CLASS: 8TH

ASSIGNMENT: MATHEMATICS

Session: 2024-2025

Assessment 2
Understanding Quadrilaterals

EXERCISE NO: 3.1

Q1. Given here are some figures.

(Fig. on book)

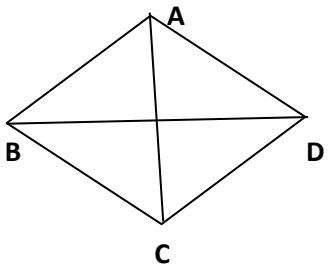
Classify each of them on the basis of the following.

(A) Simple curve **sol. 1, 2, 5, 6, 7.**
(B) Simple closed curve **sol. 1, 2, 5, 6, 7.**
(C) Polygon **sol. 1, 2, 4.**
(D) Convex polygon **sol. 2.**
(E) Concave polygon **sol. 1**

Q2. How many diagonals does each of the following have?

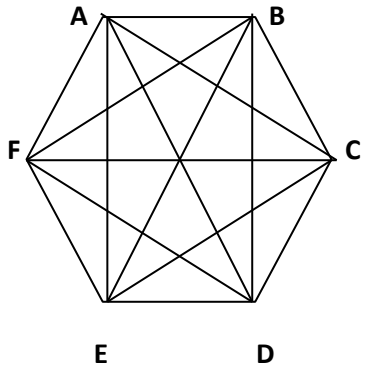
(a) A convex quadrilateral

Sol. There are 2 diagonals in a convex quadrilateral.



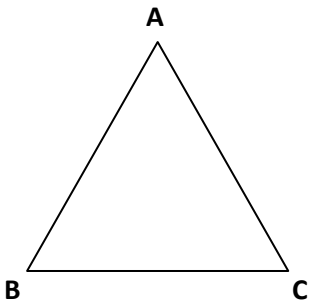
(b) A regular hexagon

Sol. There are 9 diagonals in a regular hexagon



(c) A triangle

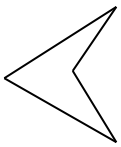
Sol.A triangle does not have any diagonals in it.



Q3. What is the sum of the measures of the angles of a convex quadrilateral? Will this property hold if the quadrilateral is not convex? (Make a non - convex quadrilateral and try!)

Sol. The sum of the measures of the angles of a convex quadrilateral is 360^0. If the quadrilateral is not convex this property does hold.

Non – convex quadrilateral.



Q4. Examine the table (each fig. is divided into triangles and the sum of the angles deduced from that:

TABLE ON BOOK

What can you say about the angle sum of a convex polygon with number of sides

(a) 7
(b) 8
(c) 10
(d) N

Sol. From the table, it can be observed that the angle sum of a convex polygon of n sides is

(n -2) x 180^0 hence the angle sum of the convex polygons having number of sides as above will be as follows .

(a) (7- 2) x 180^0 = 900^0

(b) (8-2)x180^0 =1080^0

(c) (10-2) x180^0 =1440^0

(d) (n-2) x180^0

Q5. What is a regular polygon? State the name of a regular polygon of

- **(i) 3 sides**
- **(ii) 4 sides**
- **(iii) 6 sides**

Ans: A polygon with equal sides and equal angles is called a regular polygon.

(i) Equilateral triangle.
(ii) Square.
(iii) Regular Hexagon.

Q6. Find the angle measure *x* in the following figures:

FIGURES ON BOOK

(A) Sum of the measures of all interior angles of a quadrilateral is 360^0.

Therefore, in the given quadrilateral

$50^0+130^0+120^0+x = 360^0$

$300^0+x=360^0$

$/=360^0-300^0$

$/=60^0$

(B) From the fig, it can be concluded that,

$90^0+a=180^0$ (linear pair)

$a= 180^0-90^0$

$a=90^0$

Sum of the measures of all interior angles of a quadrilateral is 360^0.

