ONLINE MATHS CLASS - X - 37 (29 / 09 /2020)

Chapter 3 – Mathematics of chance

Let's discuss practical situations related to the idea of chance ,

1. *Coin is used to tossing in a cricket match .We can not predict early whether it is head or tail . We can only assume the result .*
2. *While throwing a die in a snake and ladder game , we can not predict early which number is coming upward . Here also we can only assume the result .*

Mathematical analysis of cases where the result can not be calculated accurately , is discussing in this unit .

There are 9 red balls and one yellow ball in a box . If a ball is chosen without looking , it most likely to be red .

There are 8 red balls and 2 yellow balls in the second box . Here also if a ball is chosen without looking , it most likely to be red .

There are 5 red balls and 5 yellow balls in the third box . If a ball is chosen without looking it may be red or yellow .

For the first and second box the chance of getting a red ball is more . From the third box , chance of getting red ball and yellow ball are equal .

Let's try to analyse mathematically such situations

1. *Five black and five white beads in one box . Six black and four white in another . One has choose a box and pick a bead . If it is black , he wins . Which box is the better choice ?*

Here each box contains equal number of beads . (Each box contains 10 beads).The second box contains more blacks . So we have a greater probability of getting a black from the second box .

2. *Six black and five white beads in one box . Five black and four white in another . One has choose a box and pick a bead . If it is black , he wins . Which box is the better choice ?*

Total number of beads in first box = 11

$\frac{6}{11}$ of total beads is black .

Total number of beads in second box = 9

$\frac{5}{9}$ *of total beads is black* .

$\frac{5}{9}$ *is greater than* $\frac{6}{11}$

Second box has a larger black part . So the second box is the better choice to win the game .

(*In other words , the probability of getting a black bead from the second box is larger . Further , the probability of getting a black bead from the first box is* $\frac{6}{11}$ *and the probability of getting a black bead from the second box is* $\frac{5}{9}$)

NB :

$\frac{6}{11}$ $\quad$ $\frac{5}{9}$

$6 \times 9 \qquad 5 \times 11$

$54 < 55 \implies \frac{6}{11} < \frac{5}{9}$

Conclusion

Thus the probability is mathematically analysed by converting it into number by calculating how many of the favourable outcomes out of total outcomes .

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$$

Let's solve some problems related to this idea

1. *Numbers 1 to 25 are written on paper slips and put in a box .One slip is taken from it .*

a) *What is the probability that it is an even number ?*

b) *What is the probability of being a multiple of 3 ?*

c) *What is the probability of being a multiple of 6 ?*

Answer .

Total number of outcomes = 25

a) *Number of favourable outcomes* = 12

(*Here number of favourable outcomes is the number of even numbers*)

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{12}{25}$$

b) *Favourable outcomes* = 3 , 6 , 9 , 12 , 15 , 18 , 21 , 24

Number of favourable outcomes = 8

(*Here number of favourable outcomes is the number of multiples of* 3)

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{8}{25}$$

c) *Favourable outcomes* = 6 , 12 , 18 , 21

Number of favourable outcomes = 4

(*Here number of favourable outcomes is the number of of multiples of* 6)

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{4}{25}$$

2. *There are 3 red balls and 7 green balls in a bag , 8 red balls and 7 green balls in another .*

a) *What is the probability of getting a red ball from the first bag ?*

b) *What is the probability of getting a red ball from the second bag ?*

c) *If all the balls are put in a single bag , what is the probability of getting a red ball from it ?*

Answer .

a) *Total number of outcomes* (*Number of balls in first box*) = 10

Number of favourable outcomes = 3

(Here number of favourable outcomes is the number of red balls)

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{3}{10}$$

b) *Total number of outcomes (Number of balls in first box)* = 15

Number of favourable outcomes = 8

(Here number of favourable outcomes is the number of red balls)

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{8}{15}$$

c) *Total number of outcomes* (Total *Number of balls in two boxes*) = 25

Number of favourable outcomes = 11

(Here number of favourable outcomes is the number of red balls in two boxes)

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{11}{25}$$

3. *One is asked to say a two digit number .What is the probability of it being a perfect square ?*

Answer .

Total number of outcomes (total number of two digit numbers) = 90

Favourable outcomes = 16 , 25 , 36 , 49 , 64 , 81

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{6}{90} = \frac{1}{15}$$

More activities (Text book page 71)

(1) A box contains 6 black and 4 white balls. If a ball is taken from it, what is the probability of it being black? And the probability of it being white?

(5) A bag contains 3 red beads and 7 green beads. Another contains one red and one green more. The probability of getting a red from which bag is more?

ONLINE MATHS CLASS - X - 37 (29 / 09 /2020)

WORKSHEET

1. *One is asked to say a letter in the English alphabet .*

a) *How many letters are there in English alphabet ?*

b) *What is the probability of telling a vowel ?*

c) *What is the probability of telling a consonant ?*

d) *What is the sum of the probabilities of telling a vowel and not telling a vowel ?*

2. *One is asked to say a two digit number .*

a) *How many two digit numbers are there ?*

b) *What is the probability of getting a number in which one of the digits is 1 ?*

c) *What is the probability of getting a number in which the product of the digits is a prime number ?*

3. *There are 10 red and 7 blue balls in a basket . A ball is taken from it*

a) *What is the probability of getting a red ball ?*

b) *What is the probability of getting a blue ball ?*

c) *What is the sum of the probabilities of getting a red ball and not getting a red ball ?*

d) *If three more blue balls are added to the basket and one ball is taken , what is the probability of getting a red ball ?*

4. *One is asked to say a three digit number .*

a) *How many three digit numbers are there ?*

b) *What is the probability of getting a number whose digits are same ?*

c) *What is the probability of getting a number in which all digits are different ?*

SARATH .A .S , HST ,GHS ANCHACHAVADI

ONLINE MATHS CLASS - X - 38 (01 / 10 /2020)

What did we learn in the last class ?

The probability is mathematically analysed by converting it into number by calculating how many of the favourable outcomes out of total outcomes .

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$$

Let's solve some problems related to this idea .

(1) A box contains 6 black and 4 white balls. If a ball is taken from it, what is the probability of it being black? And the probability of it being white?

