पुऽना International School

Shree Swaminarayan Gurukul, Zundal

Grade – 10

MATHS

Specimen copy

Year 21-22

INDEX

CHAPTER 7

COORDINATES GEOMETRY

KEY POINTS TO REMEMBER –

- **DISTANCE FORMULA**
- **SECTION FORMULA**

1. **Distance Formula: The length of a line segment joining A and B is the distance between two points A (x_1, y_1) and B (x_2, y_2)**

THE DISTANCE FORMULA

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

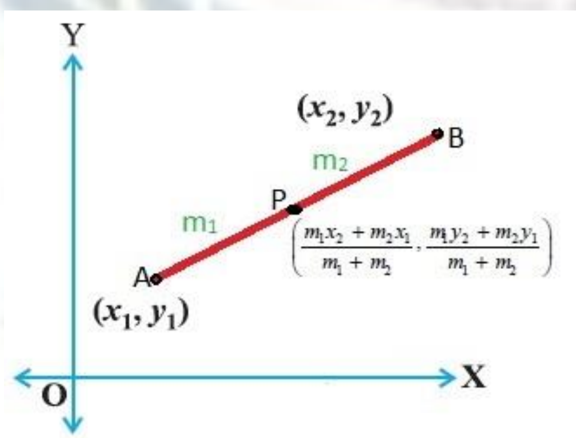
2. **The distance of a point P (x, y) from the origin (0, 0) is**

O (0, 0) —————————————— **P (x, y)**

$$\textbf{OP} = \sqrt{(x-0)^2 + (y-0)^2}$$

$$\textbf{OP} = \sqrt{x^2 + y^2}$$

3. **SECTION FORMULA: The coordinate of the point P (x, y) which divides the line segment joining the points A (x_1, y_1) and B (x_2, y_2) internally in the ratio m_1: m_2 are**



Section Formula

So, the coordinates of the point **P**(x, y) which divides the line segment joining the points **A**(x_1, y_1) and **B**(x_2, y_2), internally, in the ratio **m1: m2** are

$$\left(\frac{m_1x_2+m_2x_1}{m_2+m_1},\frac{m_1y_2+m_2y_1}{m_2+m_1}\right)$$

This is known as the **section formula**.

4. MID-POINT FORMULA: The midpoint of the line segment joining the points A (x_1, y_1) and B (x_2, y_2) is

$$\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$$

Chapter - 7

Coordinate Geometry
Exercise 7.1

1. Find the distance between the following pairs of points:

(i) (2, 3), (4,1)

(ii) (–5, 7), (–1, 3)

(iii) (a, b), (–a, b)

Ans. (i) Applying Distance Formula to find distance between points (2, 3) and (4,1), we get d =

$$\sqrt{(4-2)^2+(1-3)^2}=\sqrt{(2)^2+(-2)^2}=\sqrt{4+4}=\sqrt{8}=2\sqrt{2}\text{ units}$$

(ii) Applying Distance Formula to find distance between points (–5, 7) and (–1, 3), we get d =

$$\sqrt{[-1-(-5)]^2+(3-7)^2}=\sqrt{(4)^2+(-4)^2}=\sqrt{16+16}=\sqrt{32}=4\sqrt{2}\text{ units}$$

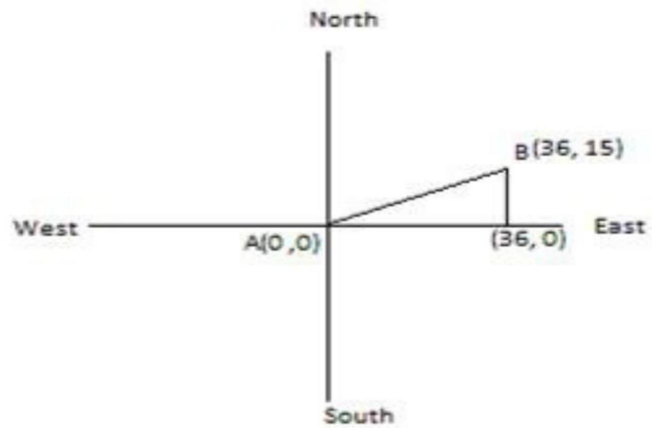
(iii) Applying Distance Formula to find distance between points (a, b) and (–a, –b), we get

d= $\sqrt{(-a-a)^2+(-b-b)^2}=\sqrt{(-2a)^2+(-2b)^2}=\sqrt{4a^2+4b^2}=\sqrt{4(a^2+b^2)}=2\sqrt{a^2+b^2}$

2. Find the distance between the points (0, 0) and (36, 15). Also, find the distance between towns A and B if town B is located at 36 km east and15 km north of town A.

Ans. Applying Distance Formula to find distance between points (0, 0) and (36, 15), we get d = $\sqrt{(36-0)^2+(15-0)^2} = \sqrt{(36)^2+(15)^2} = \sqrt{1296+225} = \sqrt{1521} = 39$ units

Town B is located at 36 km east and15 km north of town A. So, the location of town A and B can be shown as:



Clearly, the coordinates of point A are (0, 0) and coordinates of point B are (36, 15).

To find the distance between them, we use Distance formula:

d = $\sqrt{[36-0]^2+(15-0)^2} = \sqrt{(36)^2+(15)^2} = \sqrt{1296+225} = \sqrt{1521} = 39$ Km

3. Determine if the points (1, 5), (2, 3) and (–2, –11) are collinear.

Ans. Let A = (1, 5), B = (2, 3) and C = (–2, –11)

Using Distance Formula to find distance AB, BC and CA.

AB = $\sqrt{[2-1]^2+(3-5)^2} = \sqrt{(1)^2+(-2)^2} = \sqrt{1+4} = \sqrt{5}$

BC = $\sqrt{[-2-2]^2+(-11-3)^2} = \sqrt{(-4)^2+(-14)^2} = \sqrt{16+196} = \sqrt{212} = 2\sqrt{53}$

CA = $\sqrt{[-2-1]^2+(-11-5)^2} = \sqrt{(-3)^2+(-16)^2} = \sqrt{9+256} = \sqrt{265}$

Since AB + AC $\neq$ BC, BC + AC $\neq$ AB and AC $\neq$ BC.

Therefore, the points A, B and C are not collinear.

4. Check whether (5, –2), (6, 4) and (7, –2) are the vertices of an isosceles triangle.

Ans. Let A = (5, –2), B = (6, 4) and C = (7, –2)

Using Distance Formula to find distances AB, BC and CA.

