Strand 1 Chapter 1 Probability

1. **The Fundamental Principle of Counting.**

   I know that if one task can be accomplished in ***m*** ways and following this a second task can be accomplished in ***n*** ways then the first task followed by the second task can be accomplished in ***m* X *n*** ways.

   Example 1 Page 2

2. I know that a **Permutation is an arrangement of a number of objects in a 'certain order'** and can use boxes to to write down the number of ways each box can be filled. i.e. A, B and C 3 x 2 x 1 = 6 ways to write the letters A, B and C in different order

3. I know that **5! = 5 x 4 x 3 x 2 x 1 = 120**

4. I know that **n! Is the number on n different objects when all the objects are included in each arrangement** i.e. 5 different objects can be arranged in 5! ways.

   Example 2, 3 and 4 Page 3

5. I know that in general, the number of arrangements of n objects, taking r at a time is given by

   $$^{n}P_{r} = n!/(n-r)!$$

   Example 5 and 6 Page 5.

   Ex 1.1 Q2 – Q26 Even Page 6

6. I know that a Combination is a selection of objects chosen from a given set and that in Combinations, unlike Permutations, the order is not important.

7. I know that the number of combinations of r objects, chosen from a set of n different objects, is denoted by $\binom{n}{r}$ where

   $$\binom{n}{r} = n! / r!(n-r)! \quad \Rightarrow \quad \binom{n}{r} = \binom{n}{n-r}$$

   And **0! = 1** and $\binom{n}{n} = \binom{n}{0} = 1$

8. I know that $\binom{n}{r}$ may also be written as $^{n}C_{r}$

Example 1 and 2 Page 9

9. I know that if we have 2 different sets, one containing m different things and the other containing n different things, the number of combinations which can be made containing r of the first and s of the second is

$$\binom{m}{r} \times \binom{n}{s}$$

10. I know that the word or indicates that results are added in problems associated with permutations, combinations or probability.

Example 3 and 4 Page 11

Exercise 1.2 Q1 to Q21 Odd Page 11

11. I know that probability uses numbers to tell us how likely something is to happen on a scale of 0 (impossible) to 1 (certain) expressed as a fraction or decimal and that ½ or 0.5 represents and 'evens chance' of something happening.

12. I know that 'throwing a dice' is a TRIAL
That the numbers 1,2,3,4,5,6 all have an 'EQUALLY LIKELY' chance of happening and represent the list of 'possible outcomes' aka the 'sample space'

That the required result (or result we want) is called an EVENT. i.e a 6

P(Event)=number of successful outcomes of event/number of all possible outcomes

Also If A is an Event then P(A happening)=1-P(A not happening)
I know that the probabilities of equally likely events add up to 1.

Example 1, 2 Page 15

13. I know how to generate **sample spaces** on a grid resulting from 2 events like tossing a coin and throwing a dice. I can find required probabilities from the generated sample space.
Example 3 pg 16
Ex 1.3 Q1 – Q17 Odd Page 16

14. I know how to find the '**EXPERIMENTAL PROBABILITY or RELATIVE FREQUENCY = Number of successful Trials / Total Number of Trials'**

Example 1 Pg 19

15. I know how to find the '**EXPECTED FREQUENCY**' = **'probability of the event happens' X 'number of trials'** and know that the sum of probabilities adds up to 1.
    Example 2 Pg 20
    Ex 1.4 Q1 – Q11 Page 21

16. I know that 2 Events are '**MUTUALLY EXCLUSIVE**' if they **cannot happen at the same time** like picking a 'spade' and 'a red picture card' at the same time from a pack of cards.

    I know to apply the 'OR Rule' / 'Addition rule') to find the Probability of one event OR another happening. (Whether they are mutually exclusive or not)
    Mutually Exclusive **P(A or B) = P(A) + P(B)**
    Not Mutually Exclusive **P(A or B) = P(A) + P(B) – P(A and B)**

    Example 1 Pg 24

17. I know how fill in, complete and read the cardinal numbers (#) for 2 and 3 topic **Venn Diagrams.**

    I know how to find the probabilities of events happening using **Venn Diagrams**.
    Example 2 Page 25
    Example 3 Page 26

18. I know that a set of events is **exhaustive if the set contains all possible outcomes**.
    i.e. A: getting an odd number throwing a dice
    B: Getting an even number
    These two events contain all the possible outcomes when a dice is thrown. These events are said to be exhaustive. **If A and B are exhaustive events, then P(A) + P(B) = 1**
    Ex 1.5 Q2 – Q24 Page 26

19. I know how to find, for two event like tossing a coin and throwing a dice, the probability of getting a HEAD and a 6 using the **MULTIPLICATION or AND** Rule which states that

    P(A and B)=P(A) X P(B)
    Example 1, 2, 3 and 4 Pg 30
    Ex 1.6 Q1 – Q15 Odd Page 32

20. I know that Conditional probability involves situations where the probability of a second event depends on the outcome of the first event.

    If A and B are two events, the conditional probability that A occurs, given that B has already occurred, is written P(A|B) 'the probability of A given B'

    P(A|B) = P(A n B) / P(B)

    And

    The General Multiplication Law P(A and B) = P(A) X P(B|A)

    Example 1, 2, 3 and 4 Page 35

    Ex 1.7 Q2 – Q20 Even Page 37