Answer .

Total number of outcomes = 10

Probability of it being black $= \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{6}{10} = \frac{3}{5}$

Probability of it being white $= \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{4}{10} = \frac{2}{5}$

(2) A bag contains 3 red beads and 7 green beads. Another contains one red and one green more. The probability of getting a red from which bag is more?

Answer .

First bag

Total number of outcomes = 10

Probability of getting red $= \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{3}{10}$

Second bag

Total number of outcomes = 12

Probability of getting red = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{4}{12} = \frac{1}{3}$

$\frac{1}{3}$ *is larger than* $\frac{3}{10}$

$\frac{3}{10}$ $\quad$ $\frac{1}{3}$

$3 \times 3 \quad 1 \times 10$

$9 < 10 \Rightarrow \frac{3}{10} < \frac{1}{3}$

The probability of getting a red from the second bag is more .

(3). *Numbers* 1 *to* 50 *are written on slips of paper and put in a box . A slip is drawn from it , but before doing so , one must make a guess about the number , either prime number or a multiple of* 5 *. Which is a better guess ? Why ?*

Answer .

Total number of outcomes = 50

Prime numbers = 2 , 3 , 5 , 7 , 11 , 13 , 17 , 19 , 23 , 29 , 31 , 37 , 41 ,43 , 47

Number of favourable outcomes = 15

Probability of getting a prime number = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{15}{50} = \frac{3}{10}$

Multiples of five = 5 , 10 , 15 , 20 , 25 , 30 , 35 , 40 , 45 , 50

Number of favourable outcomes = 10

Probability of getting a multiple of five = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{10}{50} = \frac{1}{5}$

$\frac{3}{10}$ *is larger than* $\frac{1}{5}$

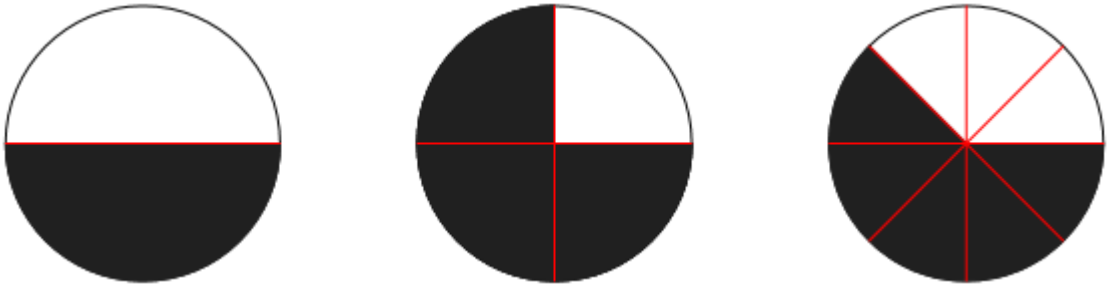
$\frac{3}{10}$ $\quad$ $\frac{1}{5}$

$3 \times 5 \quad 1 \times 10$

$15 > 10 \Rightarrow \frac{3}{10} > \frac{1}{5}$

The guess of prime number is better .

Geometrical probability



In the figure first circle is divided into two equal parts , second circle is divided into four equal parts and the third circle divided into eight equal parts .

In the first figure Half of the portion is black . That is $\frac{1}{2}$ *th part of the total area is black and* $\frac{1}{2}$ *th part is white .*

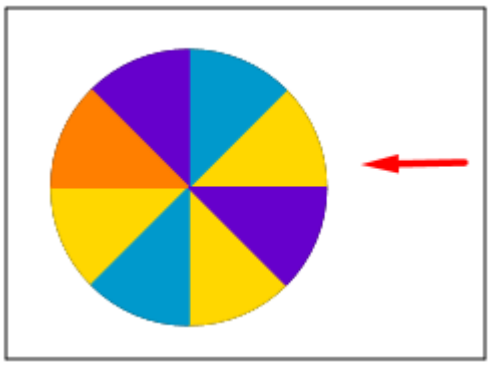
$\frac{3}{4}$ *th part of total area is black and* $\frac{1}{4}$ *th part of the area is white in the second figure .*

$\frac{5}{8}$ *th part of total area is black and* $\frac{3}{8}$ *th part of the area is white in the second figure .*

Activity 1.

A circular disc is divided into eight equal parts and are coloured (spinning wheel) . It spins on a board .

What is the probability of getting yellow against the arrow when it stops ?



Here three out of eight parts are yellow .

Probability of getting yellow = $\frac{3}{8}$

Here probability is calculated in terms of the areas of the geometrical figures .

Here probability is how much part is the desired area out of the total area . It is known as the geometrical probability

SARATH .A .S , HST ,GHS ANCHACHAVADI

Let's solve some problems related to this idea .

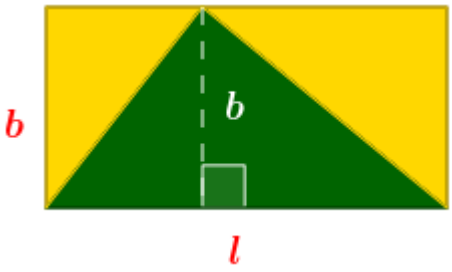
(1) *If you shut your eyes and put a dot in this rectangle .*

What is the probability that it would be within the green triangle ?

Answer

Area of the rectangle = $l \times b$

Area of the triangle = $\frac{1}{2}\ l \times b$



Half the area of the rectangle is that of the triangle .

probability that the dot would be within the green triangle = $\frac{1}{2}$

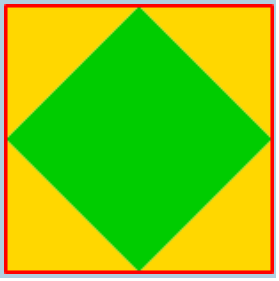
NB :

probability that it would be within the green triangle = $\frac{\text{Area of the triangle}}{\text{Area of the rectangle}}$

$= \frac{\frac{1}{2}\ l \times b}{l \times b} = \frac{1}{2}$

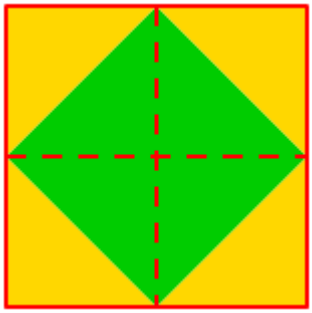
(2) *In the figure a square got by joining the mid points of a larger square .*

If we put a dot in the larger square without looking , what is the probability of it being within the green square ?



