Q.1) In how many ways can 4 of 15 laboratory assistants be chosen to assist with an experiment?

Q.2) If there are 9 cars in a race, in how many different ways can they place first, second and third?

Q.3) A customer can order a tailor shirt with choice of 12 materials, 10 shirt styles, 6 monogram styles, or no monogram. How many ways can a customer order a shirt?

Q.4) Three lottery tickets are drawn from a total of 50. If the tickets will be distributed to each of three employees in the order in which they are drawn, the order will be important. How many simple events are associates with the experiment?

Q.5) A printed circuit board may be purchased from five suppliers. In how many ways can three suppliers be chosen from the five?

Q.6) A school of management has four finalists for a faculty position in the Accounting Department, three finalists for a position in the Finance Department, and two finalists for a position in the Marketing Department. In how many ways can the three positions be staffed from among the nine finalists?

Q.7) In a math class of 30 students, 17 are boys and 13 are girls. On a unit test, 4 boys and 5 girls made an A grade. If a student is chosen at random from the class, what is the probability of choosing a girl or an A student?

Q.8) If A and B are two events and the probability P(B)≠1 Find the probability

$$P(A|\bar{B})$$

Q.9) If A and B are two mutually exclusive events find the probability

$$P(A|\bar{B})$$

Q.10) If A and B are two mutually exclusive events and

$$P(A \cup B) \neq 0, then\ P(A|A \cup B) = ???$$

Q.11) Let A and B be the possible outcomes of an experiment and suppose

$$P(A) = 0.4, P(A \cup B) = 0.7\ AND\ \ P(B) = P$$

For what choice of p are A and B mutually exclusive?

Q.12) Two six faced unbiased dice are thrown. Find the probability that the sum of the numbers shown is 7 or their product is 12.

Q.13) Defects are classified as A ,B and C and the following probabilities have been determined from available production data:

P(A)= 0.20, P(B) = 0.16, P(C)=0.14, $P(A \cap B) = 0.08, P(A \cap C) = 0.05, P(B \cap C) = 0.04\ and\ \ P(A \cap B \cap C) = 0.02$

What is the probability that a randomly selected item of product will exhibit at least one type of defect? What is the probability that it exhibit both A and B defects but is free from type C?

Q.14) Given A,B and C are mutually exclusive events, explain why each of the following is not permissible assignments of probabilities,

i. $P(A) = 0.24\ P(B) = 0.4\ and\ P(A \cup C) = 0.2$
ii. $P(A) = 0.7\ P(B) = 0.1\ and\ P(A \cap B) = 0.2$
iii. $P(A) = 0.6\ P(A \cap \bar{B}) = 0.5$

Q.15) From a group of 8 children, 5 boys and 3 girls, three children are selected at random. Calculate the probabilities that selected group contains

i. no girl
ii. only one girl
iii. atleast one girl
iv. more girls than boys

Q.16) If ***F*** and ***S*** are the events that a magazine publisher will launch a new fashion magazine or a new sports magazine, and ***P(F)*** = 0.35 and ***P(S)*** = 0.25, find the probability that the publisher

a. will not launch the fashion magazine
b. will launch the fashion magazine or the sports magazine
c. will launch neither the fashion magazine nor the sports magazine

Q.17) The probability that a woman trying on a dress will ask to have it altered is 0.65, the probability that she will ask to have it delivered to her home is 0.32, and the probability that she will ask to have both done is 0.21. What is the probability that a woman shopping in this store will ask

a. either to have the dress altered or to have it delivered to her home
b. neither to have it altered nor to have it delivered to her home

Q.18) A jar contains black and white marbles. Two marbles are chosen without replacement. The probability of selecting a black marble and then a white marble is 0.34, and the probability of selecting a black marble on the first draw is 0.47. What is the probability of selecting a white marble on the second draw, given that the first marble drawn was black?

Q.19) The probabilities that a burglar alarm system will be installed in a warehouse is 0.90, and the probability that the burglar alarm will be installed and will decrease the number of burglaries is 0.60. What is the probability that if the burglar alarm is installed the number of burglaries will decrease.