AB = $\sqrt{[6-5]^2+[4-(-2)]^2} = \sqrt{(1)^2+(6)^2} = \sqrt{1+36} = \sqrt{37}$

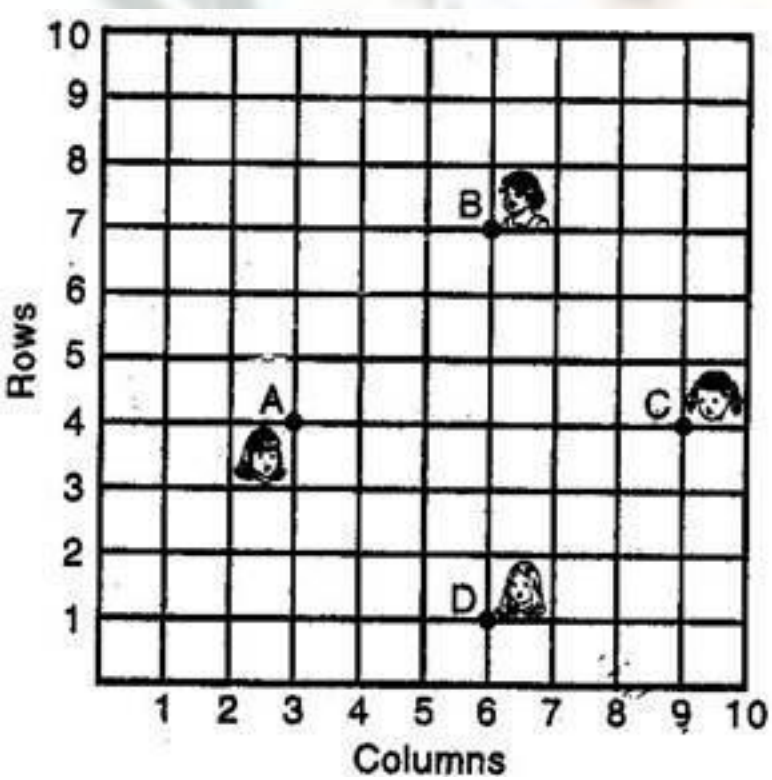
BC = $\sqrt{[7-6]^2+(-2-4)^2} = \sqrt{(1)^2+(-6)^2} = \sqrt{1+36} = \sqrt{37}$

CA = $\sqrt{[7-5]^2+[-2-(-2)]^2} = \sqrt{(2)^2+(0)^2} = \sqrt{4+0} = \sqrt{4} = 2$

Since AB = BC.

Therefore, A, B and C are vertices of an isosceles triangle.

5. In a classroom, 4 friends are seated at the points A (3, 4), B (6, 7), C (9, 4) and D (6, 1). Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli. "Don't you think ABCD is a square?"Chameli disagrees. Using distance formula, find which of them is correct.



Ans. We have A = (3, 4), B = (6, 7), C = (9, 4) and D = (6, 1)

Using Distance Formula to find distances AB, BC, CD and DA, we get AB =

$$\sqrt{[6-3]^2+[7-4]^2}=\sqrt{(3)^2+(3)^2}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$$

BC = $\sqrt{[9-6]^2+[4-7]^2}=\sqrt{(3)^2+(-3)^2}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$

CD = $\sqrt{[6-9]^2+[1-4]^2}=\sqrt{(-3)^2+(-3)^2}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$

DA = $\sqrt{[6-3]^2+[1-4]^2}=\sqrt{(3)^2+(-3)^2}=\sqrt{9+9}=\sqrt{18}=3\sqrt{2}$

Therefore, All the sides of ABCD are equal here. … (1)

Now, we will check the length of its diagonals.

AC = $\sqrt{[9-3]^2+[4-4]^2}=\sqrt{(6)^2+(0)^2}=\sqrt{36+0}=6$

BD = $\sqrt{[6-6]^2+[1-7]^2}=\sqrt{(0)^2+(-6)^2}=\sqrt{0+36}=\sqrt{36}=6$

So, Diagonals of ABCD are also equal. … (2)

From (1) and (2), we can definitely say that ABCD is a square.

Therefore, Champa is correct.

6. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer.

(i) (–1, –2), (1, 0), (–1, 2), (–3, 0)

(ii) (–3, 5), (3, 1), (0, 3), (–1, –4)

(iii) (4, 5), (7, 6), (4, 3), (1, 2)

Ans. (i) Let A = (–1, –2), B = (1, 0), C= (–1, 2) and D = (–3, 0)

Using Distance Formula to find distances AB, BC, CD and DA, we get

AB = $\sqrt{[1-(-1)]^2+[0-(-2)]^2} = \sqrt{(2)^2+(2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

BC = $\sqrt{[-1-1]^2+[2-0]^2} = \sqrt{(-2)^2+(2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

CD = $\sqrt{[-3-(-1)]^2+[0-2]^2} = \sqrt{(-2)^2+(-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

DA = $\sqrt{[-3-(-1)]^2+[0-(-2)]^2} = \sqrt{(-2)^2+(2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

Therefore, all four sides of quadrilateral are equal. … (1)

Now, we will check the length of diagonals.

AC = $\sqrt{[-1-(-1)]^2+[2-(-2)]^2} = \sqrt{(0)^2+(4)^2} = \sqrt{0+16} = \sqrt{16} = 4$

BD = $\sqrt{[-3-1]^2+[0-0]^2} = \sqrt{(-4)^2+(0)^2} = \sqrt{16+0} = \sqrt{16} = 4$

Therefore, diagonals of quadrilateral ABCD are also equal. … (2)

From (1) and (2), we can say that ABCD is a square.

(ii) Let A = (–3, 5), B= (3, 1), C= (0, 3) and D= (–1, –4)

Using Distance Formula to find distances AB, BC, CD and DA, we get

AB = $\sqrt{[3-(-3)]^2+[1-5]^2} = \sqrt{(6)^2+(-4)^2} = \sqrt{36+16} = \sqrt{52} = 2\sqrt{13}$

BC = $\sqrt{[0-3]^2+[3-1]^2} = \sqrt{(-3)^2+(2)^2} = \sqrt{9+4} = \sqrt{13}$

CD = $\sqrt{[-1-0]^2+[-4-3]^2} = \sqrt{(-1)^2+(-7)^2} = \sqrt{1+49} = \sqrt{50} = 5\sqrt{2}$

DA = $\sqrt{[-1-(-3)]^2+[-4-5]^2} = \sqrt{(2)^2+(-9)^2} = \sqrt{4+81} = \sqrt{85}$

We cannot find any relation between the lengths of different sides.

Therefore, we cannot give any name to the quadrilateral ABCD

(iii) Let A = (4, 5), B= (7, 6), C= (4, 3) and D= (1, 2)

Using Distance Formula to find distances AB, BC, CD and DA, we get AB =

$\sqrt{[7-4]^2+[6-5]^2} = \sqrt{(3)^2+(1)^2} = \sqrt{9+1} = \sqrt{10}$

BC = $\sqrt{[4-7]^2+[3-6]^2} = \sqrt{(-3)^2+(-3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

CD = $\sqrt{[1-4]^2+[2-3]^2} = \sqrt{(-3)^2+(-1)^2} = \sqrt{9+1} = \sqrt{10}$

DA = $\sqrt{[1-4]^2+[2-5]^2} = \sqrt{(-3)^2+(-3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

Here opposite sides of quadrilateral ABCD are equal. … (1)

We can now find out the lengths of diagonals.