Answer

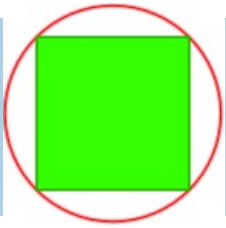
(If we join the midpoints of the bigger rectangle (diagonals of the smaller rectangle) , we get eight right angled triangles . They are equal triangles , so their areas are equal .)



4 out of 8 equal triangles are green .

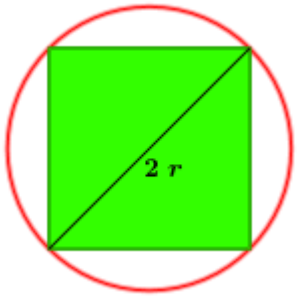
Probability of the dot being within the green square = $\frac{4}{8} = \frac{1}{2}$

(3) A square with all vertices on a circle is given .What is the probability of a dot put without looking to be within the square ?



Answer

Take , radius of the circle = r



Diagonal of the square = Diameter of the circle

$$a\sqrt{2} = 2r$$

$$a = \frac{2r}{\sqrt{2}} = \sqrt{2}\,r$$

Probability of the dot being within the green square = $\frac{\text{Area of the square}}{\text{Area of the circle}}$

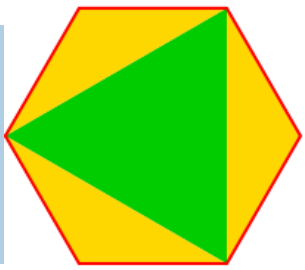
Area of the square = $a^2 = (\sqrt{2}\,r)^2 = 2r^2$

Area of the circle = πr^2

Probability of the dot being within the green square = $\frac{\text{Area of the square}}{\text{Area of the circle}} = \frac{2r^2}{\pi r^2} = \frac{2}{\pi}$

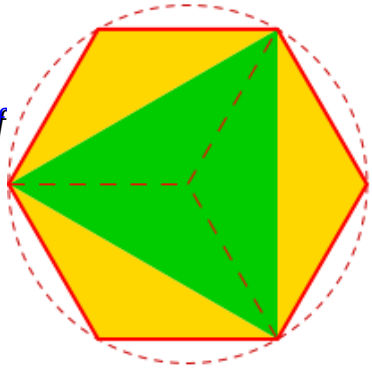
(3) A triangle got by joining alternate vertices of a regular hexagon .

If put a dot without looking in this hexagon , what is the probability of it being within the green triangle ?



Answer

(If we join the ends of the triangle to the centre of the circumcircle of the hexagon , we get three green triangles and three yellow triangles . They are equal triangles .So their areas are same .)

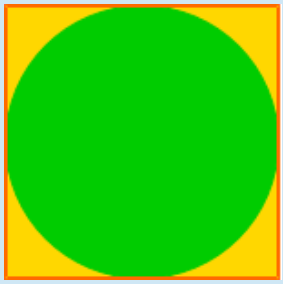


3 *out of 6 triangles are green .*

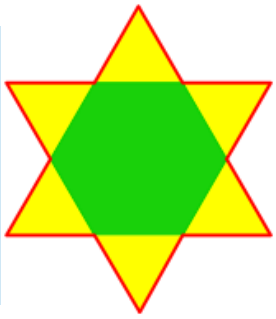
Probability of the dot being within the green square = $\frac{3}{6} = \frac{1}{2}$

More activities

(1). *Consider a circle exactly fitting inside the square . If we put a dot without looking in this square , what is the probability of it being within the circle ? .*

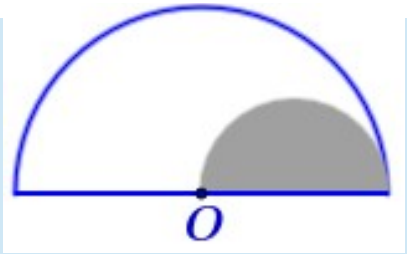


(2). *A regular hexagon formed by two overlapping equilateral triangles. If we put a dot without looking in this figure , what is the probability of it being within the hexagon ?*



ONLINE MATHS CLASS - X - 38 (01 / 10 /2020)

WORK SHEET

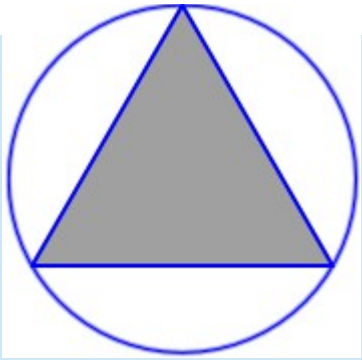


1. *There are two semicircles in the figure . O is the centre of the larger semicircle . Put a dot in this figure without looking .*

a) *If the radius of the smaller semi circle is* r *, What is the radius of the larger semicircle ?*

b) *What is the probability that the dot would be within the smaller semicircle ?*

c) *What is the probability that the dot would be outside the smaller semicircle ?*

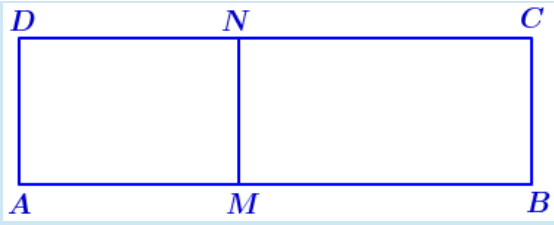


2. *In the figure , an equilateral triangle is drawn inside a circle . Put a dot in this figure without looking .*

a) *If the radius of the circle is* r *, What is the length of the side of the triangle ?*

b) *What is the probability that the dot would be within the triangle ?*

c) *What is the probability that the dot would be outside the triangle ?*



3 . *Two rectangles are joined in the figure . If we put a dot in the figure without looking , the probability of it would be within the rectangle AMND is* $\frac{4}{9}$

