution as given below

<b><math>X</math></b>	0.5	1	1.5	2
<b><math>P(X)</math></b>	$k$	$k^2$	$2k^2$	$k$

Find the value of  $k$ .

(i) Find the value of  $k$ .

(ii) Determine the mean of the distribution.



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11. Prove that

$$(i) P(A) = P(A \cap B) + P(A \cap \bar{B})$$

$$(ii) P(A \cup B) = P(A \cap B) + P(A \cap \bar{B}) + P(\bar{A} \cap B)$$



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12. If  $x$  is the number of tails in three tosses of a coin, then determine the standard deviation of  $X$ .



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13. In a dice game, a player pays a stake of ₹1 for each throw of a die. She receives ₹5, if the die shows a 3, ₹2, if the die shows a

1 or 6 and nothing otherwise, then what is the player's expected profit per throw over a long series of throws?



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14. Three dice are thrown at the same time. Find the probability of getting three two's, if it is known that the sum of the numbers on the dice was 6



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15. Suppose 10000 tickets are sold in a lottery each for ₹ 1. First prize is of ₹ 3000 and the second prize is of ₹ 2000. There are three third prizes of ₹ 500 each. If you buy one ticket, then what is your expectation?



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**16.** A bag contains 4 white and 5 black balls. Another bag contains 9 white and 7 black balls. A ball is transferred from the first bag to the second and then a ball is drawn at random from the second bag. Find the probability that the ball drawn is white.



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**17.** A bag contains 3 white and 2 black balls and another bag contains 2 white and 4 black balls. One bag is chosen at random. From the selected bag, one ball is drawn. Find the probability that the ball drawn is white.



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**18.** A box has 5 blue and 4 red balls. One ball is drawn at random and not replaced. Its colour is also not noted. Then, another ball is drawn at random. What is the probability of second ball being blue?

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**19.** Four cards are successively drawn without replacement from a deck of 52 playing cards. What is the probability that all the four cards are king?

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**20.** If a die is thrown 5 times, then find the probability that an odd number will come up exactly three times.

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21. If ten coins are tossed, then what is the probability of getting atleast 8 heads?

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22. The probability of a man hitting man hitting target is 0.25. If he shoots 7 times, then what is the probability of his hitting atleast twice ?

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23. A lot of 100 watches is known to have 10 defective watches. If 8 watches are selected (one by one with replacement) at

random, then what is the probability that there will be atleast one defective watch ?



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24. Consider the probability distribution of a random variable X

<b>X</b>	0	1	2	3	4
<b>P(X)</b>	0.1	0.25	0.3	0.2	0.15

Calculate

Calculate

(i)  $V\left(\frac{X}{2}\right)$  (ii) Variance of X.



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25. The probability distribution of a random variable X is given below

$X$	0	1	2	3
$P(X)$	$k$	$\frac{k}{2}$	$\frac{k}{4}$	$k$

Determine the value of  $k$

- (i) Determine the value of  $K$ .
- (ii) Determine  $P(X \leq 2)$  and  $P(X > 2)$ .
- (iii) Find  $P(X \leq 2) + P(X > 2)$ .



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26. For the following probability distribution determine standard deviation of the random variable  $X$ .

$X$	2	3	4
$P(X)$	0.2	0.5	0.3



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27. A biased die is such that  $P(4) = \frac{1}{10}$  and other scores being equally likely. The die tossed twice. If  $X$  is the number of four seen, then find the variance of the random variable  $X$ .



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28. A die is thrown three times. Let  $X$  be the number of twos seen. Find the expectation of  $X$ .



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29. Two biased dice are thrown together. For the first die  $P(6) = \frac{1}{2}$ , other scores being equally likely while for the second die,  $P(1) = \frac{2}{5}$  and other scores are equally likely. Find the probability distribution of the number of ones seen.

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**30.** Two probability distribution of the discrete random variable  $X$  and  $Y$  are given below.

$X$	0	1	2	3
$P(X)$	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
$Y$	0	1	2	3
$P(Y)$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{2}{5}$	$\frac{1}{10}$

Prove that  $E(Y^2) = 2E(X)$ .