AC = $\sqrt{[4-4]^2+[3-5]^2} = \sqrt{(0)^2+(-2)^2} = \sqrt{0+4} = \sqrt{4} = 2$

BD = $\sqrt{[1-7]^2+[2-6]^2} = \sqrt{(-6)^2+(-4)^2} = \sqrt{36+16} = \sqrt{52} = 2\sqrt{13}$

Here diagonals of ABCD are not equal. … (2)

From (1) and (2), we can say that ABCD is not a rectangle therefore it is a parallelogram.

---

7. Find the point on the x–axis which is equidistant from (2, –5) and (–2, 9).

Ans. Let the point be (x, 0) on x–axis which is equidistant from (2, –5) and (–2, 9). Using

Distance Formula and according to given conditions we have:

$$\sqrt{[x-2]^2+[0-(-5)]^2}=\sqrt{[x-(-2)]^2+[(0-9)]^2}$$

$\Rightarrow$ $\sqrt{x^2+4-4x+25}=\sqrt{x^2+4+4x+81}$

Squaring both sides, we get

$\Rightarrow$ $x^2+4-4x+25 = x^2+4+4x+81$

$\Rightarrow -4x + 29 = 4x + 85$

$\Rightarrow 8x = -56$

$\Rightarrow x = -7$

Therefore, point on the x–axis which is equidistant from (2, –5) and (–2, 9) is (–7, 0)

8. Find the values of y for which the distance between the points P (2, –3) and Q (10, y) is 10units.

Ans. Using Distance formula, we have

$$10=\sqrt{(2-10)^2+(-3-y)^2}$$

$\Rightarrow$ $10=\sqrt{(-8)^2+9+y^2+6y}$

$\Rightarrow$ $10=\sqrt{64+9+y^2+6y}$

Squaring both sides, we get

100 =

$\Rightarrow$ $y^2+6y-27=0$

Solving this Quadratic equation by factorization, we can write

$\Rightarrow$ $y^2+9y-3y-27=0$

$\Rightarrow y(y + 9) - 3(y + 9) = 0$

$\Rightarrow (y + 9)(y - 3) = 0$

$\Rightarrow y = 3, -9$

---

9. If, Q (0, 1) is equidistant from P (5, –3) and R (x, 6), find the values of x. Also, find the distances QR and PR.

Ans. It is given that Q is equidistant from P and R. Using Distance Formula, we get PQ=RQ

$$\Rightarrow \sqrt{(0-5)^2+[1-(-3)]^2}=\sqrt{(0-x)^2+(1-6)^2}$$

$\Rightarrow \sqrt{(-5)^2+(4)^2}=\sqrt{(-x)^2+(-5)^2}$

$\Rightarrow \sqrt{25+16}=\sqrt{x^2+25}$

Squaring both sides, we get

$\Rightarrow 25+16= x^2+25$

$\Rightarrow x^2=16$

$\Rightarrow x = 4, -4$

Thus, Q is (4, 6) or (–4, 6).

Using Distance Formula to find QR, we get

Using value of x = 4 QR = $\sqrt{(4-0)^2+(6-1)^2}=\sqrt{16+25}=\sqrt{41}$

Using value of x = –4 QR = $\sqrt{(-4-0)^2+(6-1)^2}=\sqrt{16+25}=\sqrt{41}$

Therefore, QR = $\sqrt{41}$

Using Distance Formula to find PR, we get

Using value of x = 4 PR = $\sqrt{(4-5)^2+[6-(-3)]^2}=\sqrt{1+81}=\sqrt{82}$

Using value of x =–4 PR = $\sqrt{(-4-5)^2+[6-(-3)]^2}=\sqrt{81+81}=\sqrt{162}=9\sqrt{2}$

Therefore, x = 4, –4

QR= $\sqrt{41}$,PR= $\sqrt{82}, 9\sqrt{2}$

10. Find a relation between x and y such that the point (x, y) is equidistant from the point (3, 6) and (–3, 4).

Ans. It is given that (x, y) is equidistant from (3, 6) and (–3, 4).

Using Distance formula, we can write

$$\sqrt{(x-3)^2+(y-6)^2}=\sqrt{[x-(-3)]^2+(y-4)^2}$$

$$\Rightarrow \sqrt{x^2+9-6x+y^2+36-12y}=\sqrt{x^2+9+6x+y^2+16-8y}$$

Squaring both sides, we get

$$\Rightarrow x^2+9-6x+y^2+36-12y = x^2+9+6x+y^2+16-8y$$

$\Rightarrow -6x - 12y + 45 = 6x - 8y + 25$

$\Rightarrow 12x + 4y = 20$

$3x + y = 5$

Exercise 7.2

1. **Find the coordinates of the point which divides the join of (–1, 7) and (4, –3) in the ratio 2:3.**

Ans. Let $x_1 = -1,\ x_2 = 4,\ y_1 = 7$ and $y_2 = -3,\ m_1 = 2\ and\ m_2 = 3$

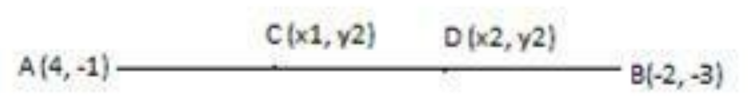
Using Section Formula to find coordinates of point which divides join of (–1, 7) and (4, –3) in the ratio 2:3, we get

$$x = \frac{m_1 x_2 + m_2 x_1}{m_1 + m_2} = \frac{2 \times 4 + 3 \times (-1)}{2+3} = \frac{8-3}{5} = \frac{5}{5} = 1$$

$$y = \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} = \frac{2 \times (-3) + 3 \times 7}{2+3} = \frac{-6+21}{5} = \frac{15}{5} = 3$$

Therefore, the coordinates of point are (1, 3) which divides join of (–1, 7) and (4, –3) in the ratio 2:3.

2. **Find the coordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3).**

Ans. 

We want to find coordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3).

We are given AC = CD = DB

We want to find coordinates of point C and D.

Let coordinates of point C be (x_1, y_1) and let coordinates of point D be (x_2, y_2).

Clearly, point C divides line segment AB in 1:2 and point D divides line segment AB in 2:1.