Therefore, in the given quadrilateral,

$60^0+70^0+x+90^0=360^0$

$220^0+x=360^0$

$/=360^0- 220^0$

$/=140^0$

(C) From the fig, it can be concluded that,

$70^0+a=180^0$ (linear pair)

$a=180^0-70^0$

$a=110^0$

$60^0+b=180^0$ (linear pair)

$b=180^0-60^0$

$b=120^0$

Sum of the measures of all interior angles of a pentagon is 540^0

Therefore, in all the given pentagon,

$120^0+110^0+30^0+x+x=540^0$

$260^0+2x=540^0$

$2x=540^0-260^0$

$2x=280^0$

$/=140^0$

(D) Sum of the measures of all interior angles of a pentagon is 540^0

$5x=540^0$

$/=108^0$

Q7. (a) find $x+y+z$

(b) Find $x+y+z+w$

Sol. (a) $x+90^0=180^0$ **(linear pair)**

$/=180^0-90^0$

$/=90^0$

$Z+30^0=180^0$ **(linear pair)**

$Z=180^0-30^0$

$Z=150^0$

$Y=90^0+30^0$ **(exterior angle theorem)**

$Y=120^0$

Therefore, $x+y+z=90^0+120^0+150^0=360^0$

(b) Sum of the measures of all interior angles of a quadrilateral is 360^0.

Therefore, in the given quadrilateral,

$a+60^0+80^0+120^0=360^0$

$a+260^0=360^0$

$a=360^0-260^0$

$a=100^0$

$x+120^0=180^0$ **(linear pair)**

$x=180^0-120^0$

$x=60^0$

$y+80^0=180^0$ **(linear pair)**

$y=180^0-80^0$

$y=100^0$

$z+60^0=180^0$ **(linear pair)**

$z=180^0-60^0$

$z=120^0$

$w+100^0=180^0$ **(linear pair)**

$w=180^0-100^0$

$w=80^0$

Sum of the measures of all interior angles=$x+y+z+w$

$=60^0+100^0+120^0+80^0=360^0$

EXERCISE 3.2

Q1. Find x in the following figures.

FIGURES ON BOOK

Sol. (a) we know that sum of all exterior angles of any polygon is 360^0

$125^0+125^0+x=360^0$

$250^0+x=360^0$

$x=360^0-250^0$

$x=110^0$

(b) we know that the sum of exterior angles of any polygon is 360^0

$60^0+90^0+70^0+x+90^0=360^0$

$310^0+x=360^0$

$/=50^0$

Q2. Find the measure of each exterior angle of a regular polygon of

(1) 9 sides
(2) 15 sides
(3) Sum of all exterior angle of the given polygon = 360^0

Each exterior angle of a regular polygon has the same measure.

Thus, measure of each exterior angle of a regular polygon of 9 sides

$\frac{360^0}{9}$

$= 40^0$

(ii) sum of all exterior angle s of the given polygon = 360^0

Each exterior angle of a regular polygon has the same measure.

Thus, measure of exterior angle of regular polygon of 15 sides

$\frac{360^0}{15}$ **= 24^0**

Question 3: How many sides does a regular polygon have if the measure of an exterior angle is 24^0?

Sum of all exterior angles of the given polygon = 360^0

Measure of each exterior angle = 24^0

Thus, number of sides of the regular polygon

= $\frac{360^0}{24}$ **= 15**

Question 4: how many sides does a regular polygon have if its interior angles is 165^0 ?

Measure of each interior angle = 165^0

Measure of each interior angle = 180^0 - 165^0 = 15^0

The sum of all exterior angles of any polygon is 360^0.

Thus, number of sides of the polygon $\frac{360^0}{15}$ **= 24^0**

Question 5: (a) is it possible to have a regular polygon with measure of each exterior angle as 22^0?

(b) Can it be an interior angle of a regular polygon? Why?

The sum of all exterior angles of all polygons is 360^0. In a regular polygon, each exterior angle is of the same measure.Hence, if 360^0 is a perfect multiple of the given exterior angle, then the given polygon will be possible.