Q.20) The probability that it is Friday and that a student is absent is 0.03. Since there are 5 school days in a week, the probability that it is Friday is 0.2. What is the probability that a student is absent given that today is Friday?

Q.21) Indicate whether each of the following statements is true or false. If false, indicate why.

a. If Pr(A/B)=0 then A and B are mutually exclusive.
b. If Pr(A/B)=0, then A and B are independent.

Q.22) If A and B are disjoint events, P[A]=0.33, P[B]=0.48, find $P[\overline{A} \cap \overline{B}]$

Q.23) Given that events A and B are mutually exclusive and P (A) = 0.4 and P (B) = 0.3, find

a. $P(A \cap B)$
b. $P(A \cup B)$
c. $P(A / B)$

Q.24) Among the 25 invoices prepared by a billing department, 5 contain errors while the others do not. If we randomly check 3 of these invoices, what are the probabilities that

a. All three will contain errors
b. Neither will contain errors
c. At least one will contain errors

Q.25) $P(A) = 0.60,\ P(B) = 0.40,\ P(A \cap B) = 0.24$ Find

i. $P(A / B)$
ii. $P(\overline{A} / B)$

iii. $P(\overline{A} / \overline{B})$

Q.26) If the probabilities are 0.58, 0.25 and 0.19 that a person in a certain income bracket will invest in money market funds, common stocks, or both, find the probabilities that a person in that income bracket

a. Who invests in money-market funds will also invest in common stocks.
b. Who invests in common stocks will also invest in money-market funds.

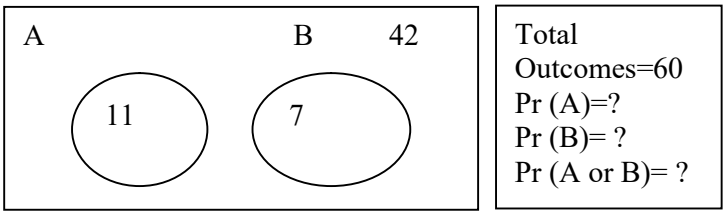
Q.27) **In New York State, 48% of all teenagers own a skateboard and 39% of all teenagers own a skateboard and roller blades. What is the probability that a teenager owns roller blades given that the teenager owns a skateboard?**

Q.28) (Mutually Exclusive events). A single card is chosen at random from a standard deck of 52 playing cards. What is the probability of choosing a 5 or a king?

Q.29) On New Year's Eve, the probability of a person having a car accident is 0.09. The probability of a person driving while intoxicated is 0.32 and probability of a person having a car accident while intoxicated is 0.15. What is the probability of a person driving while intoxicated or having a car accident?

Q.30) A glass jar contains 1 red, 3 green, 2 blue and 4 yellow marbles. If a single marble is chosen at random from the jar, what is the probability of each outcome?

Q.31) From which of following Venn diagram, which indicates the number of outcomes of an experiment corresponding to each event and the number of out comes that do not correspond to either event, give the probabilities indicated:



Q.32) Suppose the probability that a husband will vote in a referendum is 0.21, the probability that his wife will vote in the referendum is 0.28, and the probability that both the husband and wife will vote is 0.15.

a. What is the probability that a wife will vote given that her husband will vote?
b. What is the probability that a husband will vote given that his wife will vote?
c. What is the probability that a wife will not vote given that her husband will vote?
d. What is the probability that a wife will vote given that her husband will not vote?
e. What is the probability that a wife will not vote given that her husband will not vote?
f. What is the probability that a wife will vote but her husband not?
g. What is the probability that at least one of them will vote?

Q.33) The probability that a married man watches a certain television show is 0.4 and the probability that a married woman watches the show is 0.5. The probability that a man watches the show, given that his wife does is 0.7. Find the probability that a married couple watches the show.