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**31.** A factory produces bulbs. The probability that any one bulb is defective is  $\frac{1}{50}$  and they are packed in 10 boxes. From a single box, find the probability that

(i) none of the bulbs is defective.

(ii) exactly two bulbs are defective.

(iii) more than 8 bulbs work properly.



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**32.** Suppose you have two coins which appear identical in your pocket. You know that one is fair and one is 2-headed. If you take one out, toss it and get a head, what is the probability that it was fair coin?



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**33.** Suppose that 6% of the people with blood group O are left handed and 10% of those with other blood groups are left handed, 30 % of the people have blood groups O. If a left

handed person is selected at random, what is the probability that he/she will have blood group O?

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**34.** If two natural numbers  $r$  and  $s$  are drawn one at a time, without replacement from the set  $S=\{1,2,3,\dots,n\}$ , then find  $P(r \leq p/s \leq p)$  where  $p \in S$ .

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**35.** Find the probability distribution of the maximum of two scores obtained when a die is thrown twice. Determine also the mean of the distribution.

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36. The random variable  $X$  can take only the values 0,1,2. If

$$P(X = 0) = P(X = 1) = p \text{ and } E(X^2) = E[X],$$

then find value of  $p$ .



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37. Find the variance of the following distribution.

$X$	0	1	2	3	4	5
$P(X)$	$\frac{1}{6}$	$\frac{5}{18}$	$\frac{2}{9}$	$\frac{1}{6}$	$\frac{1}{9}$	$\frac{1}{18}$



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38. A and B throw a pair of dice alternately. A wins the game, if

he gets a total of 6 and B wins, if she gets a total of 7. If a

starts the game, then find the probability of winning the game by A in third throw of the pair of dice.



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**39.** Two dice are tossed. Find whether the following two events A and B are independent  $A=\{(x,y):x+y=11\}$  and  $B=\{(x,y):x \neq 5\}$ , where  $(x,y)$  denotes a typical sample point.



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**40.** An urn contains  $m$  white and  $n$  black balls. A ball is drawn at random and is put back into the urn along with  $k$  balls of the same colour as that of the ball drawn. a ball is again drawn at random. Show that the probability of drawing a white ball now does not depend on  $k$ .

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## Long Answer Type Questions

1. Three bags contain a number of red and white balls as follows Bag I : 3 red balls, Bag II : 2 red balls and 1 white balls and Bag III : 3 white balls. The probability that bag  $i$  will be chosen and a ball is selected from it is  $\frac{i}{6}$ , where  $i=1,2,3$ . What is the probability that

(i) a red ball will be selected? (ii) a white ball is selected?

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2. Refer to question 41 above. If a white ball is selected, what is the probability that it come from Itbr?. (i) Bag II? (ii) Bag III?

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3. A shopkeeper sells three types of flower seeds  $A_1$ ,  $A_2$  and  $A_3$ . They are sold as mixture, where the proportions are 4 : 4 : 2, respectively. The germination rates of the three types of seeds are 45%, 60% and 35%. Calculate the probability

(i) of a randomly chosen seed to germinate.

(ii) that it will not germinate given that the seed is of type  $A_3$ .

(iii) that it is of the type  $A_2$  given that a randomly chosen seed does not germinate

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4. A letter is known to have come either from 'TATA NAGAR' or from 'CALCUTTA'. On the envelope, just two consecutive letters

came from 'TATA NAGAR'?



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5. There are two bags, one of which contains 3 black and 4 white balls while the other contains 4 black and 3 white balls. A die is thrown. If it shows up 1 or 3, a ball is taken from the 1st bag but if it shows up any other number, a ball is chosen from the II bag. Find the probability of choosing a black ball.



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6. There are three urns containing 2 white and 3 black balls, 3 white and 2 black balls and 4 white and 1 black balls, respectively. There is an equal probability of each urn being chosen. A ball is drawn at random from the chosen urn and it is

found to be white. Find the probability that the ball drawn was from the second urn.



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7. By examining the chest X-ray, the probability that TB is detected when a person is actually suffering is 0.99. The probability of an healthy person diagnosed to have TB is 0.001. In a certain city, 1 in 1000 people suffers from TB. A person is selected at random and is diagnosed to have TB. What is the probability that he actually has TB?