Using Section Formula to find coordinates of point C which divides join of (4, –1) and (–2, –3) in the ratio 1:2, we get

$$x_1 = \frac{1 \times (-2) + 2 \times 4}{1+2} = \frac{-2+8}{3} = \frac{6}{3} = 2$$

$$y_1 = \frac{1 \times (-3) + 2 \times (-1)}{1+2} = \frac{-3-2}{3} = \frac{-5}{3}$$

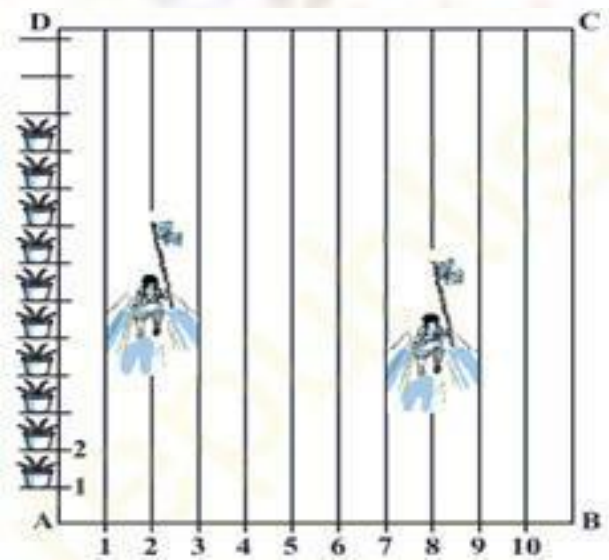
Using Section Formula to find coordinates of point D which divides join of (4, –1) and (–2, –3) in the ratio 2:1, we get

$$x_2 = \frac{2 \times (-2) + 1 \times 4}{1+2} = \frac{-4+4}{3} = \frac{0}{3} = 0$$

$$y_2 = \frac{2 \times (-3) + 1 \times (-1)}{1+2} = \frac{-6-1}{3} = \frac{-7}{3}$$

Therefore, coordinates of point C are (2, -5/3) and coordinates of point D are (0, -7/3)

3. **To conduct sports day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD. Niharika runs 14th of the distance AD on the 2nd line and posts a green flag. Preet runs 15th of the distance AD on the eighth line and posts a red flag. What is the distance between both the flags? If Rashmi has to post a blue flag exactly halfway between the line segments joining the two flags, where should she post her flag?**



Ans. Niharika runs 14^{th} of the distance AD on the 2^{nd} line and posts a green flag.

There are 100 flower pots. It means, she stops at 25th flower pot.

Therefore, the coordinates of point where she stops are (2 m, 25 m).

Preet runs 15th of the distance AD on the eighth line and posts a red flag. There are 100 flower pots. It means, she stops at 20th flower pot.

Therefore, the coordinates of point where she stops are (8, 20).

Using Distance Formula to find distance between points (2 m, 25 m) and (8 m, 20 m), we get

$$d = \sqrt{(2-8)^2 + (25-20)^2} = \sqrt{(-6)^2 + 5^2} = \sqrt{36+25} = \sqrt{61}m$$

Rashmi posts a blue flag exactly halfway the line segment joining the two flags. Using

section formula to find the coordinates of this point, we get

$$x=\frac{2+8}{2}=\frac{10}{2}=5$$

$$y=\frac{25+20}{2}=\frac{45}{2}$$

Therefore, coordinates of point, where Rashmi posts her flag are $\left(5, \frac{45}{2}\right)$ (5, $\frac{45}{2}$).

It means she posts her flag in 5th line after covering $\frac{45}{2}$ = 22.5 m of distance.

4. Find the ratio in which the line segment joining the points (–3, 10) and (6, –8) is divided by (–1, 6).

Ans. Let (–1, 6) divides line segment joining the points (–3, 10) and (6, –8) in k:1.

Using Section formula, we get

$$-1=\frac{(-3)\times1+6\times k}{k+1}$$

−k – 1 = (−3 + 6k)

−7k = −2

k = $\frac{2}{7}$

Therefore, the ratio is $\frac{2}{7}$:1 which is equivalent to 2:7.

Therefore, (–1, 6) divides line segment joining the points (–3, 10) and (6, –8) in 2:7.

5. Find the ratio in which the line segment joining A (1, –5) and B (–4, 5) is divided by the x–axis. Also find the coordinates of the point of division.

Ans. Let the coordinates of point of division be (x, 0) and suppose it divides line segment joining A (1, –5) and B (–4, 5) in k:1.

According to Section formula, we get

$$x = \frac{1\times 1+(-4)\times k}{k+1} = \frac{1-4k}{k+1} \; and \; 0 = \frac{(-5)\times 1+5k}{k+1} \quad \dots (1)$$

$$0 = \frac{(-5)\times 1+5k}{k+1}$$

5 = 5k

k = 1

Putting value of k in (1), we get

$$x = \frac{1\times 1+(-4)\times 1}{1+1} = \frac{1-4}{2} = \frac{-3}{2}$$

Therefore, point ($\frac{-3}{2}$, 0) on x–axis divides line segment joining A (1, –5) and B (–4, 5) in 1:1.

---

6. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

Ans. Let A = (1, 2), B = (4, y), C = (x, 6) and D = (3, 5)

We know that diagonals of parallelogram bisect each other. It means that coordinates of midpoint of diagonal AC would be same as coordinates of midpoint of diagonal BD. … (1)

Using Section formula, the coordinates of midpoint of AC are:

$$\frac{1+x}{2}, \frac{2+6}{2} = \frac{1+x}{2}, 4$$

Using Section formula, the coordinates of midpoint of BD are:

$$\frac{4+3}{2}, \frac{5+y}{2} = \frac{7}{2}, \frac{5+y}{2}$$

According to condition (1), we have

$$\frac{1+x}{2}=\frac{7}{2}$$

(1 + x) = 7

x = 6

Again, according to condition (1), we also have

$$4=\frac{5+y}{2}$$

8 = 5 + y

y = 3

Therefore, x = 6 and y = 3

7.Find the coordinates of a point A, where AB is the diameter of a circle whose centre is (2, –3) and B is (1, 4).

Ans. We want to find coordinates of point A. AB is the diameter and coordinates of center are (2, –3) and, coordinates of point B are (1, 4).

Let coordinates of point A are (x, y). Using section formula, we get

$$2=\frac{x+1}{2}$$

4 = x + 1

x = 3

Using section formula, we get

$$-3=\frac{4+y}{2}$$

$-6 = 4 + y$

$y = -10$

Therefore, Coordinates of point A are (3, –10).

8. If A and B are (–2, –2) and (2, –4) respectively, find the coordinates of P such that AP = 3/7 AB and P lies on the line segment AB.

Ans. A = (–2, –2) and B = (2, –4)

It is given that AP= $\frac{3}{7}$ AB

PB=AB–AP=AB− $\frac{3}{7}$ AB= $\frac{4}{7}$ AB

So, we have AP: PB = 3: 4

Let coordinates of P be (x, y)

Using Section formula to find coordinates of P, we get

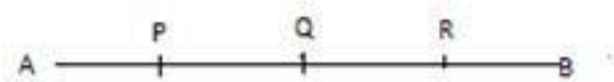
$$x = \frac{(-2)\times 4 + 2\times 3}{3+4} = \frac{6-8}{7} = \frac{-2}{7}$$

$$y = \frac{(-2)\times 4 + (-4)\times 3}{3+4} = \frac{-8-12}{7} = \frac{-20}{7}$$

Therefore, Coordinates of point P are $\left(\frac{-2}{7}, \frac{-20}{7}\right)$.