(a) Exterior angle = 22^0

3600 is not a perfect multiple of 22^0 .Hence, such polygon is not possible

(b) Interior angle =22^0

Exterior angle = $180^0 – 22^0 = 158^0$

Such a polygon is not possible as 360^0 is not a perfect multiple of 158^0

Q6.(a) What is the minimum interior angle possible for a regular polygon ? Why

(c) What is the maximum exterior angle possible for a regular polygon?

sol. Consider a regular polygon having the lowest possible number of sides (I, e an equilateral triangle)

The exterior angle of this triangle will be the maximum exterior angle possible for any regular polygon.

Exterior angle of an equilateral triangle = $\frac{360^0}{3}$ **=120^0**

Hence, maximum possible measure of exterior angle for any polygon is 120^0.

Also, we know that an exterior angle and an interior angle are always in a linear pair.

Hence, minimum interior angle = $180^0 - 120^0 = 60^0$

EXERCISE:3.3

Q1. Given a parallelogram ABCD. Complete each statement along with the definition or property used.

FIG ON BOOK

(I) AD =.....
(II) $\angle DCB =$.....
(III) $OC =$
(IV) m$\angle$DAB + m$\angle CDA =$

SOL.(I) In a parallelogram, opposite sides are equal in length.

AD =BC

(II) In a parallelogram, opposite angles are equal in measure

$\angle$DCB =$\angle$DAB

(III) In a parallelogram, diagonals bisect each other.

Hence, OC =OA

(IV) In a parallelogram, adjacent angles are supplementary to each other.

Hencem$\angle$DAB +m $\angle$CDA =180^0

Q2. Consider the following parallelograms. Find the values of the unknown *x,y,z*.

FIG ON BOOK

SOL.(1) $x + 100 = 180^0$ (adjacent angles are supplementary)

$\angle = 180^0 - 100$

$\angle = 80^0$

$Z = x = 80^0$ (opposite angles are equal)

$Y = 100^0$ (opposite angles are equal)

(II) $50^0 + Y = 180^0$(adjacent angles are supplementary)
$Y = 130^0$
$\angle = Y = 130^0$(opposite angles are equal)
$Z = \angle = 130^0$(corresponding angles)

(iii)$x = 90^0$(vertically opposite angle)

$\angle + y + 30^0 = 180^0$(angle sum property of triangles)

$120^0 + y = 180^0$

$Y = 60^0$

$Z = y = 60^0$ (alternate interior angles)

Q3. Can a quadrilateral ABCD be a parallelogram if

(1) $\angle D + \angle B = 180^0$?
(2) AB = DC = 8cm, AD= 4cm and BC = 4.4 cm?
(3) $\angle A = 70^0$ and $\angle C = 650^0$?

SOL. (i)

For $\angle D + \angle B = 180^0$, quadrilateral ABCD may or may not be a parallelogram.

Along with this condition, the following conditions should also be fulfilled.

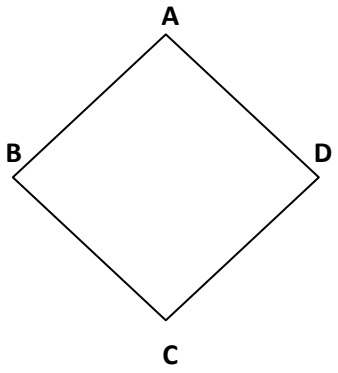
The sum of the measures of adjacent angles should be 180^0.

Opposite angles should also be of same measures.

(ii) No. Opposite sides AD and BC are of different lengths

(iii) No .opposite angles A and C have different measures.

Q4:-



KITE

Q5. The measures of two adjacent angles of a parallelogram are in the ratio 3:2. Find the measure of each of the angles of the parallelogram.

Sol. Let the measures of two adjacent angles Aand B, of parallelogram ABCD are in the ratio of 3:2.Let A =3x and B =2x

We know that the sum of the measures of adjacent angles is 180^0 for a parallelogram.