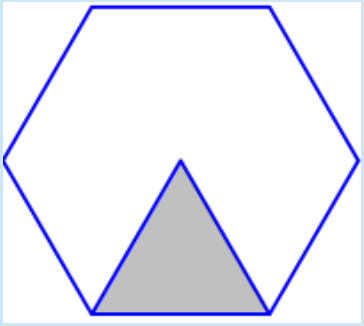
a) *What is the probability that the dot would be within the rectangle MBCN ?*

b) If *AM* = 8 *cm* and *MN* = 5 *cm* , *what is the area of the rectangle ABCD ?*

c) *If the area of the rectangle AMND is* y *and the probability of the dot would be within this rectangle is* $\frac{y}{x}$ *, what is the area of the rectangle MBCN ?*

SARATH .A .S , HST ,GHS ANCHACHAVADI

4. *In the figure , an equilateral triangle is drawn inside a regular hexagon . Put a dot in this figure without looking .*

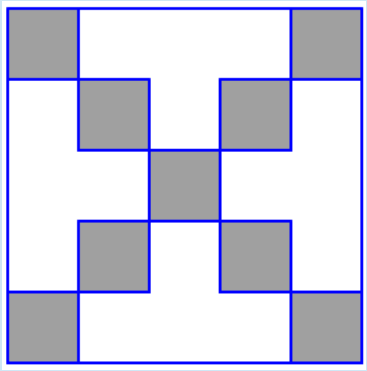


a) *What is the maximum number of triangles of the given size can be cut from the hexagon ?*

b) *What is the probability that the dot would be within the triangle ?*

c) *What is the probability that the dot would be outside the triangle ?*

5 . *In the figure , small equal squares are drawn inside a square . Put a dot in this figure without looking .*



a) *What is the maximum number of small squares of the given size can be cut from the larger square ?*

b) *What is the probability that the dot would be within the shaded portion ?*

c) *What is the probability that the dot would be outside the shaded portion ?*

ONLINE MATHS CLASS - X - 39 (05 / 10 /2020)

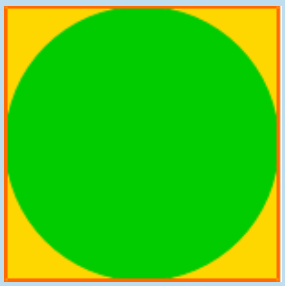
hat did we learn in the last class ?

Probability can be calculated in terms of the areas of the geometrical figures .

Here probability is how much part is the desired area out of the total area . It is known as the geometrical probability

Let's solve some problems related to this idea .

(1). *Consider a circle exactly fitting inside the square . If we put a dot without looking in this square , what is the probability of it being within the circle ? .*



Answer .

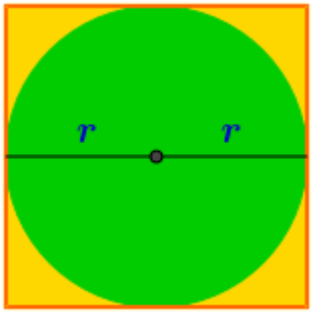
Probability of the dot being within the circle = $\frac{\text{Areaof the circle}}{\text{Area of the square}}$

Diameter of the circle = Side of the square

Take , radius of the circle = r

Side of the square = $2r$

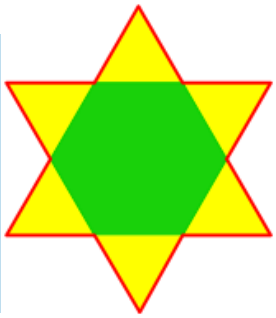
Area of the circle = πr^2



Area of the square = side x side = $2r \times 2r = 4r^2$

Probability of the dot being within the circle = $\frac{\text{Areaof the circle}}{\text{Area of the square}} = \frac{\pi r^2}{4r^2} = \frac{\pi}{4}$

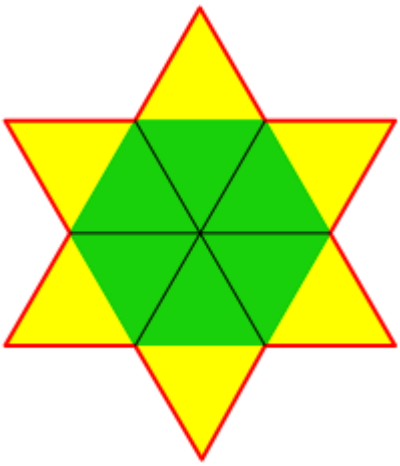
(2). *A regular hexagon formed by two overlapping equilateral triangles. If we put a dot without looking in this figure , what is the probability of it being within the hexagon ?*



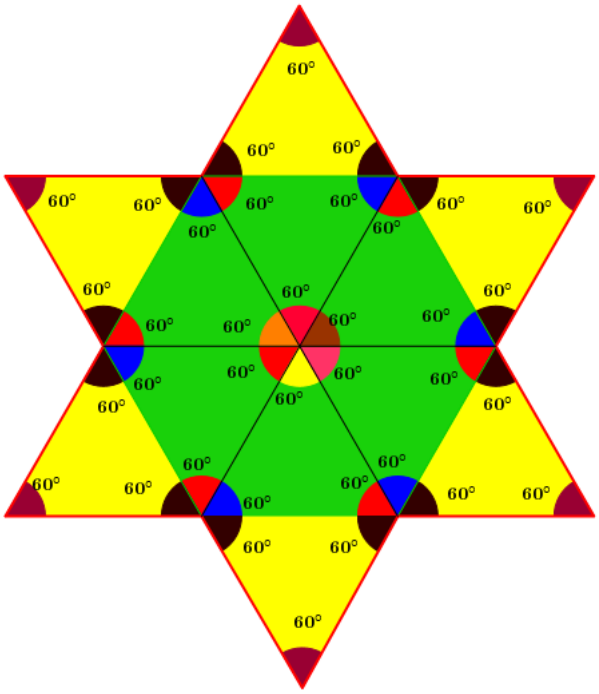
Answer .

We can cut the regular hexagon in the figure into 6 equilateral triangles as shown . Then there are 12 triangles and they are equal triangles .