9. Find the coordinates of the points which divides the line segment joining A (–2, 2) and B (2, 8) into four equal parts.

Ans. A = (–2, 2) and B = (2, 8)



Let P, Q and R are the points which divide line segment AB into 4 equal parts.

Let coordinates of point $P = (x_1, y_1)$, $Q = (x_2, y_2)$ and $R = (x_3, y_3)$

We know AP = PQ = QR = RS.

It means, point P divides line segment AB in 1:3.

Using Section formula to find coordinates of point P, we get

$$x_1 = \frac{(-2)\times 3 + 2\times 1}{1+3} = \frac{-6+2}{4} = \frac{-4}{4} = -1$$
$$y_1 = \frac{2\times 3 + 8\times 1}{1+3} = \frac{6+8}{4} = \frac{14}{4} = \frac{7}{2}$$

Since, AP = PQ = QR = RS.It means, point Q is the mid-point of AB.

Using Section formula to find coordinates of point Q, we get

$$x_2 = \frac{(-2)\times 1 + 2\times 1}{1+1} = \frac{-2+2}{2} = \frac{0}{2} = 0$$
$$y_2 = \frac{2\times 1 + 8\times 1}{1+1} = \frac{2+8}{2} = \frac{10}{2} = 5$$

Because, AP = PQ = QR = RS.

It means, point R divides line segment AB in 3:1

Using Section formula to find coordinates of point P, we get

$$x_3 = \frac{(-2)\times 1 + 2\times 3}{1+3} = \frac{-2+6}{4} = \frac{4}{4} = 1$$
$$y_3 = \frac{2\times 1 + 8\times 3}{1+3} = \frac{2+24}{4} = \frac{26}{4} = \frac{13}{2}$$

Therefore, P = (–1, $\frac{7}{2}$), Q= (0, 5) and R = (1,$\frac{13}{2}$)

10. Find the area of a rhombus if its vertices are (3, 0), (4, 5), (–1, 4) and (–2, –1) taken in order.

{Hint: Area of a rhombus = $\frac{1}{2}$ (product of its diagonals)}

Ans. Let A = (3, 0), B = (4, 5), C = (–1, 4) and D = (–2, –1)

Using Distance Formula to find length of diagonal AC, we get

$$AC = \sqrt{[3-(-1)]^2+(0-4)^2} = \sqrt{4^2+(-4)^2} = \sqrt{16+16} = \sqrt{32} = 4\sqrt{2}$$

Using Distance Formula to find length of diagonal BD, we get

$$BD = \sqrt{[4-(-2)]^2+[5-(-1)]^2} = \sqrt{6^2+6^2} = \sqrt{36+36} = \sqrt{72} = 6\sqrt{2}$$

$\because$ Area of rhombus = ½ (product of its diagonals)

$= \frac{1}{2} \times AC \times BD = \frac{1}{2} \times 4\sqrt{2} \times 6\sqrt{2}$ = 24 sq. units

======================XXXXXXXXXXXXXX============================S

WORK - SHEET

CHAPTER – 7 STD -10th

COORDINATE GEOMETRY

SOLVE (EACH CARRY ONE MARK)

1. The number of coordinate axes in a plane is

   (a) 1 (b) 2 (c) 3 (d) 4

2. The coordinate of origin are

   (a) (0, 0) (b) (0, 1) (c) (1, 0) (d) (1, 1)

3. The angle between x- axis and y- axis is

   (a) 0° (b) 45° (c) 90° (d) 60°

4. The distance of the point (3, 4) from x- axis is

   (a) 3   (b) 1   (c) 7   (d) 4

5. Find the distance between the point (2, 3) and (4, 5)

   (a) 3   (b) $\sqrt{8}$ (c) 5   (d) 4

6. If A (x, 2), b (-3, -4) and C (7, -5) are collinear, than find the value of x

7. Find the point on x-axis which is equidistance from points (-1, 0) and (5, 0)

8. Determine if the points (1, 5), (2, 3) and (-2, -11) are collinear.

SOLVE (EACH CARRY TWO MARKS)

9. Check whether (5, –2), (6, 4) and (7, –2) are the vertices of an isosceles triangle.

10. Find the point on the x–axis which is equidistant from (2, –5) and (–2,9).

11. Find the values of y for which the distance between the points P (2, –3) and Q (10,y) Is 10 units

12. If, Q (0, 1) is equidistant from P (5, –3) and R (x, 6), find the values of x. Also, find the distances QR and PR.

13. Find a relation between x and y such that the point (x, y) is equidistant from the Point(3, 6) and (-3, 4).

SOLVE (EACH CARRY THREE MARKS)

14. Find the coordinates of the point which divides the join of (–1, 7) and (4, –3) in the ratio 2:3.

15. Find the coordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3)

16. Find the ratio in which the line segment joining the points (–3, 10) and (6, –8) is divided by (–1, 6).

Chapter – 15 Probability.

KEY POINTS TO REMEMBER –

(I) Probability

(II) Miscellaneous Questions

1. **The Theoretical probability of the occurrence of an event E written as P(E) is**

$$P(E) = \frac{\text{Number of outcomes favourable of } E}{\text{Number of all outcomes of the experiment}}$$

2. **Experiment:** An activity which ends in some well defined outcomes is called an experiment.
3. **Trial:** Performing an experiment once is called a trial.
4. **Event:** The possible outcomes of a trial are called an Event.
5. **Sure event**: An event whose occurrence is certain is called a sure event.
6. The sum of the probability of all the elementary events of an experiment is 1.
7. The probability of a sure event is 1 and probability of an impossible event is 0.
8. If E is an event, in general, it is true that

$$P(\text{not } E) = 1 - P(E)$$

$$P(\text{not } E) + P(E) = 1$$

∴ Probability of an event E + Probability of the event 'not E' = **1**.

Event E and Event not E are called complementary events.

9. From the definition of the probability, the numerator is always less than or equal to the denominator therefore $0 \le P(E) \le 1$

Chapter - 15
Probability

Exercise 15.1

1. Complete the statements:

2. **Probability of event E + Probability of event "not E" = _______________**

3. **The probability of an event that cannot happen is _______________. Such an event is called _______________.**

4. **The probability of an event that is certain to happen is _______________. Such an event is called _______________.**

5. **The sum of the probabilities of all the elementary events of an experiment is _______________.**

6. **The probability of an event is greater than or equal to _______________ and less than or equal to _______________.**

Ans. (i) 1

(iv) 0, impossible event

(v) 1, sure or certain event

(vi) 1

(vii) 0, 1

3. Which of the following experiments have equally likely outcomes? Explain.

(i) A driver attempts to start a car. The car starts or does not start.

