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 ?*

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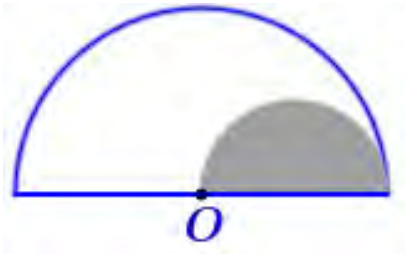
ONLINE MATHS CLASS - X - 38 (01 / 10 /2020)

WORRK 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 ?*

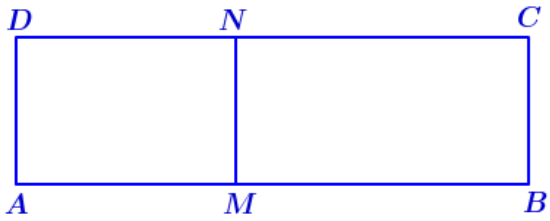
2. *In the figure , an equilateral triangle is drawn inside a circle . Put a dot in this figure without looking .*

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 ?*

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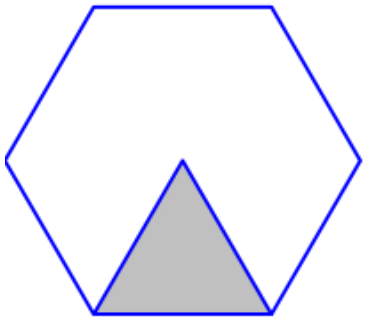
4. *In the figure , an equilateral triangle is drawn inside a regular hexagon . Put a dot in this figure without looking .*

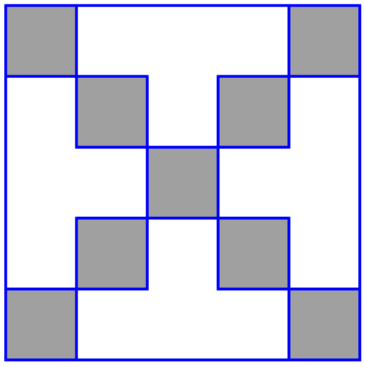


a) *What is the maximum number of triangles of the given size can be cut from the hexagon ?*

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 - 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* $\frac{3}{10}$

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

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

$3 \times 3 \qquad 1 \times 10$

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

(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* $\frac{1}{5}$

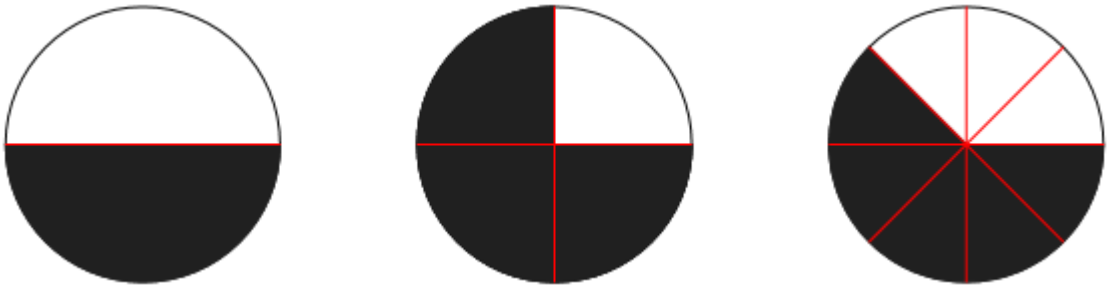
The guess of prime number is better .

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

$3 \times 5 \qquad 1 \times 10$

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

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 .*

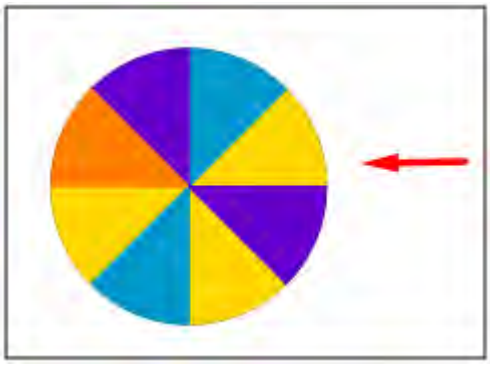
$\frac{3}{4}$ *th part of total area is black and* $\frac{1}{4}$ *th part of the area is white in the second figure .*

$\frac{5}{8}$ *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

Let's solve some problems related to this idea .