Probability of the dot being within the hexagon = $\frac{6}{12} = \frac{1}{2}$

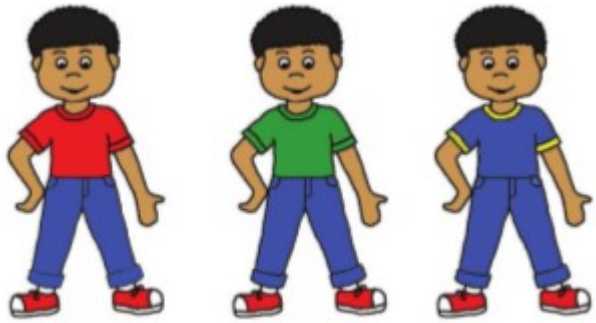


NB :

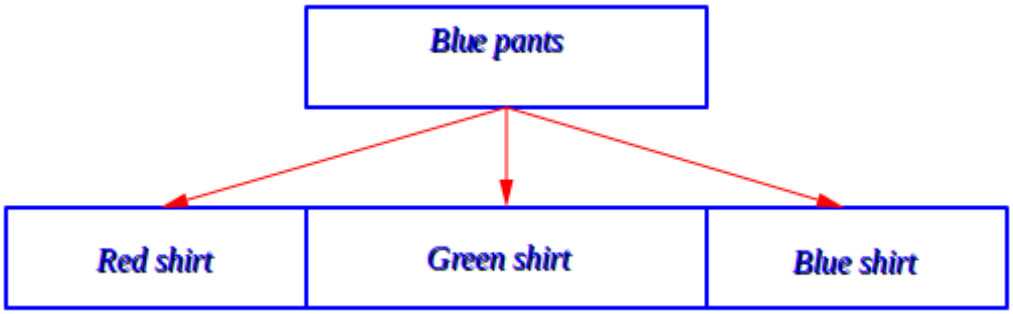


PAIRS

(1) *Looking for a clean dress , Johny found a pair of blue pants and three shirts , red , green and blue . In how many ways he can wear the dress ?*



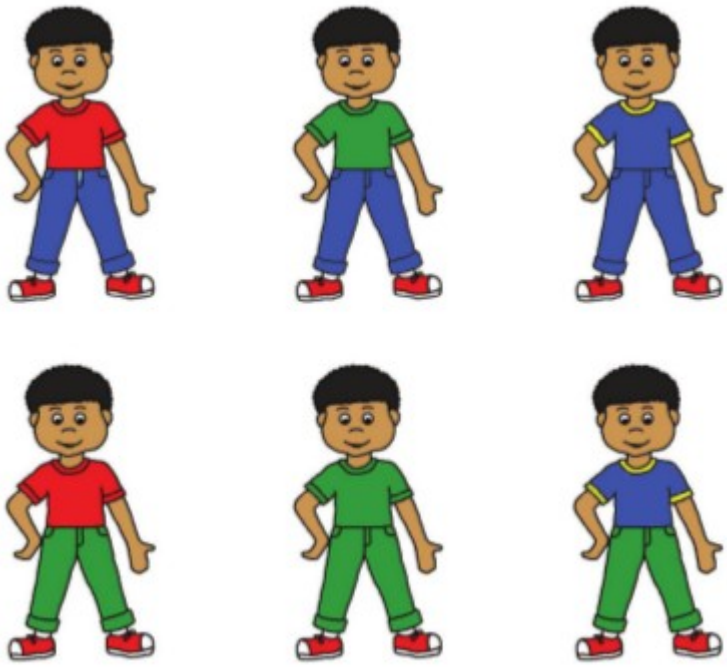
He can wear the dress in three different ways as shown above .



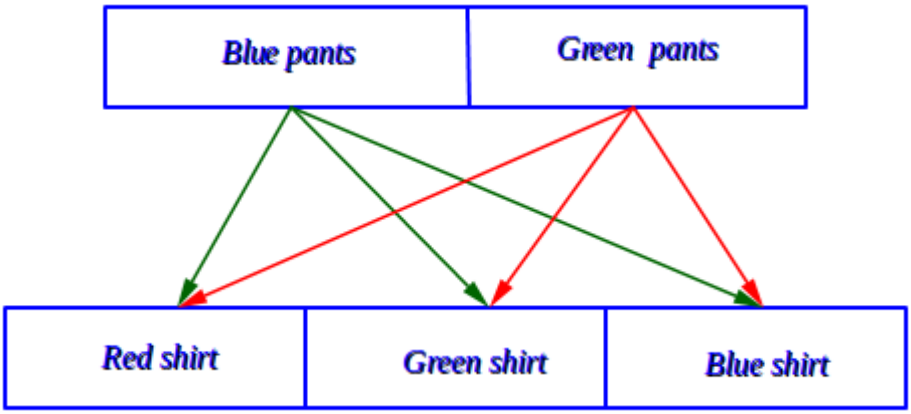
We can write these as pairs .

(Blue pants , Red shirt) , (Blue pants , Green shirt) , (Blue pants , Blue shirt)

(2) *If Johny got two pants , blue and green in colour and three shirts red , green and blue in colour , in how many ways he could have worn the dress ? What was the probability of wearing shirt and pants of the same colour ?*



He could have worn the dress in six different ways as shown above .



We can write these as pairs .

(Blue pants , Red shirt) , (Blue pants , Green shirt) , (Blue pants , Blue shirt)

(Green pants , Red shirt) , (Green pants , Green shirt) , (Green pants , Blue shirt)

Total number of results = 6

Favourable results = (Blue pants , Blue shirt) , (Green pants , Green shirt)

Number of favourable results = 2

Probability of wearing shirt and pants of the same colour = $\frac{\text{Number of favouarable results}}{\text{Total number of results}}$

$$= \frac{2}{6} = \frac{1}{3}$$

(3) *A box contains four slips numbered* 1 , 2 , 3 , 4 *and another box contains two slips* 1 , 2

One slip is taken from each

a) *What are the possible pairs ?*

b) *What is the probability of both the numbers being odd ?*

c) *What is the probability of both the numbers being even ?*

d) *What is the probability of one odd and the other even ?*

e) *What is the probability of both the numbers being same ?*

Answer .

a) (1 , 1) , (1 , 2)

(2 , 1) , (2 , 2)

(3 , 1) , (3 , 2)

(4, 1) , (4 , 2)

Total number of results = 8

b) *Favourable results* = (1 , 1) , (3 , 1)

Number of favourable results = 2

Probability of both the numbers being odd = $\frac{\text{Number of favouarable results}}{\text{Total number of results}}$

$$= \frac{2}{8} = \frac{1}{4}$$

c) *Favourable results* = (2 , 2) , (4 , 2)

Number of favourable results = 2

probability of both the numbers being even = $\frac{\text{Number of favouarable results}}{\text{Total number of results}}$

$$= \frac{2}{8} = \frac{1}{4}$$

d) *Favourable results* = (1 , 2) , (2 , 1) , (3 , 2) , (4 , 1)

Number of favourable results = 4

Probability of one odd and the other even = $\frac{\text{Number of favouarable results}}{\text{Total number of results}}$

$$= \frac{4}{8} = \frac{1}{2}$$

e) *Favourable results* = (1 , 1) , (2 , 2)

Number of favourable results = 2

Probability of both the numbers being same = $\frac{\text{Number of favouarable results}}{\text{Total number of results}} = \frac{2}{8} = \frac{1}{4}$

(4) *From all two digit numbers with either digits* 1 , 2 *or* 3 *one number is chosen*

a) *What is the probability of both the digits being same* ?

b) *What is the probability of the sum of the digits being* 4 ?

Answer .

Total results = 11 , 12 , 13 , 21 , 22 , 23 , 31 , 32 , 33

Total number of results = 9

a) ***Favourable results*** = 11 , 22 , 33

Number of favourable results = 3

Probability of both the numbers being same = $\frac{\text{Number of favouarable results}}{\text{Total number of results}} = \frac{3}{9} = \frac{1}{3}$

b) ***Favourable results*** = 13 , 22 , 31

Number of favourable results = 3

Probability of the sum of the digits being 4 = $\frac{\text{Number of favouarable results}}{\text{Total number of results}} = \frac{3}{9} = \frac{1}{3}$

(4) *A box contains ten slips numbered* 1 to 10 *and another box contains five slips* from 1 *to* 5 . *One slip is taken from each .What is the probability of both the numbers being odd* ?

Answer .

Total number of results = 10 x 5 = 50

Number of odd numbers in the first box = 5

Number of odd numbers in the second box = 3

Number of favourable results = 5 x 3 = 15

Probability of both the numbers being odd = $\frac{\text{Number of favouarable results}}{\text{Total number of results}} = \frac{15}{50} = \frac{3}{10}$

NB :

$(1,1)$, $(1,2)$, $(1,3)$, $(1,4)$, $(1,5)$

$(2,1)$, $(2,2)$, $(2,3)$, $(2,4)$, $(2,5)$

$(3,1)$, $(3,2)$, $(3,3)$, $(3,4)$, $(3,5)$

$(4,1)$, $(4,2)$, $(4,3)$, $(4,4)$, $(4,5)$

$(5,1)$, $(5,2)$, $(5,3)$, $(5,4)$, $(5,5)$

10 Numbers

$(6,1)$, $(6,2)$, $(6,3)$, $(6,4)$, $(6,5)$

$(7,1)$, $(7,2)$, $(7,3)$, $(7,4)$, $(7,5)$

$(8,1)$, $(8,2)$, $(8,3)$, $(8,4)$, $(8,5)$

$(9,1)$, $(9,2)$, $(9,3)$, $(9,4)$, $(9,5)$

$(10,1)$, $(10,2)$, $(10,3)$, $(10,4)$, $(10,5)$

5 Numbers

Total number of results = 10 x 5 = 50

$(1,1)$, $(1,3)$, $(1,5)$

$(3,1)$, $(3,3)$, $(3,5)$

5 Numbers

$(5,1)$, $(5,3)$, $(5,5)$

$(7,1)$, $(7,3)$, $(7,5)$

$(9,1)$, $(9,3)$, $(9,5)$

3 Numbers

Number of pairs in which two numbers are odd = 5 x 3 = 15

SARATH .A .S , HST ,GHS ANCHACHAVADI

ONLINE MATHS CLASS - X - 39 (05 / 10 /2020)

WORK SHEET

(1) *There are two boxes contain some slips numbered from* 1 *.One slip is taken from each .*

The numbers on the slips in each box is given in the table below .Complete the table.

Box 1	*Box 2*	*Possible pairs*	*Number of pairs*	*Product of the number of slips in each box*
1 , 2	1	(1 , 1) , (2 , 1)	2	2 x 1 = 2
1 , 2	1 , 2	(1 , 1) , (1 , 2) (2 , 1) , (2 , 2)	4	2 x 2 = 4
1 , 2 , 3	1 , 2	(1 , 1) , (1 , 2) (2 , 1) , (2 , 2) (3 , 1) , (3 , 2)	6	3 x 2 = 6
1 , 2 , 3	1 , 2 , 3	----------	----------	----------
1 , 2 , 3 , 4	1 , 2	----------	----------	----------
1 , 2 , 3 , 4 , 5	1 , 2 , 3	----------	----------	----------
1 , 2 , 3 , 4 , 5 , 6	1 , 2 , 3 , 4	----------	----------	----------

(3) *A box contains five slips numbered* 1 , 2 , 3 , 4 , 5 *and another box contains three slips* 1 , 2 , 3 *One slip is taken from each*

a) *What are the possible pairs* ?

b) *What is the probability of both the numbers being odd* ?

c) *What is the probability of both the numbers being even* ?

d) *What is the probability of the sum of the digits being even* ?

SARATH .A .S , HST ,GHS ANCHACHAVADI

ONLINE MATHS CLASS - X – 40 (06 / 10 /2020)

(1) *In class* 10 *A , there are* 20 *boys and* 20 *girls . In* 10 *B , there are* 15 *boys and* 25 *girls .*

One student is to be selected from each class .

a) *What is the probability of both being girls* ?

b) *What is the probability of both being girl* ?

c) *What is the probability of one boy and one girl* ?

d) *What is the probability of at least one boy* ?

Answer .

	10 A	10 B
Number of boys	20	15
Number of girls	20	25
Total number of students	40	40

Total number of outcomes = 40 x 40 = 1600

a) *Number of favourable outcomes* = 20 x 25 = 500

$$\textit{Probability of both being girls} = \frac{\textit{Number of favourable outcomes}}{\textit{Total number of outcomes}} = \frac{500}{1600} = \frac{5}{16}$$

b) *Number of favourable outcomes* = 20 x 15 = 300

$$\textit{Probability of both being boys} = \frac{\textit{Number of favourable outcomes}}{\textit{Total number of outcomes}} = \frac{300}{1600} = \frac{3}{16}$$

c) *Number of favourable outcomes* = 20 x 25 + 20 x 15 = 500 + 300 = 800

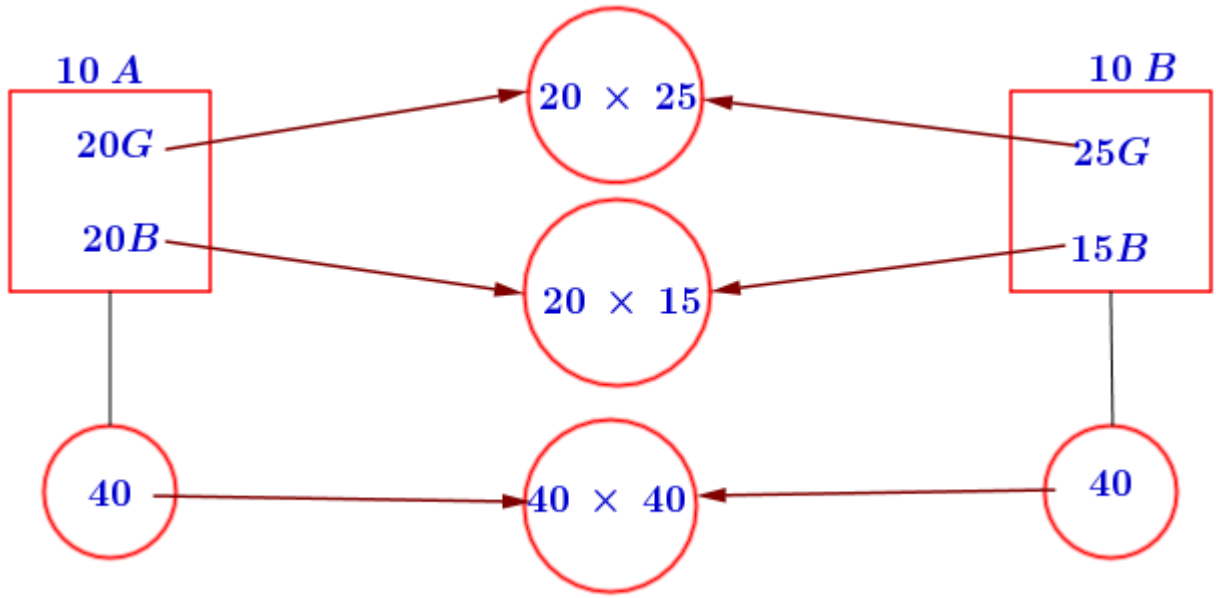
$$\textit{Probability of one boy and one girl} = \frac{\textit{Number of favourable outcomes}}{\textit{Total number of outcomes}} = \frac{800}{1600} = \frac{1}{2}$$

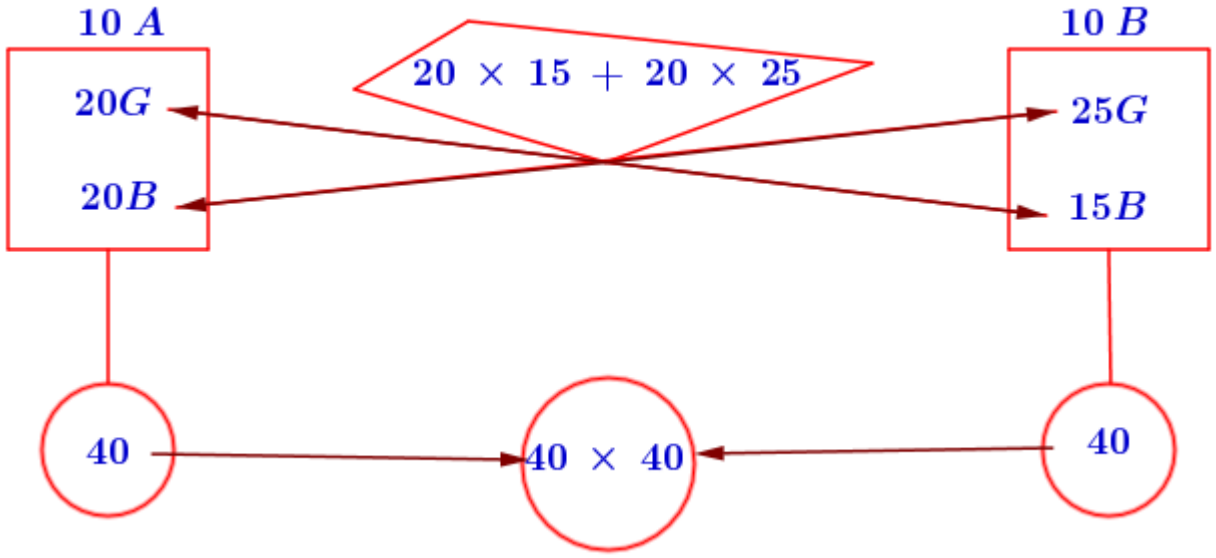
c) *Number of favourable outcomes* = 20 x 15 + 20 x 25 + 20 x 15

= 300 + 500 + 300 = 11

Probability of atleast one boy = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$ = $\frac{1100}{1600}$ = $\frac{11}{16}$

NB :





(2) *Each two digit number is written on a paper slip and these are all put in a box .What is the probability that the product of the digits of a number drawn is a prime number ? What if three digit numbers are used instead ?*

Answer

Total number of outcomes = 90

(Total number of two digit numbers)

Two digit numbers in which product of the digits is prime = 12 , 21 , 13 , 31 , 15 , 51 , 17 , 71

Number of favourable outcomes = 8

Probability that the product of the digits of a two digit number drawn is a prime number = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$

$= \frac{8}{90} = \frac{4}{45}$

Total number of outcomes = 900

(Total number of three digit numbers)

Three digit numbers in which product of the digits is prime = 112 , 121 , 211 ,
113 , 131 , 311 ,
115 , 151 , 511 ,
117 , 171 , 711

Number of favourable outcomes = 12

Probability that the product of the digits of a two digit number drawn is a prime number = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$

$= \frac{12}{900} = \frac{1}{75}$

(3) *One is asked to say a two digit number*

(i) *What is the probability of both digits being same* ?