(ii) A player attempts to shoot a basketball. She/he shoots or misses the shot.

(iii) A trial is made to answer a true-false question. The answer is right or wrong.

(iv) A baby is born. It is a boy or a girl.

Ans. (i) In the experiment, “A driver attempts to start a car. The car starts or does not start”, we are not justified to assume that each outcome is as likely to occur as the other. Thus, the experiment has no equally likely outcomes.

6. In the experiment, “A player attempts to shoot a basketball. She/he shoots or misses the shot”, the outcome depends upon many factors e.g. quality of player. Thus, the experiment has no equally likely outcomes.

7. In the experiment, “A trial is made to answer a true-false question. The answer is right or wrong.” We know, in advance, that the result can lead to one of the two possible ways – either right or wrong. We can reasonably assume that each outcome, right or wrong, is likely to occur as the other. Thus, the outcomes right or wrong are equally likely.

8. In the experiment, “A baby is born, It is a boy or a girl, we know, in advance that there are only two possible outcomes – either a boy or a girl. We are justified to assume that each outcome, boy or girl, is likely to occur as the other. Thus, the outcomes boy or girl are equally likely.

---

6. Why is tossing a coin considered to be a fair way of deciding which team should get the ball at the beginning of a football game?

Ans. The tossing of a coin is considered to be a fair way of deciding which team should get the ball at the beginning of a football game as we know that the tossing of the coin only land in one of two possible ways – either head up or tail up. It can reasonably be assumed that each outcome, head or tail, is as likely to occur as the other, i.e., the outcomes head and tail are equally likely. So the result of the tossing of a coin is completely unpredictable.

---

7. Which of the following cannot be the probability of an event:

(A) 2/ 3

(B) -1.5

(iv) 15%

(v) 0.7

Ans.

(A) Since the probability of an event E is a number P(E) such that

$0 \leq P(E) \leq 1$ $0 \leq 2/3 \leq 1$ therefore 2/3 can be probability of Event

(B) Since the probability of an event E is a number P(E) such that

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

$\therefore -1.5$ cannot be the probability of an event.

(c) Since the probability of an event E is a number P(E) such that

$0\% \leq P(E) \leq 100\%$

$\therefore$ $0\% \leq 15\% \leq 100\%$, therefore 15% can be probability of Event

(B) (D) Since the probability of an event E is a number P(E) such that

$0 \leq P(E) \leq 1$ $0 \leq 0.7 \leq 1$ therefore 0.7 can be probability of Event

---

(iii) If P(E) = 0.05, what is the probability of 'not E'?

Ans. Since P(E) + P (not E) = 1

$\therefore$ P (not E) = 1 – P(E) = 1 – 0.05 = 0.95

(iv) A bag contains lemon flavoured candles only. Malini takes out one candy without looking into the bag. What is the probability that she takes out:

(iv) an orange flavoured candy?

(v) a lemon flavoured candy?

Ans. (i) Consider the event related to the experiment of taking out of an orange flavoured candy from a bag containing only lemon flavoured candies. Since no outcome gives an orange flavoured candy, therefore, it is an impossible event. So its probability is 0.

8. Consider the event of taking a lemon flavoured candy out of a bag containing only lemon flavoured candies. This event is a certain event. So its probability is 1.

⇒ It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

Ans. Let E be the event of having the same birthday

⇒ P(E) = 0.992

⇒ But $P(E) + P\left(\overline{E}\right) = 1$

$\therefore P\left(\overline{E}\right) = 1 - P(E) = 1 - 0.992 = 0.008$

10. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is:

10 red?

11 not red?

Ans. There are 3 + 5 = 8 balls in a bag. Out of these 8 balls, one can be chosen in 8 ways

. ∴ Total number of elementary events = 8

⇒ Since the bag contains 3 red balls, therefore, one red ball can be drawn in 3 ways. ∴

Favourable number of elementary events = 3

Hence P (getting a red ball) = $\frac{3}{8}$

(ii) Since the bag contains 5 black balls along with 3 red balls, therefore one black (not red) ball can be drawn in 5 ways.

∴ Favourable number of elementary events = 5

Hence P (getting a black ball) = $\frac{5}{8}$

⇒ **of the box at random. What is the probability that the marble taken out will be:**
A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out

(i) red? **(ii) white?** **(iii) not green?**

Ans. Total number of marbles in the box = 5 + 8 + 4 = 17

∴ Total number of elementary events = 17

⇒ There are 5 red marbles in the box.

∴ Favourable number of elementary events = 5

∴ P (getting a red marble) = $\frac{5}{17}$

11. There are 8 white marbles in the box.

∴ Favourable number of elementary events = 8

∴ P (getting a white marble) = $\frac{8}{17}$

⇒ There are 5 + 8 = 13 marbles in the box, which are not green.

∴ Favourable number of elementary events = 13

∴ P (not getting a green marble) = $\frac{13}{17}$

---

10. A piggy bank contains hundred 50 p coins, fifty Re. 1 coins, twenty Rs. 2coins and ten Rs. 5 coins. If it is equally likely that of the coins will fall out when the bank is turned upside down, what is the probability that the coin:

(i) will be a 50 p coin?

(ii) will not be a Rs.5 coin?

Ans. Total number of coins in a piggy bank = 100 + 50 + 20 + 10 = 180

∴ Total number of elementary events = 180

⇒ There are one hundred 50 coins in the piggy bank.
∴ Favourable number of elementary events = 100

∴ P (falling out of a 50 p coin) = $\frac{100}{180} = \frac{5}{9}$

(ii) There are 100 + 50 + 20 = 170 coins other than Rs. 5 coin. ∴

Favourable number of elementary events = 170

∴ P (falling out of a coin other than Rs. 5 coin) = $\frac{170}{180} = \frac{17}{18}$

---

11. Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fishes and 8 female fishes (see figure). What is the probability that the fish taken out is a male fish?

Ans. Total number of fish in the tank = 5 + 8 = 13

$\therefore$ Total number of elementary events = 13

There are 5 male fishes in the tank.

$\therefore$ Favourable number of elementary events = 5

Hence, P (taking out a male fish) = $\dfrac{5}{13}$

---

12. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see figure) and these are equally likely outcomes. What is the probability that it will point at:

(i) 8?

(ii) an odd number?

(iii) a number greater than 2?

(iv) a number less than 9?

Ans. Out of 8 numbers, an arrow can point any of the numbers in 8 ways.

$\therefore$ Total number of possible outcomes = 8

(i) Favourable number of outcomes = 1

Hence, P (arrow points at 8) = $\frac{1}{8}$

(ii) Favourable number of outcomes = 4

Hence, P (arrow points at an odd number) = $\frac{4}{8}=\frac{1}{2}$

(iii) Favourable number of outcomes = 6

Hence, P (arrow points at a number > 2) = $\frac{6}{8}=\frac{3}{4}$

(iv) Favourable number of outcomes = 8

Hence, P (arrow points at a number < 9) = $\frac{8}{8}=1$

13. A dice is thrown once. Find the probability of getting:

(i) a prime number.