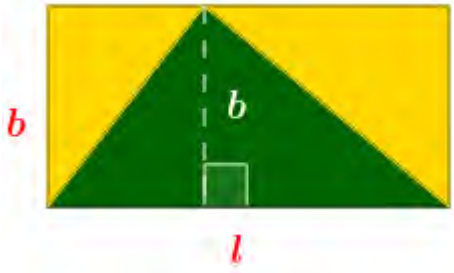
(1) *If you shut your eyes and put a dot in this rectangle .*

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 = $\frac{1}{2}$

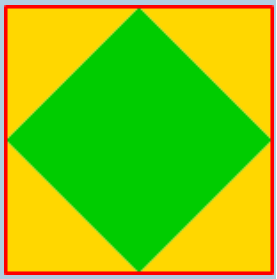
NB :

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

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

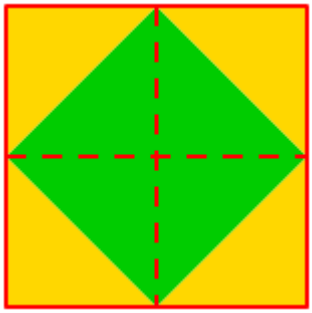
(2) *In the figure a square got by joining the mid points of a larger square .*

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



Answer

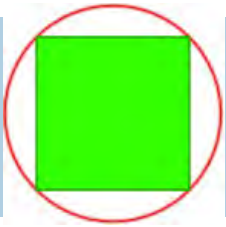
(If we join the midpoints of the bigger rectangle (diagonals of the smaller rectangle) , we get eight right angled triangles . They are equal triangles , so their areas are equal .)



4 out of 8 equal triangles are green .

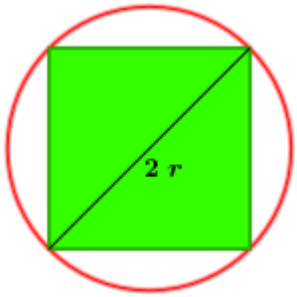
Probability of the dot being within the green square = $\frac{4}{8} = \frac{1}{2}$

(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 = $\frac{\text{Area of the square}}{\text{Area of the circle}}$

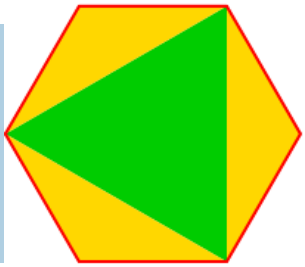
Area of the square = $a^2 = (\sqrt{2}\,r)^2 = 2r^2$

Area of the circle = πr^2

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

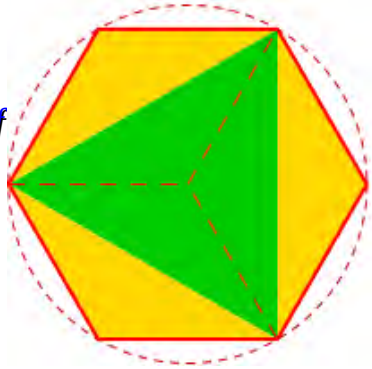
(3) A triangle got by joining alternate vertices of a regular hexagon .

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 .)

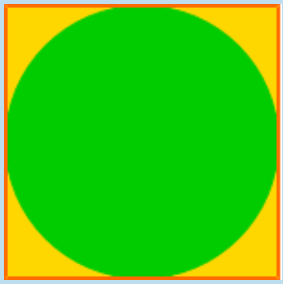


3 out of 6 triangles are green .

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 - 39 (05 / 10 /2020)

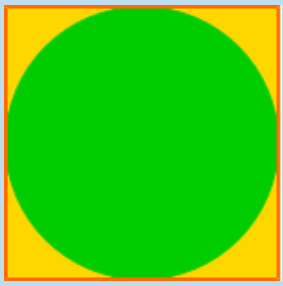
What did we learn in the last class ?

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 .

