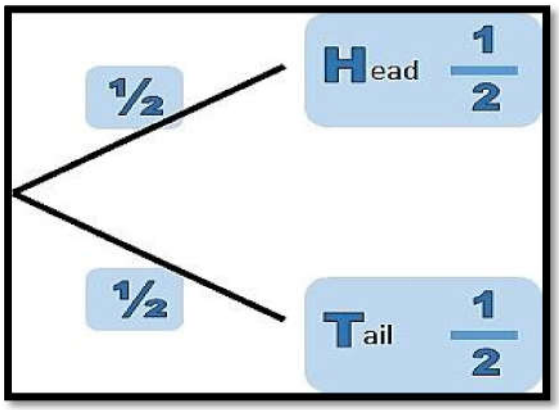
Ratu Navula College
Year 11 Applied Mathematics Lesson Notes – Week 8

Lesson 61
Strand 8 : Probability
Sub- Strand 8.1 : Probability
Learning Outcome : Construct the probability diagram and find the probability

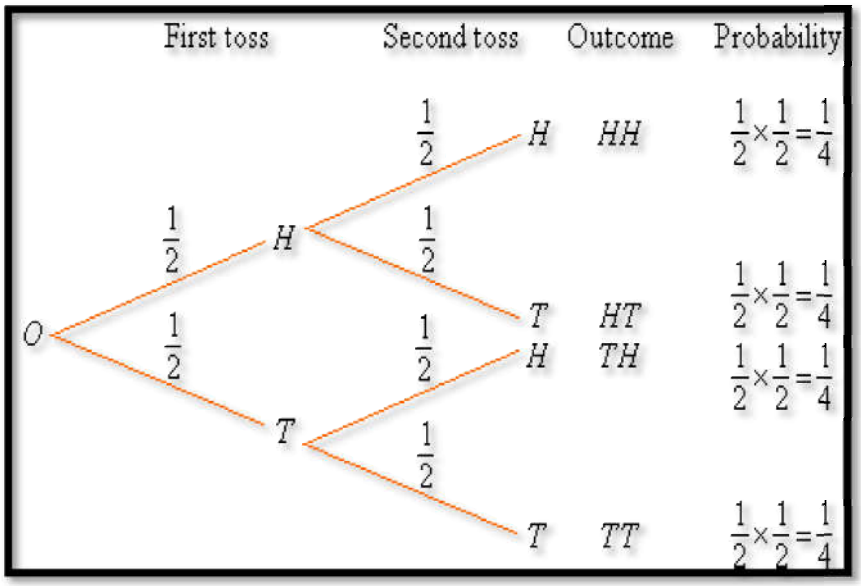
PROBABILITY TREE (Branching diagram)

TOSSING A COIN



Sample Space: {H, T}

TOSSING COIN TWICE



Example 1

On tossing a coin twice, what is the probability of getting only one tail?

Solution:

On tossing a coin twice, the possible outcomes are {HH, TT, HT, TH}

Therefore, the total number of outcomes is 4

Getting only one tail includes {HT, TH}

Therefore, the number of favorable outcomes is 2

Hence, the probability of getting exactly one tail is 2/4 = 1/2

Example 2 (Tossing the coin ONCE)

A fair coin is tossed once. Find the following probabilities:

(a) a Head?
(b) not the Head?
(c) Head or Tail?
(d) Head and Tail?

Solutions

A fair coin is tossed so the sample space is { H , T }. Total number of outcome is 2.

$$\textbf{Probability} = \frac{\textbf{Number of Favourable Outcome}}{\textbf{Total Number of Favourable Outcome}}$$

(a) Getting a Head?

Let E be the event of getting the head. E = {H}

$$\boldsymbol{P = \frac{1}{2}}$$

(b) Getting not the head ?

Let E be the event of not getting the head. E = {T}

$$\mathbf{P = \frac{1}{2}}$$

(c) Getting Head or Tail?