Q.34) The probabilities that a TV station will receive 0, 1, 2, 3, …, 8 or at least 9 complaints after showing a controversial program are, respectively, 0.01, 0.03, 0.07,

0.15, 0.19, 0.18, 0.14, 0.12, 0.09 and 0.02. What are the probabilities that after showing such a program the station will receive

a. At most 4 complaints
b. At least 6 complaints
c. From 5 to 8 complaints

Q.35) The probability that an integrated circuit chip will have defective etching is 0.12, the probability that it will have a crack defect is 0.29, and the probability that it has both is 0.07

a. What is the probability that a newly manufactured chip will have either an etching or a crack defect?
b. What is the probability that a newly manufactured chip will have neither defect?

Q.36) Fill in the blanks

i. $P[A \cap \overline{A}]$ = _____
ii. $P[A \cup \overline{A}]$ = _____
iii. $P[A \cap S]$ = _____
iv. P[A ∪ S]=_____
v. $P[S \mid A]$ = _____
vi. $P[A \mid \overline{A}]$ = _____
vii. $P[\overline{A} \mid B]$ = _____
viii. If A and B are disjoint events, and $P[A] = 0.5$, $P[B] = 0.3$, then $P[A \cup B]$ = _____
ix. If A and B are disjoint events in a sample space, then $P[A \cap \overline{B}]$ =_____.
x. If P[A]= 0.2 and P[B|A]=0.3, then P[B ∩ A]= _____
xi. If P[A]= 0.2 , $P[A \cap B]$ = 0.06, then $P[B \mid A]$ = _____
xii. $P[A \cap \phi]$ =_____.
xiii. If A and B are events in the same sample space then $P[A \cup \overline{A}]$ =_____.
xiv. If A and B are events in the same sample space then $P[A \cap \overline{B}]$ =_____.

Q.37) True or False

a. If A and B are independent events, then $P[A \mid B] = P[B]$ T / F
b. If A and B are disjoint events in a sample space, then $P[A \mid B] = 0$ T / F
c. If A and B are disjoint events in a sample space, then $P[A \cup B] = P[A] + P[B]$ T / F

d. If A is any event in a sample space S, then $P[A \cup S] = 1$. T / F

e. If A and B are disjoint events, then $P[A \cap B] = 0$. T / F

f. P[$\overline{A} \mid B$] = 1- P[A|B]. T / F

g. $P[A \cap \overline{B}] = P[A] - P[A \cap B]$
T / F

Q.38) **Multiple Choices**

1. $P[A \cap B \mid B]$ is equal to
   a. P[A]
   b. P[A|B]
   c. $P[A \cap B]$
2. If A and B are disjoint events then $P[A \cap B]$ is equal to
   a) P[A|B]P[A]
   b) P[A]P[B]
   c) 0
3. If $B \subset A$, then P[A|B] =
   a. P[A]
   b. P[B]
   c. 1

4. If A and B are disjoint events in a sample space S, then P[A-B]is equal to
   a) P[A] – P[B];
   b) P[A];
   c) 0.

5. If A and B are events in a sample space, then $P[\overline{A \cap B}]$ is equal to

(a). $P[\overline{A} \cap \overline{B}]$, (b) $P[\overline{A} \cup \overline{B}]$, (c). $1 - P[A \cup B]$

6. If $B \subset A$, then P[A|B] =
   a. P[A]
   b. P[B]
   c. 1

7. If A and B are events defined on the same sample space, then $P[\overline{A \cup B}]$ is equal to
   a. $P[\overline{A} \cap \overline{B}]$
   b. 1- $P[\overline{A} \cap \overline{B}]$
   c. Neither a nor b.

8. If A and B are events defined on the same sample space, then $P[\overline{A \cap B}]$ is equal to
   a) $P[\overline{A} \cap \overline{B}]$

b) $1- P[\overline{A} \cap \overline{B}]$

c) $P[\overline{A} \cup \overline{B}]$

9..If A and B are any events in a sample space S, then $P[\overline{A} \cup \overline{B}]$ is equal to

a) $P[\overline{A \cap B}]$

b) $P[A \cap B]$

c) $1- P[A \cup B]$