$A+B = 180^0$

$3\angle + 2\angle = 180^0$

$5\angle = 180^0$

$\angle = 180^0 \div 5$

$\angle = 36^0$

So, A =C =3$\angle = 108^0$ (opposite angles)

B =D =2$\angle = 72^0$ (opposite angles)

Thus,the measures of the angles of the parallelogram are 108^0, 72^0,108^0,and 72^0.

Q6. Two adjacent angles of a parallelogram have equal measure .Find the measure of each of the angles of the parallelogram.

Sol. Sum of adjacent angles $= 180^0$

$\angle A + \angle B = 180^0$

$\angle A + \angle A = 180^0 (\angle A = \angle A)$

$2\angle A = 180^0$

$\angle A = 180^0 \div 2$

$\angle A = 90^0$

$\angle B = \angle A = 90^0$

$\angle C = \angle A = 90^0$ (opposite angles)

$\angle D = \angle B = 90^0$ (opposite angles)

Thus,each angle of the parallelogram measures 90^0

Q7.The adjacent figure HOPE is a parallelogram .Find the angles measures *x ,y,andz*. State the properties you use to find them.

FIG ON BOOK

Sol. *Y*=40^0 (alternate interior angles)

$70^0 = z + 40^0$ (corresponding angles)

$70^0 - 40^0 = z$

$Z = 30^0$

$\angle + (z + 40^0) = 180^0$ (adjacent pair of angles)

$\angle + 30^0 + 40^0 = 180^0$

$\angle + 70^0 = 180^0$

$\angle = 180^0 - 70^0$

$\angle = 110^0$

Q8. The following figures GUNS and RUNS are parallelogram .Find *x and y* (lengths are in cm)

FIG IN BOOK

Sol. (i) we know that the lengths of opposite sides of a parallelogram is equal to each other.

GU =SN

3*Y* -1 =26

3*Y* =27

***Y* =27÷3**

***Y* =9**

SG =NU

3*/* =18

***/* =18÷3**

***/* =6**

Hence, the measures of x and y are 6cm and 9cm respectively.

(ii)We know that the diagonals of a parallelogram bisect each other.

***Y* +7 =20**

***Y* = 20 -7**

***Y* = 13**

***/ + y* =16**

***/* + 13 =16**

***/* =16 -13**

***/* =3**

Hence, the measures of *x* and *y* are 3cm and 13cm respectively.

Q9 Sol:- In ||gm RISK

<I=<k
<I=120°
Also <I+<S=180
120+<S=180
<S=180-120
<S=60°
in a ||gm CLUE
<L=<E
<L=70°
<E=70°
In Δ SOE
<S+<O+<E=180 {Angle Sum property}
60°+<x+70°=180°
130+x=180°
x=180-130

x=50°

Q10 Sol:- Quad KLMN is a trapezium

∴ <M+<C=180°{Angles on the same sides of transversal}

Also KL||NM

Q11 Sol:-in trap ABCD

AB||DC

then <B+<C=180 {Angles on the same sides of transversal}

120°+<C=180

<C=180-120

<C=60°

Q12:- In Quad PQRS

<R=90°

<Q=130°

SP||RQ

<P+<Q=180°

<P+130°=180°

<P=180-130°

<P=50°

similarly <S=90°

Exercise 3.4

Q1.State whethertrue or false.

a. All rectangles are squares.

Sol. False, all squares are rectangles but all rectangles are not squares.

b. All rhombuses are parallelograms

Sol. True, opposite sides of a rhombus is equal and parallel to each other.

c. All squares are rhombuses and also rectangles.

Sol. True, all squares are rhombuses as all sides of a square are of equal lengths. All squares are also rectangles as each internal angle measures 90^0

d. All squares are not parallelograms.

Sol. False, all squares are parallelograms as opposite sides are equal and parallel.

e. All kites are rhombuses.

Sol. False, a kite does not have all sides of the same lengths.

f. All rhombuses are kites.

Sol. True, a rhombus also has two distinct consecutive pairs of sides of equal length.

g. All parallelograms are trapeziums.

Sol. True, all parallelograms have a pair of parallel sides.

h. All squares are trapeziums.

Sol. True, all squares have a pair of parallel sides.

Q2. Identify all the quadrilaterals that have

a) Four sides of equal length.

Sol. Rhombus and square are the quadrilaterals that have four sides of equal length.

b) Four right angles.

Sol. Square and rectangle are the quadrilaterals that have four right angles.

Q3. Explain how a square is

a) A quadrilateral

Sol. A square is a quadrilateral since it has four sides.

b) A parallelogram

Sol. A square is a parallelogram since its opposite sides are parallel to each other

c) A rhombus

Sol. A square is a rhombus since its four sides are of the same length.

Q4. Name the quadrilaterals whose diagonals

a) Bisect each other.

Sol. The diagonals of a parallelogram, rhombus, square and rectangle bisect each other.

b) Are perpendicular bisectors of each other?

Sol. The diagonals of a rhombus and square act as perpendicular bisectors.

c) Are equal

Sol. The diagonals of a rectangle and square are equal.

Q5. Explain why a rectangle is a convex quadrilateral.

Sol. In a rectangle, there are two diagonals, both lying in the interior of the rectangle. Hence, it is a convex quadrilateral.

Q6. ABC is a right-angled triangle and o is the midpoint of this side opposite to the right angle. Explain why o is equidistant from A, B and C. (The dotted lines are drawn additionally to help you).

(FIG ON BOOK)

Sol.Draw lines AD and DC such that ADIIBC, ABIIDC

AD=BC, AB=DC

ABCD is a rectangle as opposite sides are equal and parallel to each other and all the interior angles are of 90^0

In a rectangle, diagonals are of equal length and also these bisect each other.

Hence, OA=OC=OB=OD

Thus, O is equidistant from A, B and C.

DATA HANDLING

EXERCISE. 5.2

1. A survey was made to find the type of music that a certain group of young people liked in a city. Adjoining pie chart shows the findings of this survey.
From this pie chart, answer the following:
(i) If 20 people liked classical music, how many young people were surveyed?
(ii) Which type of music is liked by the maximum number of people?
(iii) If a cassette company were to make 1000 CD's, how many of each type would they make?
Ans. (i) 10% represents 100 people.

Therefore 20% represents = $\frac{100 \times 20}{10}$

= 200 people

Hence, 200 people were surveyed.

(ii) Light music is liked by the maximum number of people.

(iii) CD's of classical music = $\frac{10 \times 1000}{100}$
= 100

CD's of semi-classical music = $\frac{20 \times 1000}{100}$ = 200

CD's of light music = $\frac{40 \times 1000}{100}$ = 400

CD's of folk music = $\frac{30 \times 1000}{100}$ = 300

2. A group of 360 people were asked to vote for their favourite season from the three seasons rainy, winter and summer.
(i) Which season got the most votes?
(ii) Find the central angle of each sector.
(iii) Draw a pie chart to show this information.

Season	Number of votes
Summer	90
Rainy	120
Winter	150

Ans. (i) Winter season got the most votes.

(ii) Central angle of summer season = $\frac{90^\circ \times 360^\circ}{360^\circ} = 90^\circ$

Central angle of rainy season

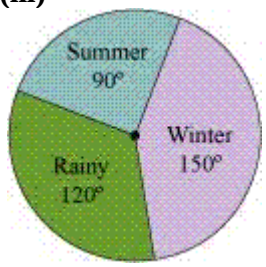
$= \frac{120^\circ \times 360^\circ}{360^\circ} = 120^\circ$