(ii) a number lying between 2 and 6.

(iii) an odd number.

Ans. Total number of Possible outcomes of throwing a dice = 6

(i) On a dice, the prime numbers are 2, 3 and 5.

Therefore, favourable outcomes = 3

Hence P (getting a prime number) = $\frac{3}{6}=\frac{1}{2}$

(ii) On a dice, the number lying between 2 and 6 are 3, 4, 5.

Therefore, favourable outcomes = 3

Hence P (getting a number lying between 2 and 6) = $\frac{3}{6} = \frac{1}{2}$

(iii) On a dice, the odd numbers are 1, 3 and 5.

Therefore, favourable outcomes = 3

Hence P (getting an odd number) = $\frac{3}{6} = \frac{1}{2}$

---

14. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting:

(i) a king of red colour

(ii) a face card

(iii) a red face card

(iv) the jack of hearts

(v) a spade

(vi) the queen of diamonds.

Ans. Total number of possible outcomes = 52

(i) There are two suits of red cards, i.e., diamond and heart. Each suit contains one king.

$\therefore$ Favourable outcomes = 2

Hence, P (a king of red colour) = $\frac{2}{52} = \frac{1}{26}$

(ii) There are 12 face cards in a pack

. $\therefore$ Favourable outcomes = 12

Hence, P (a face card) = $\frac{12}{52} = \frac{3}{13}$

(iii) There are two suits of red cards, i.e., diamond and heart. Each suit contains 3 face cards

. $\therefore$ Favourable outcomes = 2×3 = 6

Hence, P (a red face card) = $\frac{6}{52} = \frac{3}{26}$

(iv) There are only one jack of heart. $\therefore$

Favourable outcome = 1

Hence, P (the jack of hearts) = $\frac{1}{52}$

(v) There are 13 cards of spade.

$\therefore$ Favourable outcomes = 13

Hence, P (a spade) =

(vi) There is only one queen of diamonds. $\therefore$

Favourable outcome = 1

Hence, P (the queen of diamonds) = $\frac{1}{52}$

---

15. Five cards – then ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random.

(i) What is the probability that the card is the queen?

(ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace? (b) a queen?

Ans. Total number of possible outcomes = 5

(i) There is only one queen.

$\therefore$ Favourable outcome = 1

Hence, P (the queen) = $\frac{1}{5}$

(ii) In this situation, total number of favourable outcomes = 4

(a) Favourable outcome = 1

Hence, P (an ace) = $\frac{1}{4}$

(b) There is no card as queen.

$\therefore$ Favourable outcome = 0

Hence, P (the queen) = $\frac{0}{4} = 0$

16. 12 defective pens are accidently mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

Ans. Total number of possible outcomes = 132 + 12 = 144

Number of favourable outcomes = 132

Hence, P (getting a good pen) = $\frac{132}{144} = \frac{11}{12}$

---

17. (i) A lot of 20 bulbs contains 4 defective ones. One bulb is drawn at random from the lot. What is the probability that this bulb is defective?

(ii) Suppose the bulb drawn in (i) is not defective and is not replaced. Now one bulb is drawn at random from the rest. What is the probability that this bulb is not defective?

Ans. (i) Total number of possible outcomes = 20

Number of favourable outcomes = 4

Hence P (getting a defective bulb) = $\frac{4}{20} = \frac{1}{5}$

(ii) Now total number of possible outcomes = 20 – 1 = 19

Number of favouroable outcomes = 19 – 4 = 15

Hence P (getting a non-defective bulb) = $\frac{15}{19}$

18. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number (iii) a number divisible by 5.

Ans. Total number of possible outcomes = 90

Number of two-digit numbers from 1

to 90 are 90 – 9 = 81

$\therefore$ Favourable outcomes = 81

Hence, P (getting a disc bearing a two-digit number) = $\frac{81}{90} = \frac{9}{10}$

(ii) From 1 to 90, the perfect squares are 1, 4, 9, 16, 25, 36, 49, 64 and 81. $\therefore$

Favourable outcomes = 9

Hence P (getting a perfect square) = $\frac{9}{90} = \frac{1}{10}$

(iii) The numbers divisible by 5 from 1 to 90 are 18

$\therefore$ Favourable outcomes = 18

Hence P (getting a number divisible by 5) = $\frac{18}{90} = \frac{1}{5}$

19. A child has a die whose six faces show the letters as given below:

A B C D E A

The die is thrown once. What is the probability of getting:

(i) A?

(ii) D?

Ans. Total number of possible outcomes = 6

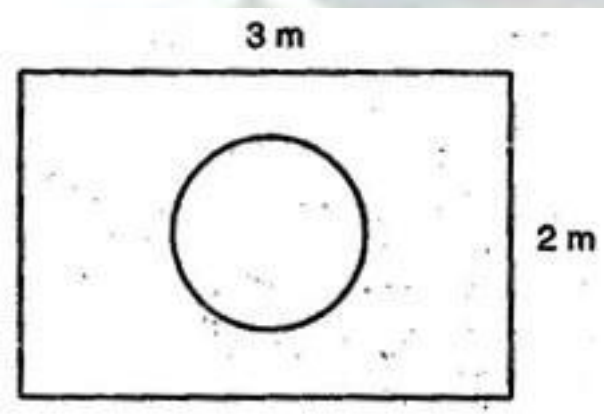
(i) Number of favourable outcomes = 2

Hence P (getting a letter A) = 2/6 = 1/3

(ii) Number of favourable outcomes = 1

Hence P (getting a letter D) = 1/6.

20. Suppose you drop a die at random on the rectangular region shown in the figure given on the next page. What is the probability that it will land inside the circle with diameter 1 m?



Ans. Total area of the given figure (rectangle) = $3 \times 2 = 6\ m^2$

And Area of circle = πr^2 = $\pi\left(\frac{1}{2}\right)^2$ = $\frac{\pi}{4}$ m^2

Hence, P (die to land inside the circle) = $\frac{\pi/4}{6} = \frac{\pi}{24}$

---

21. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that:

(i) she will buy it?

(ii) she will not buy it?

Ans. Total number of possible outcomes = 144

Number of non-defective pens = 144 – 20 = 124

$\therefore$ Number of favourable outcomes = 124

Hence P (she will buy) = P (a non-defective pen) = 124 / 144

(ii) Number of favourable outcomes = 20

Hence P (she will not buy) = P (a defective pen) = $\frac{20}{144} = \frac{5}{36}$

---

22. Refer to example 13.

(i) Complete the following table:

Event: Sum of 2 dice	2	3	4	5	6	7	8	9	10	11	12
Probability	$\frac{1}{36}$						$\frac{5}{36}$				$\frac{1}{36}$

(ii) A student argues that 'there are 11 possible outcomes 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. Therefore each of them has a probability $\frac{1}{11}$. Do you agree with this argument? Justify your answer.

