



# Cruise school, Addis Ababa



## Grade 11 Mathematics WORKSHEET-II

### Second Semester

#### Counting Principles and Probability

1. A car license plate consists of 7 characters. The first 4 characters are numerals from 0 to 9. The last 3 characters are letters excluding I, O, and X. How many different license plates are possible?
2. Suppose that the first 3 letters (A, B, and C) and the number digits are to be used to form car plates in a small town. How many different plates can be formed in total that contains 1, 2, or 3 letters and then followed by 3 digits?
3. A three – digit library identification card is to be printed from the numbers 0, 1, 2, 3, 4, 5 in such a way that the first is non – zero and no number is to be repeated. How many such cards can be printed?
4. How many four – digit numbers can be formed from the digits 1, 2, 3, 5, 7, 8 and 9 where a digit is used at most once?
  - a) if the numbers must be even?
  - b) if the numbers are less than 3000?Do this question if repetition is allowed.
5. On English quiz having 10 multiple choice questions, 3 answers are A, 2 answers are B, 2 answers are C, 1 answer is D, and 2 answers are E. How many different answer keys are possible?
6. In how many ways are the letters in the word “Coronavirus” arranged?
7. If distinct codes of eight letters are formed by rearranging the letters in the word ‘ABBEBAYE’, how many of the codes begin with B or Y?
8. A company produced 25, 000 bulbs and randomly tested 2% of the product. Among the tested bulbs, if 40 have defect of type  $D_1$ , 60 have defect of type  $D_2$  and 25 have both types of defects, what is the probability that a bulb produced by the company has none of the defects?
9. There are 4 black, 2 red and 4 white balls in a box. If three balls are selected at random what is the probability that
  - a) all the balls selected are black?
  - b) all the balls are of different color?
  - c) at least one ball is white?
  - d) at most 1 ball is red?
10. There are 3 red and 9 green balls in a box. What is the probability of drawing at random without replacement green then another green?
11. If a die and two coins are tossed together, what is the probability of the die showing a 6 and both coins showing a head?
12. Three persons  $P_1$ ,  $P_2$  and  $P_3$  are firing at a target independently and have a probability 0.7, 0.5, and 0.4, respectively, of hitting the target. What is the probability that at least one of them hits the target?
13. Items produced by certain company are subjected to two kinds of defects  $D_1$  and  $D_2$ . Out of the total production, if 5% have defect  $D_1$ , 10% have defect  $D_2$  and 2% have both defects, then what is the probability for an item to have defect  $D_2$ , given that it has defect  $D_1$ ?
14. A group of six students take their seats at random in a round table for a discussion. What is the probability that two specific students do not sit together?
15. What is the middle term in the expansion of  $(r - 5)^6$  ?

16. i) What is the constant term in the expansion of  $(x + \frac{3}{x^3})^5$ ?
- ii) In the expansion of  $(2x + 5y)^5$ ,
- what is the coefficient of the term  $x^2y^3$ ?
  - Find the terms whose coefficient is 400?
17. A student needs to select 3 books from 3 different mathematics books, 3 different physics books and 1 history book. What is the probability that one of them is mathematics and the other two are either physics or history books?
18. A box contains 5 white, 6 red and 4 black balls of identical size. If 3 balls are randomly taken out of the box one after the other, what is the probability that the first is white and both the second and the third balls are red?
19. If from a pack of 52 cards, three cards are drawn one after the other with replacement, the probability of getting all Kings is \_\_\_\_\_.
20. If  $P(E_1) = \frac{3}{7}$ ,  $P(E_2) = \frac{5}{21}$ ,  $P(E_1 \cup E_2) = \frac{13}{14}$ , then find a)  $P(E_1/E_2)$                       b)  $P(E_2/E_1)$
21. The events A and B are mutually exclusive. Suppose  $p(A) = 0.3$  and  $p(B) = 0.4$ . Then, which one the following statements is false?
- The probability of either A or B occurring is 0.7.
  - The probability that neither A nor B will happen 0.3.
  - The probability of either A or B occurring is 0.12.
  - $P(A \cap B) = 0$
22. A student is taking two courses, history and mathematics. The probability that the student will pass the history course is 0.6, and the probability of passing mathematics course is 0.7. The probability of passing both is 0.5. What is the probability of passing at least one?
23. If two dice are thrown, what is the probability that both showing number "2"?