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8. An item is manufactured by three machines A, B and C. Out of the total member of items manufactured during a specified

period, 50% are manufactured on A, 30% on B and 20% on C. 2% of the items produced on A and 2% of items produced on B are defective and 3% of these produced on C are defective. All the items are stored at one godown. One item is drawn at random and is found to be defective. What is the probability that it was manufactured on machine A?



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9. Let  $X$  be a discrete random variable whose probability distribution is defined as follows.

$$P(X = x) = \begin{cases} k(x + 1), & \text{for } x=1,2,3,4 \\ 2kx, & \text{for } x=5,6,7 \\ 0, & \text{otherwise} \end{cases}$$

where,  $k$  is a constant. Calculate (i) the value of  $k$ . (ii)  $E(X)$ .

(ii) standard deviation of  $X$ .



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10. The probability distribution of a discrete random variable  $x$  is given as under

$X$	1	2	4	$2A$	$3A$	$5A$
$P(X)$	$\frac{1}{2}$	$\frac{1}{5}$	$\frac{3}{25}$	$\frac{1}{10}$	$\frac{1}{25}$	$\frac{1}{25}$

Calculate

- (i) the value of  $A$ , if  $E(X)=2.94$ .  
(ii) variance of  $X$ .



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11. The probability distribution of a random variable  $x$  is given as under

$$P(X = x) = \begin{cases} kx^2 & x = 1, 2, 3 \\ 2kx & x = 4, 5, 6 \\ 0, & \text{otherwise} \end{cases}$$

where,  $k$  is a constant. Calculate

- (i)  $E(X)$  (ii)  $E(3X^2)$  (iii)  $P(X \geq 4)$





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**12.** A bag contains  $(2n + 1)$  coins. It is known that  $n$  of these coins have a head on both sides whereas the rest of the coins are fair. A coin is picked up at random from the bag and is tossed. If the probability that the toss results in a head is  $\frac{31}{42}$ , determine the value of  $n$ .



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**13.** Two cards are drawn successively without replacement from a well shuffled deck of cards. Find the mean and standard variation of the random variable  $X$ , where  $X$  is the number of aces.



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14. A die is tossed twice . If a success is getting an even number on a toss , then find the variance of the number of successes .



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15. There are 5 cards numbered 1 to 5 , one number on one card . Two cards are drawn at random without replacement . Let  $X$  denotes the sum of the numbers on two cards drawn . Find the mean and variance of  $X$ .



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Objective Type Questions

1. If  $P(A) = \frac{4}{5}$  and  $P(A \cap B) = \frac{7}{10}$ , then  $P(B/A)$  is equal to

A.  $\frac{1}{10}$

B.  $\frac{1}{8}$

C.  $\frac{7}{8}$

D.  $\frac{17}{20}$

**Answer: C**



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2. If  $P(A \cap B) = \frac{7}{10}$  and  $P(B) = \frac{17}{20}$ , then  $P(A/B)$  equals to

A.  $\frac{14}{17}$

B.  $\frac{17}{20}$

C.  $\frac{7}{8}$

D.  $\frac{1}{8}$

**Answer:**



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3. If  $P(A) = \frac{3}{10}$ ,  $P(B) = \frac{2}{5}$  and  $P(A \cup B) = \frac{3}{5}$  then

$P(B/A) + P(A/B)$  equals to

A.  $\frac{1}{4}$

B.  $\frac{1}{3}$

C.  $\frac{5}{12}$

D.  $\frac{7}{12}$

**Answer:**



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4. If  $P(A) = \frac{2}{5}$ ,  $P(B) = \frac{3}{10}$  and  $P(A \cap B) = \frac{1}{5}$  then

$P(A/B') \cdot P(B'/A')$  is equal to

A.  $\frac{5}{6}$

B.  $\frac{5}{7}$

C.  $\frac{25}{42}$

D. 1

**Answer:**



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5. If A and B are two events such that  $P(A) = \frac{1}{2}$ ,  $P(B) = \frac{1}{3}$  and  $P(A/B) = \frac{1}{4}$  then  $P(A' \cap B')$  is equal to  $\rightarrow$