Let E be the event of getting the head or Tail . E = {H,T}

$$\boldsymbol{P = \frac{2}{2}}$$
$$\boldsymbol{= 1}$$ **(Note it is a certain event)**

(d) Getting Head and Tail

Let E be the event of getting the head and Tail . E = {}

$$\boldsymbol{P = \frac{0}{2}}$$
$$\boldsymbol{= 0}$$ **(Note it is an impossible event)**

Example 3 (Tossing the coin TWICE)

A fair coin is tossed twice. Find the following probabilities :

(a) Exactly one Head?
(b) no Head?
(c) no Head on the first coin?
(d) Head on the first coin and tail on the second coin?

Solutions

A fair coin is tossed twice so the sample space is {HH, HT, TT,TH}, hence the total outcome is 4.

(a) Getting exactly one Head?

Let E be the event of getting exactly one Head. E = {HT,TH}

$$\boldsymbol{P = \frac{2}{4}}$$
$$\boldsymbol{= \frac{1}{2}}$$

(b) Getting no Head?

Let E be the event of getting exactly one Head. E = {TT}

$$\boldsymbol{P = \frac{1}{4}}$$

(c) Getting no Head on the First coin

Let E be the event of getting no Head on the First coin. E = {TH,TT}

$$\mathbf{P = \frac{2}{4}}$$
$$\boldsymbol{= \frac{1}{2}}$$

(d) Getting Head on the first coin and Tail on the seconf Coin?

Let E be the event of getting Head on the first coin and Tail on the second coin. E={HT}

$$\mathbf{P = \frac{1}{4}}$$

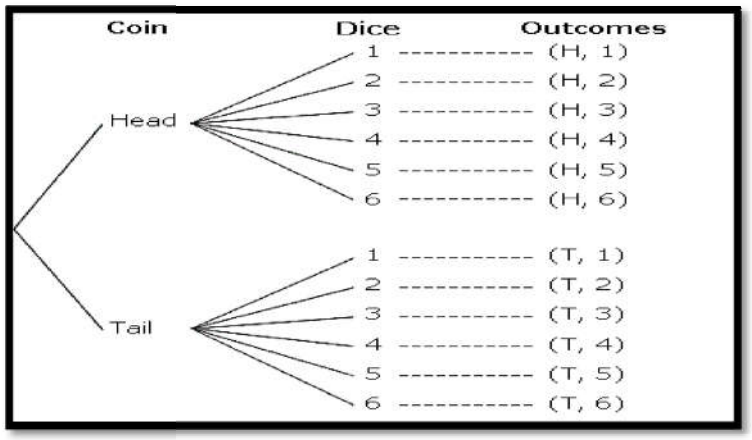
Exercise

Two fair coins are tossed. Find the following probabilities:

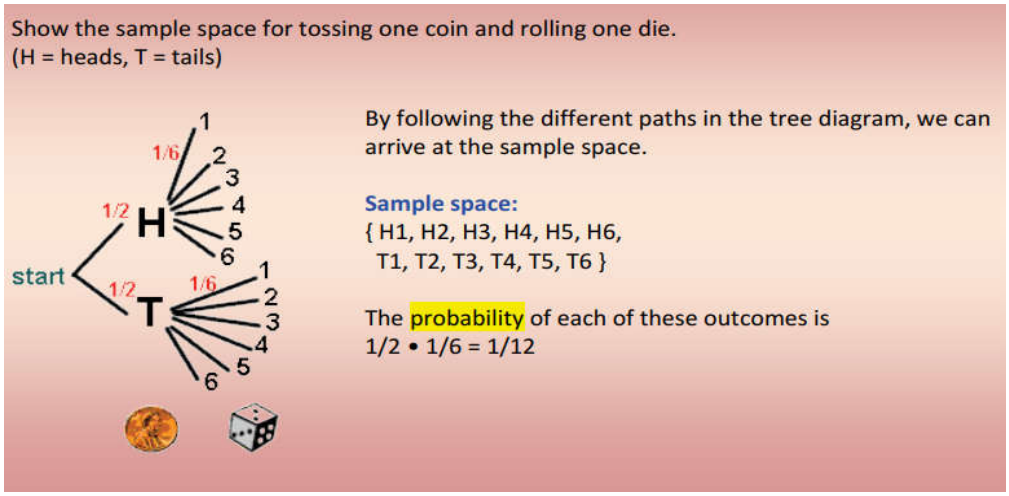
(a) no Head on the second coin?
(b) both Head?
(c) Both Tail?
(d) Head on one coin and Tail on the other coin?