Ans. Total possible outcomes of throwing two dice are:

(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)

$\therefore$ Total number of favourable outcomes = 36

(i) Favourable outcomes of getting the sum as 3 = 2

Hence P (getting the sum as 3) = $\frac{2}{36}=\frac{1}{18}$

Favourable outcomes of getting the sum as 4 = 3

Hence P (getting the sum as 4) = $\frac{3}{36}=\frac{1}{12}$

Favourable outcomes of getting the sum as 5 = 4

Hence P (getting the sum as 5) = $\frac{4}{36}=\frac{1}{9}$

Favourable outcomes of getting the sum as 6 = 5

Hence P (getting the sum as 6) = $\frac{5}{36}$

Favourable outcomes of getting the sum as 7 = 6

Hence P (getting the sum as 7) = $\frac{6}{36} = \frac{1}{6}$

Favourable outcomes of getting the sum as 9 = 4

Hence P (getting the sum as 9) = $\frac{4}{36} = \frac{1}{9}$

Favourable outcomes of getting the sum as 10 = 3

Hence P (getting the sum as 10) = $\frac{3}{36} = \frac{1}{12}$

Favourable outcomes of getting the sum as 11 = 2

Hence P (getting the sum as 11) = $\frac{2}{36} = \frac{1}{18}$

Event: Sum of 2 dice	2	3	4	5	6	7	8	9	10	11	12
Probability	$\frac{1}{36}$	$\frac{2}{36}$	$\frac{3}{36}$	$\frac{4}{36}$	$\frac{5}{36}$	$\frac{6}{36}$	$\frac{5}{36}$	$\frac{4}{36}$	$\frac{3}{36}$	$\frac{2}{36}$	$\frac{1}{36}$

(ii) I do not agree with the argument given here. Justification has already been given in part

23. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result, i.e., three heads or three tails and loses otherwise. Calculate the probability that Hanif will lose the game.

Ans. The outcomes associated with the experiment in which a coin is tossed thrice:

HHH, HHT, HTH, THH, TTH, HTT, THT, TTT

Therefore, Total number of possible outcomes = 8

Number of favourable outcomes = 6

Hence required probability = $\frac{6}{8}=\frac{3}{4}$

---

24. A die is thrown twice. What is the probability that:

(i) 5 will not come up either time?

(ii) 5 will come up at least once?

Ans. (i) The outcomes associated with the experiment in which a dice is thrown is twice:

(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)

Therefore, Total number of possible outcomes = 36

Now consider the following events:

A = first throe shows 5 and B = second throw shows 5

Therefore, the number of favourable outcomes = 6 in each case.

$\therefore$ P(A) = $\frac{6}{36}$ and P(B) = $\frac{6}{36}$

$\Rightarrow P(\overline{A}) = 1 - \frac{6}{36} = \frac{30}{36} = \frac{5}{6}$ and $P(\overline{B}) = \frac{5}{6}$

$\therefore$ Required probability = $\frac{5}{6} \times \frac{5}{6} = \frac{25}{36}$

(ii) Let S be the sample space associated with the random experiment of throwing a die twice.

Then, n(S) = 36

$\therefore$ $A \cap B$ = first and second throw shoe 5, i.e. getting 5 in each throw.

We have, A = (5, 1) (5, 2) (5, 3) (5, 4) (5, 5) (5, 6)

And B = (1, 5) (2, 5) (3, 5) (4, 5) (5, 5) (6, 5)

$\therefore$ $P(A) = \frac{6}{36}$, $P(B) = \frac{6}{36}$ and $P(A \cap B) = \frac{1}{36}$

$\therefore$ Required probability = Probability that at least one of the two throws shows 5

$= P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{6}{36} + \frac{6}{36} - \frac{1}{36} = \frac{11}{36}$

25. Which of the following arguments are correct and which are not correct? Give reasons for your answer:

(i) If two coins are tossed simultaneously there are three possible outcomes – two heads, two tails or one of each. Therefore, for each of these outcomes, the probability is 1 / 3

(ii) If a die is thrown, there are two possible outcomes – an odd number or an even number.

Therefore, the probability of getting an odd number is $\frac{1}{2}$.

Ans. (i) Incorrect: We can classify the outcomes like this but they are not then, 'equally likely'. Reason is that 'one of each' can result in two ways – from a head on first coin and tail on the second coin or from a tail on the first coin and head on the second coin. This makes it twice as likely as two heads (or two tails).

Correct: The two outcomes considered in the question are equally likely

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

WORK - SHEET

CHAPTER – 15 **Std -10th**

PROBABILITY

1. Complete the statements:

(I) Probability of event E + Probability of event "not E" = _______________

(II) The probability of an event that cannot happen is _______________. Such an event is called _______________.

(III) The probability of an event that is certain to happen is _______________. Such an event is called _______________.

(IV) The sum of the probabilities of all the elementary events of an experiment is _____________.

(V) The probability of an event is greater than or equal to _______________ and less than or equal to _______________.

2. Which of the following cannot be the probability of an event:

(A) = $\frac{2}{3}$ (B) = -1.5 (C) = 0.7 (D) = 15%

3. If P(E) = 0.05, what is the probability of 'not E'

* SOLVE (EACH CARRY TWO MARKS)

4. Find the probability of getting a head when a coin tossed once. Also find the probability of getting a tail.

5. It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

6. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is:

(I) red? (II) not red?

7.A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out the box at random. What is the probability that the marble taken out will be:

(I) red ? (ii) white ?

8. A coin is tossed once. What is the probability of getting a head ?

9. A die is thrown once. What is the probability that it show

(i) a 3 (ii) a 5 (iii) a number greater than 4?

.

* SOLVE (EACH CARRY THREE MARKS)

10. A bag contain a red ball, a blue ball and a yellow ball, all the balls being of the same size. Rritika takes out a ball from the bag without looking into it. What is the probability that she take out the

(i) yellow ball (ii) red ball (iii) blue ball

11. One card is drawn from a well – shuffled deck of 52 cards. Calculate the probability that the card will

(i) be an ace (ii) not be an ace (iii) black king

12. A box contain 3 blue, 2 white and 4 red marbles. If a marble is drawn at random from the box, What is the Probability that it will be

(i) whit? (ii) blue ? (iii) red ?

13. In a lottery there are 10 prizes and 25 blanks. What is the probability of getting a prize?

14. In a family of 3 children, find the probability of having at least one boy.

15. Two different dice are rolled simultaneously. Find the probability that

(i) the sum of the numbers appeared is less than 7 ?

(ii) the product of the number appeared is less than 18.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX