MATIMATICS GRADE 8
UNIT 6 SUMMARY

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Introduction to probability

6.1 The Concept of Probability

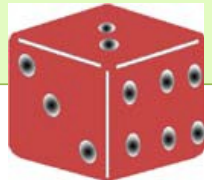
Definition 6.1: ***A process of an observation is often called an Experiment.***

Definition 6.2: **The set of all possible out comes of an experiment is called a *Sample space/the possibility set/* of the experiment and denoted by S.**

Definition 6.3: **A subset of the sample space of an experiment is called an *Event* and denoted by E.**

Example

Experiment	Sample space
Toss a coin.	{Head, tail} ={H, T}
Toss two coins	{HH, HT, TH, TT}
Toss three coins	{HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}
Roll a die.	{1, 2, 3, 4, 5, 6}



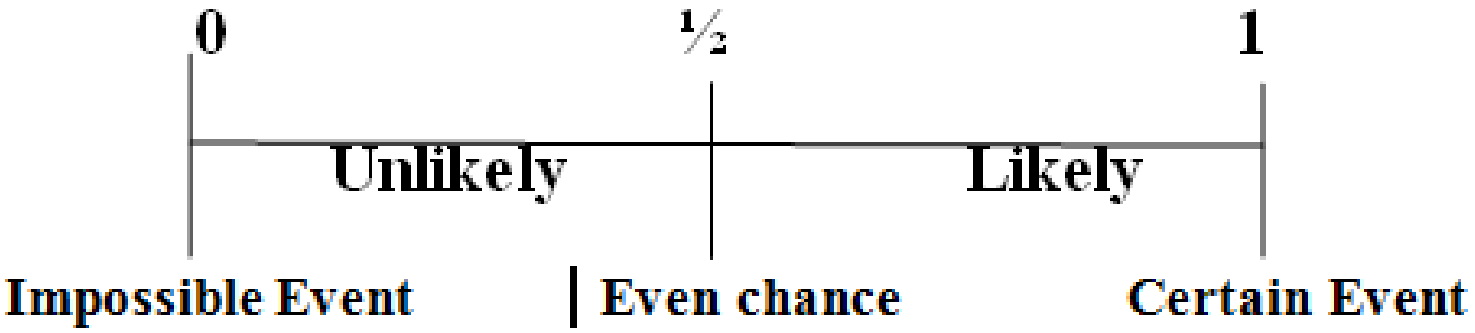
Note :-

i. If the probability of an event is one, then it is called **certain event**.

ii. If the probability of an event is 0, then it is called ***impossible out comes***.

iii. All probabilities must have a value greater than or equal to 0 and less than or equal to 1 or

$$0 \leq P(E) \leq 1.$$



6.2 Probability of Simple Events

Definition :- **probability of an event is the ratio of the number of successful out comes in the event to the total number of possible out comes in the sample space.**

$$P(\text{event}) = \frac{\text{number of successful outcomes}}{\text{total number of possible outcomes}}$$

$$\text{or } P(E) = \frac{n(E)}{n(S)}.$$

Examples

Eg 1. Six slips of paper one labeled with the letters of "POTATO". The slips are shuffled in a hat and you randomly draw one slip. What is the probability that the slip you draw:

a. the letter T?

b. either the letter O or the letter A?

c. the letter Z?

d. one of the letters P, O. T or A?

Solution

a. $P(t) = \dfrac{\text{number of successful outcomes}}{\text{total number of possible outcomes}} = \dfrac{2}{6} = \dfrac{1}{3}$

b. $P(O,A) = \dfrac{\text{number of successful outcomes}}{\text{total number of possible outcomes}} = \dfrac{3}{6} = \dfrac{1}{2}$

c. $P(Z) = \dfrac{\text{number of successful outcomes}}{\text{total number of possible outcomes}} = \dfrac{0}{6} = 0$

d. $P(P, O, T \text{ or } A) = \dfrac{\text{number of successful outcomes}}{\text{total number of possible outcomes}} = \dfrac{6}{6} = 1$

Examples

Eg 2. A bag contains 8 discs of which 4 are red, 3 are blue and 1 is yellow. Calculate the probability that when one disc is drawn from the bag it will be

a. red c. blue

b. yellow d. yellow or blue

Solution

- There are 8 discs altogether so the total number of possible out comes is 8

a. $$P(\text{red}) = \frac{\text{number of successful out comes}}{\text{total number of possible out comes}} = \frac{4}{8} = \frac{1}{2}$$

b. $$P(\text{yellow}) = \frac{\text{number of successful out comes}}{\text{total number of possible out comes}} = \frac{1}{8}$$

c. $$P(\text{blue}) = \frac{\text{number of successful out comes}}{\text{total number of possible out comes}} = \frac{3}{8}$$

d. $$P(\text{yellow or blue}) = \frac{\text{number of successful out comes}}{\text{total number of possible out comes}} = \frac{4}{8} = \frac{1}{2}$$

Exercises

Ex 1. A jar contains 2 orange, 5 blue, 3 red and 4 yellow marbles. A marble is drawn at random from the jar. Find each probability.

a. p (orange)

b. p (red)

c. p (blue)

d. (green)

Exercises

Ex 2. If three coins are thrown. What is the probability of obtaining.

a. all heads

b. all tails

c. at least one heads

d. at least two heads

Exercises

Ex 3. One letter is chosen at random from the word ISOSCELES. What is the probability of choosing.

a. the letter C

b. the letter E

c. a vowel

d. a consonant