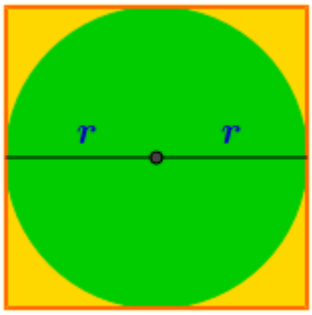
Probability of the dot being within the circle = $\frac{\text{Area of the circle}}{\text{Area of the square}}$

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 = $2r \times 2r = 4r^2$

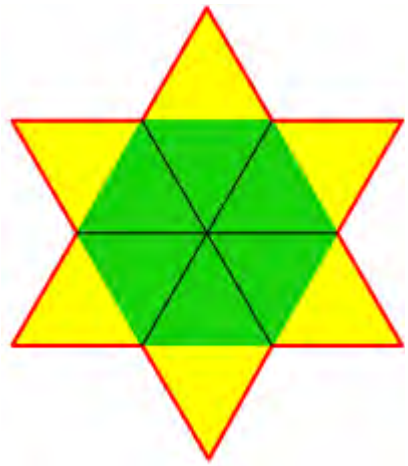
Probability of the dot being within the circle = $\frac{\text{Area of the circle}}{\text{Area of the square}} = \frac{\pi r^2}{4r^2} = \frac{\pi}{4}$

(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 ?*

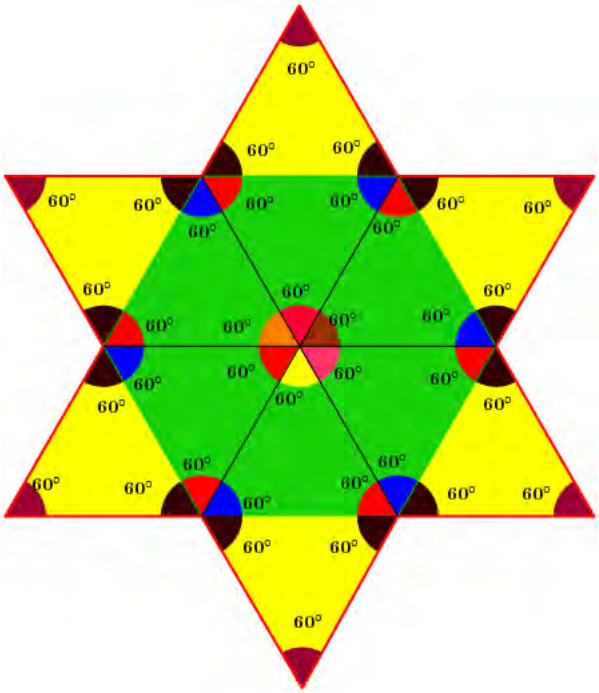
Answer .

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 = $\frac{6}{12} = \frac{1}{2}$

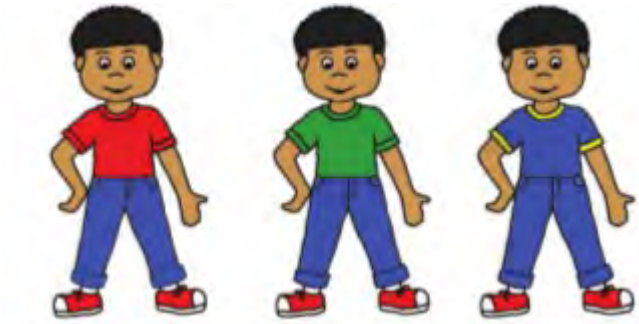


NB :