Central angle of winter season

$= \frac{150^\circ \times 360^\circ}{360^\circ} = 150^\circ$

Season	Number of votes	In fraction	Central angle
Summer	90	$\frac{90}{360}$	$\frac{90}{360} \times 360^\circ = 90^\circ$
Rainy	120	$\frac{120}{360}$	$\frac{120}{360} \times 360^\circ = 120^\circ$
Winter	150	$\frac{150}{360}$	$\frac{150}{360} \times 360^\circ = 150^\circ$

(iii)

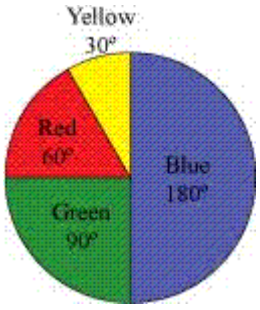


3. Draw a pie chart showing the following information. The table shows the colours preferred by a group of people.

Colours	Number of people
Blue	18
Green	9
Red	6
Yellow	3
Total	**36**

Ans. Here, central angle = 360° and total number of people = 36

Colours	Number of people	In fraction	Central angle
Blue	18	$\frac{18}{36}$	$\frac{18}{36}\times 360^{o}=180^{o}$
Green	9	$\frac{9}{36}$	$\frac{9}{36}\times 360^{o}=90^{o}$
Red	6	$\frac{6}{36}$	$\frac{6}{36}\times 360^{o}=60^{o}$
Yellow	3	$\frac{3}{36}$	$\frac{3}{36}\times 360^{o}=30^{o}$



Q4:- Figure on Book

1. **540 Marks gives the central angle=360^{o}**

   $\therefore$1 Mark gives the central angle=$\frac{360}{540}$

   105 Marks gives the central angle=$\frac{360}{540}$ x 105 =70^{o}

   Hence 70 in Hindi

2. **The difference between the mathematics and Hindi =90^{o}-70^{o}=20**

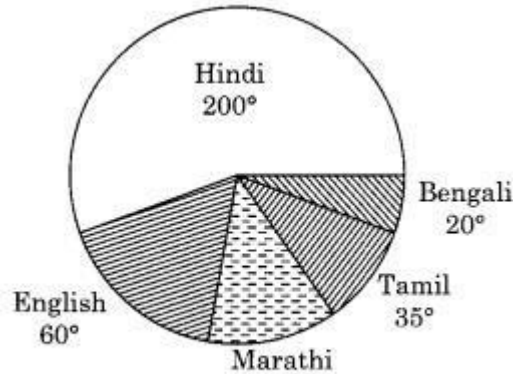
∴ 1º central angle gives Marks =$\frac{540}{360}$

∴ 20o central angle gives marks=$\frac{540}{360}$ x 28 =30

3. Social Science and Mathematics is more than science and Hindi.

Q5:-

Language	No. of Students	Fraction	Central angle
Hindi	40	$\frac{40}{72} = \frac{5}{9}$	$\frac{5}{9}x360 = 200$
English	12	$\frac{12}{72} = \frac{1}{6}$	$\frac{1}{6}x360 = 60$
Marathi	9	$\frac{9}{72} = \frac{1}{8}$	$\frac{1}{8}x360 = 45$
Tamil	7	$\frac{7}{72} = \frac{7}{72}$	$\frac{7}{72}x360 = 35$
Bengali	4	$\frac{4}{7}$ *or* $= \frac{1}{8}$	$\frac{1}{18}x360 = 20$
Total	70		

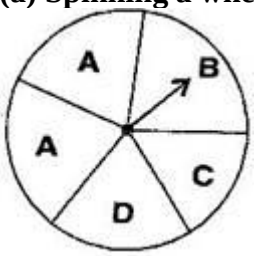


(Pie chart)

(Ex. 5.3)

1. List the outcomes you can see in these experiments.

(a) Spinning a wheel (b) Tossing two coins together

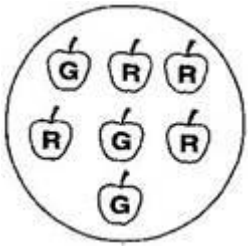


Ans. (a) There are four letters A, B, C and D in a spinning wheel. So there are 4 outcomes.
(b) When two coins are tossed together. There are four possible outcomes HH, HT, TH, TT.
(Here HT means head on first coin and tail on second coin and so on.)

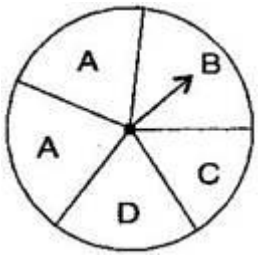
2. When a die is thrown, list the outcomes of an event of getting:
(i) (a) a prime number
(b) not a prime number
(ii) (a) a number greater than 5
(b) a number not greater than 5
Ans. (i) (a) Outcomes of event of getting a prime number are 2, 3 and 5.
(b) Outcomes of event of not getting a prime number are 1, 4 and 6.

(ii) (a) Outcomes of event of getting a number greater than 5 is 6.
(b) Outcomes of event of not getting a number greater than 5 are 1, 2, 3, 4 and 5.

3. Find the:



(a) Probability of the pointer stopping on D in (Question 1 (a)).
(b) Probability of getting an ace from a well shuffled deck of 52 playing cards.
(c) Probability of getting a red apple. (See figure alongside)
Ans. **(a)** In a spinning wheel, there are five pointers A, A, B, C, D. So there are five outcomes. Pointer stops at D which is one outcome.



So the probability of the pointer stopping on D = $\frac{1}{5}$

(b) There are 4 aces in a deck of 52 playing cards. So, there are four events of getting an ace.
So, probability of getting an ace = $\frac{4}{52} = \frac{1}{13}$

(c) Total number of apples = 7 Number of red apples = 4
Probability of getting red apple = $\frac{4}{7}$

4. Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of:
(i) getting a number 6.
(ii) getting a number less than 6.
(iii) getting a number greater than 6.
(iv) getting a 1-digit number.
Ans. **(i)** Outcome of getting a number 6 from ten separate slips is one.

Therefore, probability of getting a number 6 = $\frac{1}{10}$

(ii) Numbers less than 6 are 1, 2, 3, 4 and 5 which are five. So there are 5 outcomes.

Therefore, probability of getting a number less than 6 = $\frac{5}{10}=\frac{1}{2}$

(iii) Number greater than 6 out of ten that are 7, 8, 9, 10.So there are 4 possible outcomes.

Therefore, probability of getting a number greater than 6 = $\frac{4}{10}=\frac{2}{5}$

(iv) One digit numbers are 1, 2, 3, 4, 5, 6, 7, 8, 9 out of ten.

Therefore, probability of getting a 1-digit number = $\frac{9}{10}$

5. If you have a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector, what is the probability of getting a green sector? What is the probability of getting a none-blue sector?

Ans. There are five sectors. Three sectors are green out of five sectors.

Therefore, probability of getting a green sector = $\frac{3}{5}$

There is one blue sector out of five sectors.

Non-blue sectors = 5 – 1 = 4 sectors

Therefore, probability of getting a non-blue sector = $\frac{4}{5}$

6. Find the probability of the events given in Question 2.
Ans. When a die is thrown, there are total six outcomes, i.e., 1, 2, 3, 4, 5 and 6.
(i) (a) 2, 3, 5 are prime numbers. So there are 3 outcomes out of 6.

Therefore, probability of getting a prime number = $\frac{3}{6}=\frac{1}{2}$

(b) 1, 4, 6 are not the prime numbers. So there are 3 outcomes out of 6.

Therefore, probability of getting a prime number = $\frac{3}{6} = \frac{1}{2}$

(ii) (a) Only 6 is greater than 5. So there is one outcome out of 6.

Therefore, probability of getting a number greater than 5 = $\frac{1}{6}$

(b) Numbers not greater than 5 are 1, 2, 3, 4 and 5. So there are 5 outcomes out of 6.

Therefore, probability of not getting a number greater than 5 = $\frac{5}{6}$