A.  $\frac{1}{12}$

B.  $\frac{3}{4}$

C.  $\frac{1}{4}$

D.  $\frac{3}{16}$

**Answer:**



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6. If  $P(A) = 0.4$ ,  $P(B) = 0.8$  and  $P(B/A) = 0.6$ , then  $P(A \cup B)$  is equal to

A. 0.24

B. 0.3

C. 0.48

D. 0.96

**Answer:**



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7. If  $A$  and  $B$  are two events and  $A \neq \phi$ ,  $B \neq \phi$ , then

A.  $P(A/B) = P(A) \cdot P(B)$

B.  $P(A/B) = \frac{P(A \cap B)}{P(B)}$

C.  $P(A/B) \cdot P(B/A) = 1$

D.  $P(A/B) = P(A)/P(B)$

**Answer:**



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8. If A and B are events such that  $P(A)=0.4, P(B)=0.3$  and  $P(A \cup B) = 0.5$  then  $P(B' \cap A)$  equals to

A.  $\frac{2}{3}$

B.  $\frac{1}{2}$

C.  $\frac{3}{10}$

D.  $\frac{1}{5}$

**Answer:**



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9. If A and B are two events such that  $P(B) = \frac{3}{5}, P(A/B) = \frac{1}{2}$  and  $P(A \cup B) = \frac{4}{5}$ , then  $P(A)$



equals to

A.  $\frac{3}{10}$

B.  $\frac{1}{5}$

C.  $\frac{1}{2}$

D.  $\frac{3}{5}$

**Answer:**



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**10.** In question 64 (above),  $P(B/A')$  is equal to

A.  $\frac{1}{5}$

B.  $\frac{3}{10}$

C.  $\frac{1}{2}$

D.  $\frac{3}{5}$

**Answer:**



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11. If  $P(B) = \frac{3}{5}$ ,  $P(A/B) = \frac{1}{2}$  and  $P(A \cup B) = \frac{4}{5}$ , then

$P(A \cup B)' + P(A' \cup B)$  is equal to

A.  $\frac{1}{5}$

B.  $\frac{4}{5}$

C.  $\frac{1}{2}$

D. 1

**Answer:**



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12. If  $P(A) = \frac{7}{13}$ ,  $P(B) = \frac{9}{13}$  and  $P(A \cap B) = \frac{4}{13}$ , then

$P(A/B)$  is equal to

A.  $\frac{6}{13}$

B.  $\frac{4}{13}$

C.  $\frac{4}{9}$

D.  $\frac{5}{9}$

**Answer:**



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13. If A and B are suchg that events that

$P(A) > 0$  and  $P(B) \neq 1$ , then  $P(A' / B')$  equals to

A.  $1 - P(A/B)$

B.  $1 - P(A'/B)$

C.  $\frac{1 - P(A \cup B)}{P(B')}$

D.  $P(A')/P(B')$

**Answer:**



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**14.** If A and B are two events with with  $P(A) = \frac{3}{5}$  and  $P(B) = \frac{4}{9}$ , then  $P(A' \cap B')$  equals to

A.  $\frac{4}{15}$

B.  $\frac{8}{45}$

C.  $\frac{1}{3}$

D.  $\frac{2}{9}$

**Answer:**



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**15.** If two events are independent, then

- A. they must be mutually exclusive
- B. the sum of their probabilities must be equal to 1
- C. Both (a) and (b) are correct
- D. none of the above is correct

**Answer:**



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16. If A and B be two events such that  $P(A) = \frac{3}{8}$ ,  $P(B) = \frac{5}{8}$  and  $P(A \cup B) = \frac{3}{4}$  then  $P(A/B) \cdot P(A'/B)$  is equal to

A.  $\frac{2}{5}$

B.  $\frac{3}{8}$

C.  $\frac{3}{20}$

D.  $\frac{6}{25}$

**Answer:**



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17. If the events A and B are independent, then  $P(A \cap B)$  is equal to

A.  $P(A)+P(B)$

B.  $P(A)-P(B)$

C.  $P(A) \cdot P(B)$

D.  $P(A)/P(B)$

**Answer: C**



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**18.** Two events E and F are independent. If  $P(E) = 0.3$  and  $P(E \cup F) = 0.5$  then  $P(E/F) - P(F/E)$  equals to

A.  $\frac{2}{7}$

B.  $\frac{3}{35}$

C.  $\frac{1}{70}$

D.  $\frac{1}{7}$

**Answer: C**



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**19.** A bag contains 5 red and 3 blue balls. If 3 balls are drawn at random without replacement, then the probability of getting exactly one red ball is

A.  $\frac{45}{196}$

B.  $\frac{135}{392}$

C.  $\frac{15}{56}$

D.  $\frac{15}{29}$

**Answer:**



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20. A bag containing 5 red and 3 blue balls. If 3 balls are drawn at random without replacement the probability that exactly two of the three balls were red, the first being red is

A.  $\frac{1}{3}$

B.  $\frac{4}{7}$

C.  $\frac{15}{56}$

D.  $\frac{5}{28}$

**Answer:**



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21. Three persons A,B and C, fire at a target in turn, starting with A. Their probability of hitting the target are 0.4, 0.3 and

0.2, respectively. The probability of two hits is

A. 0.024

B. 0.188

C. 0.336

D. 0.452

**Answer: B**



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**22.** Assume that in a family, each child is equally likely to be a boy or girls .A family with three children is is choosen at random. The probability that the eldest child is a girls given that the family has at least one girls is

A.  $\frac{1}{2}$

B.  $\frac{1}{3}$

C.  $\frac{2}{3}$

D.  $\frac{4}{7}$

**Answer: D**



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**23.** If a die is thrown and a card is selected at random from a deck of playing cards, then the probability of getting an even number on the die and a spade card is

A.  $\frac{1}{2}$

B.  $\frac{1}{4}$

C.  $\frac{1}{8}$

D.  $\frac{3}{4}$

**Answer:**



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**24.** A box contains 3 orange balls, 3 green balls and 2 blue balls. Three balls are drawn at random from the box without replacement. The probability of drawing 2 green balls and one blue ball is

A.  $\frac{3}{28}$

B.  $\frac{2}{21}$

C.  $\frac{1}{28}$

D.  $\frac{167}{168}$

**Answer:**



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25. A flashlight has 8 batteries out of which 3 are dead. If two batteries selected without replacement and tested, then probability that both are dead is

A.  $\frac{33}{56}$

B.  $\frac{9}{64}$

C.  $\frac{1}{14}$

D.  $\frac{3}{28}$

**Answer:**



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26. If eight coins are tossed together, then the probability of getting exactly 3 heads is

A.  $\frac{1}{256}$

B.  $\frac{7}{32}$

C.  $\frac{5}{32}$

D.  $\frac{3}{32}$

**Answer: B**



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27. Two dice are thrown. If it is known that the sum of numbers on the dice was less than 6, the probability of getting a sum 3, is

A.  $\frac{1}{18}$

B.  $\frac{5}{18}$

C.  $\frac{1}{5}$

D.  $\frac{2}{5}$

**Answer:**



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**28.** Which one is not a requirement of a binomial distribution?

There are 2 outcomes for each trial  
There is a fixed number of trials  
The outcomes must be dependent on each other  
The probability of successes must be the same for all the trials.

A. There are 2 outcomes for each trial

B. There is a fixed number of trials

C. The outcomes must be dependent on each other

D. The probability of success must be the same for all the trials

**Answer:**



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**29.** If two cards are drawn from a well shuffled deck of 52 playing cards with replacement, then the probability that both cards are queens, is

A.  $\frac{1}{13} \cdot \frac{1}{13}$

B.  $\frac{1}{13} + \frac{1}{13}$

C.  $\frac{1}{13} \cdot \frac{1}{17}$

D.  $\frac{1}{13} \cdot \frac{4}{51}$



**Answer:**



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**30.** The probability of guessing correctly atleast 8 out of 10 answers on a true falsetype examination is

A.  $\frac{7}{64}$

B.  $\frac{7}{128}$

C.  $\frac{45}{1024}$

D.  $\frac{7}{41}$

**Answer:**



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31. If the probability that a person is not a swimmer is 0.3, then the probability that out of 5 persons 4 are swimmers is

A.  ${}^5C_4(0.7)^4(0.3)$

B.  ${}^5C_1(0.7)(0.3)^4$

C.  ${}^5C_4(0.7)(0.3)^4$

D.  $(0.7)^4(0.3)$

**Answer:**



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32. The probability distribution of a discrete random variable X is given below

$X$	2	3	4	5
$P(X)$	$\frac{5}{k}$	$\frac{7}{k}$	$\frac{9}{k}$	$\frac{11}{k}$

The value of  $k$  is

- A. 8
- B. 16
- C. 32
- D. 48

**Answer: C**



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33. For the following probability distribution.