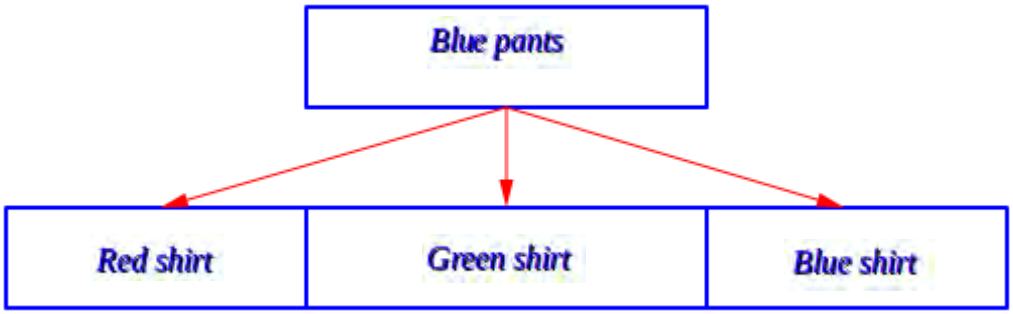


PAIRS

(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 ?*



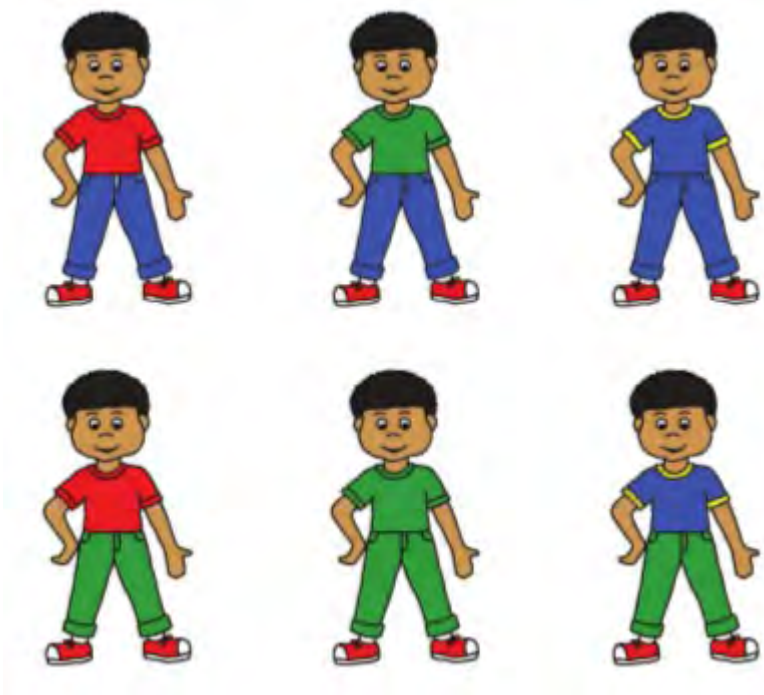
He can wear the dress in three different ways as shown above .



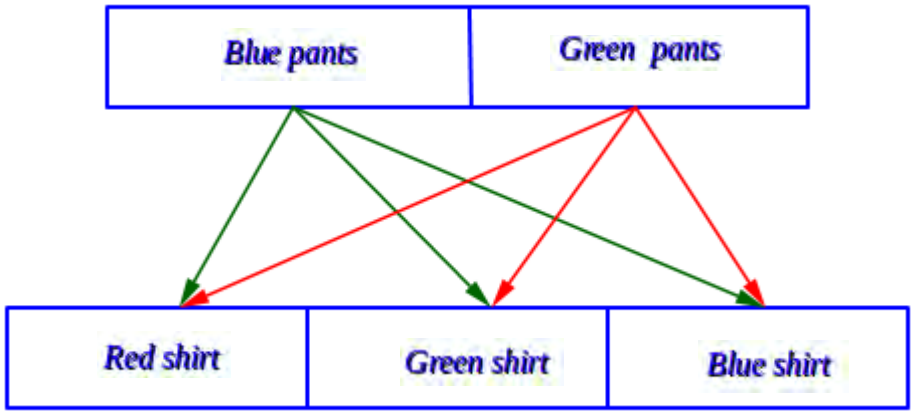
We can write these as pairs .