(ii) *What is the probability of the first digit being larger* ?

(iii) *What is the probability of the first digit being smaller* ?

Answer

Total number of outcomes = 90

(Total number of two digit numbers)

i) *Two digit numbers in which digits are same* = 11 , 22 , 33 ,44 , 55 , 66 , 77 , 88 , 99

Number of favourable outcomes = 9

Probability of both digits being same = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{9}{90} = \frac{1}{10}$

ii) *Two digit numbers in which the first digit being larger* = 10 , 20 , 21 , 30 , 31 , 32 , 40 , 41 , 42 , 43 , 50 , 51 , 52 , 53 , 54 , 60 , 61 , 62 , 63 , 64 , 65 , 70 , 71 , 72 , 73 , 74 , 75 , 76 , 80 , 81 , 82 , 83 , 84 , 85 , 86 , 87 , 90 , 91 , 92 , 93 , 94 , 95 , 96 , 97 , 98

Number of favourable outcomes = 45

Probability of the first digit being larger = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$

$= \frac{45}{90} = \frac{1}{2}$

Two digit numbers in which the first digit being smaller = 12 , 13, 14 , 15 , 16 ,17 , 18 , 19 ,

23 , 24 , 25 , 26 , 27 , 28 , 29 , 34 , 35 , 36 , 37 , 38 , 39 , 45 ,46 , 47 , 48

49 , 56 , 57 , 58 , 59 , 67 , 68 , 69 , 78 , 79 , 89

Number of favourable outcomes = 36

Probability of the first digit being smaller = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$.

$$= \frac{36}{90} = \frac{2}{5}$$

(4) *Two dice with faces numbered from* 1 *to* 6 *are rolled together .What are the possible sums ?*

Which of these sums has the maximum probability ?

Answer .

Total outcomes =

$$(1,1)\ ,\ (1,2)\ ,\ (1,3)\ ,\ (1,4)\ ,\ (1,5)\ ,\ (1,6)$$

$$(2,1)\ ,\ (2,2)\ ,\ (2,3)\ ,\ (2,4)\ ,\ (2,5)\ ,\ (2,6)$$

$$(3,1)\ ,\ (3,2)\ ,\ (3,3)\ ,\ (3,4)\ ,\ (3,5)\ ,\ (3,6)$$

$$(4,1)\ ,\ (4,2)\ ,\ (4,3)\ ,\ (4,4)\ ,\ (4,5)\ ,\ (4,6)$$

$$(5,1)\ ,\ (5,2)\ ,\ (5,3)\ ,\ (5,4)\ ,\ (5,5)\ ,\ (5,6)$$

$$(6,1)\ ,\ (6,2)\ ,\ (6,3)\ ,\ (6,4)\ ,\ (6,5)\ ,\ (6,6)$$

Total number of outcomes = 6 x 6 = 36

Possible sums = 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 , 11 , 12

Sum	*Pairs*	*Number of pairs*
2	(1 , 1)	1
3	(1 , 2) , (2 , 1)	2
4	(1 , 3) , (2 , 2) , (3 , 1)	3
5	(1 , 4) , (2 , 3) , (3 , 2) , (4 , 1)	4
6	(1 , 5) , (2 , 4) , (3 , 3) , (4 , 2) , (5 , 1)	5
7	(1 , 6) , (2 , 5) , (3 , 4) , (4 , 3) , (5 , 2) , (6 , 1)	6
8	(2 , 6) , (3 , 5) , (4 , 4) , (5 , 3) , (6 , 2)	5
9	(3 , 6) , (4 , 5) , (5 , 4) , (6 , 3)	4
10	(4 , 6) , (5 , 5) , (6 , 4)	3
11	(6 , 5) , (5 , 6)	2
12	(6 , 6)	1

Sum " 7 " occurs more . So it has the maximum probability

Probability of getting sum " 7 " = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{6}{36} = \frac{1}{6}$

ONLINE MATHS CLASS - X – 40 (06 / 10 /2020)

WORK SHEET

(1) *One is asked to say a two digit number .*

a) *How many two digit numbers are there* ?

b) *What is the probability of getting a multiple of* 5 ?

c) *What is the probability of getting a multiple of* 10 ?

d) *What is the probability of one of the digit being zero and the other being a prime number* ?

(2) *In a basket there are* 30 *apples and* 20 *oranges .There are* 25 *apples and 35 oranges in another basket . A fruit is to be chosen from each basket*

a) *If each fruit from the first basket paired with a fruit from the second basket , how many possible pairs are there* ?

b) *What is the probability of both being oranges ?*

c) *What is the probability of one apple and one orange ?*

d) *What is the probability of at least one orange ?*

(3) *Two dice with faces numbered from* 1 *to* 6 *are rolled together .*

a) *How many possible pairs of numbers will be got* ?

b) *What is the probability of both being even* ?

c) *What is the probability of both being odd* ?

d) *What is the probability of sum of the digits being even* ?

SARATH .A .S , HST ,GHS ANCHACHAVADI

(4) *Consider a leap year .*

a) *How many days are there in a leap year ?*

b) *What is the probability of occurring* 53 *saturdays in a leap year?*

c) *What is the probability of occurring* 53 *saturdays in a non-leap year ?*

(5) a) *How many days are there in the month January ?*

b) *What is the probability of occurring* 5 *sundays in January ?*

c) *What is the probability of occurring* 5 *sundays in February of a leap year ?*