$X$	-4	-3	-2	-1	0
$P(X)$	0.1	0.2	0.3	0.2	0.2

$E(X)$  is equal to

- A. 0
- B. -1
- C. -2
- D. -1.8

**Answer:**



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34. For the following probability distribution.

following probability distribution.

<b><math>X</math></b>	1	2	3	4
<b><math>P(X)</math></b>	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{2}{5}$

$E(X^2)$  is equal to

A. 3

B. 5

C. 7

D. 10

**Answer:**



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35. Suppose a random variable  $X$  follows the binomial distribution with parameters  $n$  and  $p$ , where  $p < 0$

A.  $\frac{1}{2}$

B.  $\frac{1}{3}$

C.  $\frac{1}{5}$

D.  $\frac{1}{7}$

**Answer:**



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36. In a college, 30% students fail in physics, 25% fail in Mathematics and 10% in both. One student is chosen at

random. The probability that she fails in physics, if she has failed in Mathematics is

A.  $\frac{1}{10}$

B.  $\frac{2}{5}$

C.  $\frac{9}{20}$

D.  $\frac{1}{3}$

**Answer:**



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**37.** A and B are two students. Their chances of solving a problem correctly are  $\frac{1}{3}$  and  $\frac{1}{4}$ , respectively. If the probability of their making a common error is  $\frac{1}{20}$  and they obtain the

same answer, then the probability of their answer to be correct

is

A.  $\frac{1}{12}$

B.  $\frac{1}{40}$

C.  $\frac{13}{120}$

D.  $\frac{10}{13}$

**Answer:**



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**38.** If a box has 100 pens of which 10 are defective, then what is the probability that out of a sample of 5 pens drawn one by one with replacement atmost one is defective?

A.  $\left(\frac{9}{10}\right)^5$



B.  $\frac{1}{2} \left( \frac{9}{10} \right)^4$

C.  $\frac{1}{2} \left( \frac{9}{10} \right)^4$

D.  $\left( \frac{9}{10} \right)^5 + \frac{1}{2} \left( \frac{9}{10} \right)^4$

**Answer:**



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**True False**

1. Another name for the mean of a probability distribution is expected value.



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2. If  $A$  and  $B'$  are independent events, then

$$P(A' \cup B) = 1 - P(A)P(B').$$



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3. If  $A$  and  $B$  are two events such that  $P(A) > 0$  and  $P(A)+P(B) >$

$$1, \text{ then } P(B/A) \geq 1 - \frac{P(B')}{P(A)}$$



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4. If  $A, B$  and  $C$  are three independent events such that

$$P(A)=P(B)=P(C)=p,$$

$$\text{then } P(\text{at least two of } A, B \text{ and } C \text{ occur})=3p^2 - 2p^3$$



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5. If A and B are two events such that  $P(A/B)=p, P(A)=p, P(B)=\frac{1}{3}$  and  $P(A \cup B) = \frac{5}{9}$ , then p is equal to .....

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6. If A and B are such that  $P(A' \cup B') = \frac{2}{3}$  and  $P(A \cup B) = \frac{5}{9}$  then  $P(A')+P(B')$  is equal to .....

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7. If X follows Binomial distribution with parameters  $n=5, p$  and  $P(X=2)=9P(X=3)$ , then p is equal to .....

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8. If  $X$  be a random variable taking values  $x_1, x_2, x_3, \dots, x_n$  with probabilities  $P_1, P_2, P_3, \dots, P_n$ , respectively. Then,  $\text{Var}(x)$  is equal to .....



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9. Let  $A$  and  $B$  be two events. If  $P(A/B)=P(A)$ , then  $A$  is .... of  $B$



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