(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

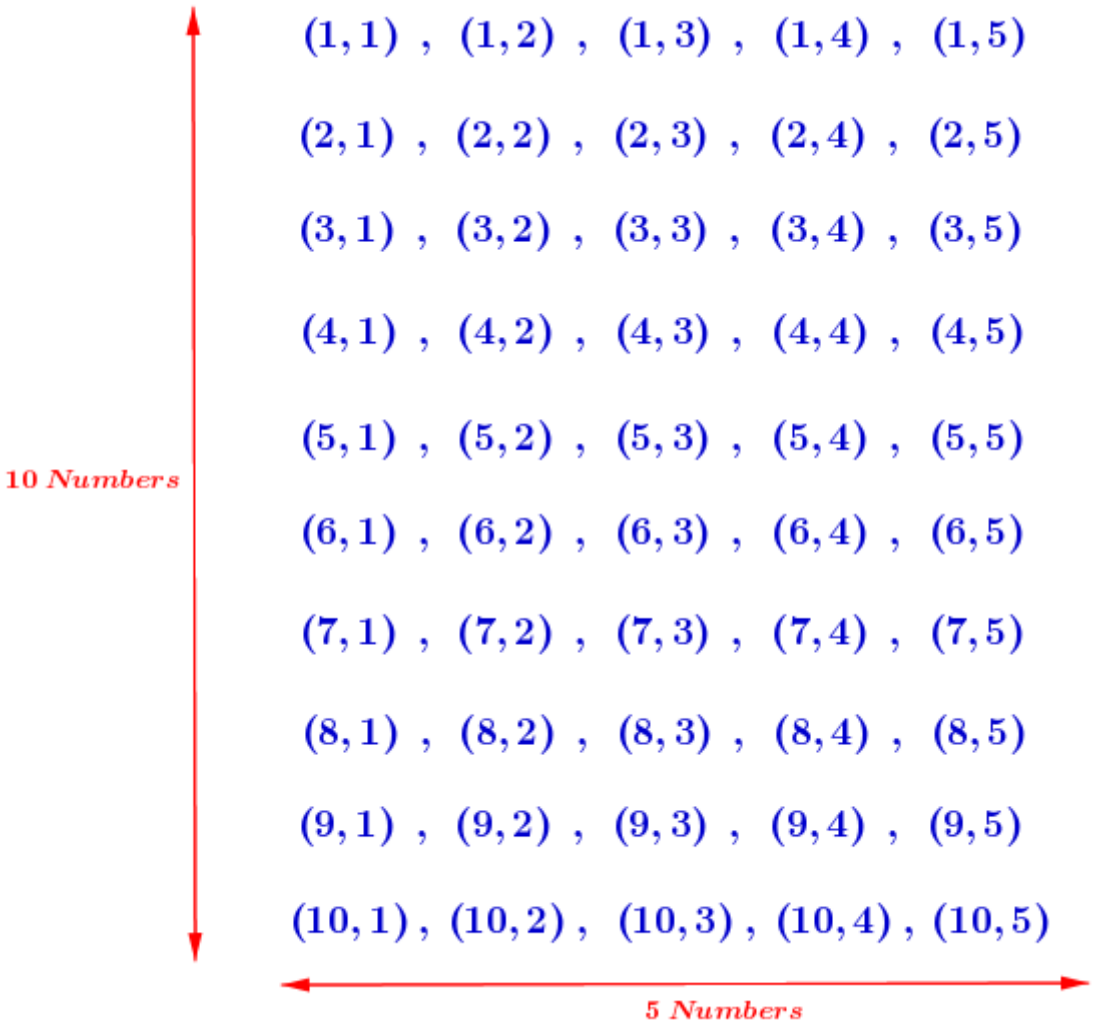
Number of odd numbers in the first box = 5

Number of odd numbers in the second box = 3

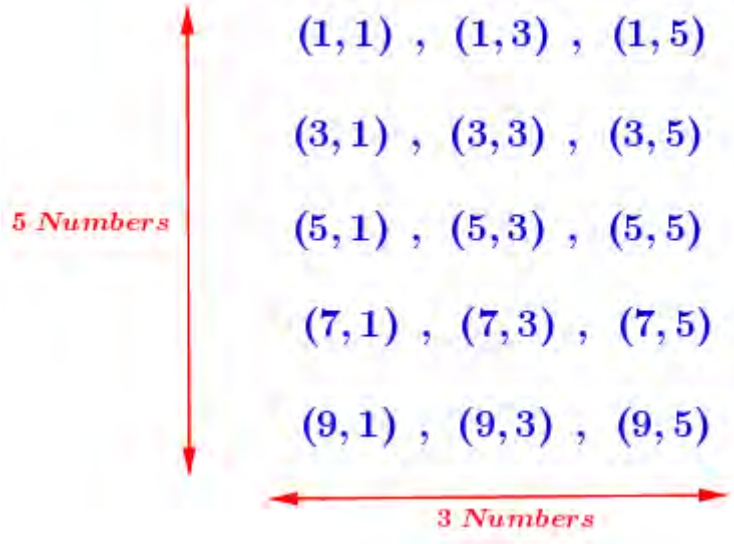
Number of favourable results = 5 x 3 = 15

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 :



Total number of results = 10 x 5 = 50



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

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) , (1 , 2)	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* ?

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