Lesson 62
Strand 8 : Probability
Sub- Strand 8.1 : Probability
Learning Outcome : Construct the probability diagram and find the probability

TOSSING A COIN AND ROLLING A DIE



Note : The total outcome is 12



Example 1

A coin is tossed and a die is rolled. Find the probability of getting :

(a) a Head and 3 ?
(b) even number and Tail?

Solution

	1	2	3	4	5	6
H	**(H,1)**	**(H,2)**	**(H,3)**	**(H,4)**	**(H,5)**	**(H,6)**
T	**(T,1)**	**(T,2)**	**(T,3)**	**(T,4)**	**(T,5)**	**(T,6)**

Note

- **The probability of getting a { H , T } is ½**
- **The probability of getting {1 , 2 , 3 , 4 , 5 , 6 } is $\frac{1}{6}$**

(a) a Head and 3?

Sample space ={H,3}

$$\mathbf{P} = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$$

(b) a even number and Tail?

Sample space ={(T.2) , (T,4} , (T,6)} . In this case we are going to add all probabilities together.

$\mathbf{P} = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$**(probability of one)**

$$\mathbf{P} = (\mathbf{T}, \mathbf{2}) + (\mathbf{T}, \mathbf{4}) + (\mathbf{T}, \mathbf{6})$$

$$= \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$$

$$= \frac{3}{12}$$

$$= \frac{1}{4}$$

Example 2

A box contains 3 Red marbles, 2 Green marbles and a Yellow marble. If a marble is selected at random, find the probability that it is :

(a) A red marble?
(b) A green or Yellow marble?
(c) Not Red marble?

Solutions

Total number of outcome is $3\ \text{Red} + 2\ \text{Green} + 1\ \text{Yellow} = 6\ \text{marbles}$

(a) a red marble?

$\boldsymbol{P} = \frac{3}{6}$

$= \frac{\mathbf{1}}{\mathbf{2}}$

(b) a green or yellow marble?

$\boldsymbol{P} = \frac{\mathbf{2+1}}{\mathbf{6}}$

$= \frac{\mathbf{1}}{\mathbf{2}}$

(c) not red marble?

$\boldsymbol{P} = \frac{\mathbf{2+1}}{\mathbf{6}}$

$= \frac{\mathbf{1}}{\mathbf{2}}$

Exercise

1) A coin is tossed and a die is rolled. Find the probability of getting :
   (a) a Tail and 6 ?
   (b) even number and Head?
   (c) old number and a Tail?

2) A dish containss 8 red jellybeans, 5 yellow jellybeans, 3 black jelly beans and 4 pink jelly beans. If a jellybean is selected at random, find the probability that it is :
   (a) A red jellybean?
   (b) Black or pink jellybeans?
   (c) Not yellow jellybeans?

WORKSHEET 8

2018

Two coins are tossed at the same time. The probability of getting the **same outcome** on both coins is

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

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

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

D. 1

Which of the following **cannot** be the probability of an event?

A. 0

B. 0.5

C. 1

D. 1.2

A coin and a die are tossed at the same time.

(i) How many possible outcomes are there in the sample space?

(ii) Find the probability of getting a head on the coin and an even number on the die?

A box contains 10 identical marbles of which some are blue, some green and the rest yellow. The probability of picking a blue marble is $\frac{1}{2}$

(i) How many blue marbles are in the box?

(ii) If there are 4 green marbles in the box, what is the probability of picking a green marble?