ALTERNATE ACADEMIC PLAN FOR THE MONTH

CLASS:10 | **CO-ORDINATE GEOMETRY-7** | **NOVEMBER 2021**

Sl. No.	Month /week	Learning outcomes	Learning Activity	Evaluation
	November first week 3 periods	CO-ORDINATE GEOMETRY (CARTICIAN SYSTEM)	Student will learn about co-ordinate geometry and cartesian system by solving worksheet.	Activity sheet-01
		Marking points in a graph sheet using their co-ordinates.	Students asked to mark points in graph sheet using given co-ordinates.	Activity sheet-02
		Finding co-ordinates of the given point	Using activity sheet students are asked to find co-ordinates of the points. https://youtu.be/JSI6Hi19YUo	Activity sheet-03 Math text book -1 Page no 60 solve I main problems.
	November 2nd week 4 periods	Distance formula	Explaining with example, the method of solving problems using distance formula. https://youtu.be/JSI6Hi19YUo https://youtu.be/ghnkYZUeirUo	Activity sheet-04 & 05. Solve workbook problems in page no 60,61,62,63,64 & 65 II main.
		Section formula	Learn to solve problems using section formula. https://youtu.be/OyHaN7s6aaQo	Activity sheet-06 & 07. Workbook-1 page no 66,67,68, 69 & 70 III main.
	November 3rd week 4 periods	Area of a triangle	Learn to find the area of triangle using formula. https://youtu.be/-kwlHgeh8Qwo https://youtu.be/mHvWaxF70RQo .	Activity sheet-08 & 09. Solve Workbook-1 page no 71 & 72.

CLASS:10 **REAL NUMBERS-8** **NOVEMBER 2021**

Sl. No.	Month /week	Learning outcomes	Learning Activity	Evaluation
1	November 3rd week 4 periods	Euclid's algorithm, Fundamental Theorem of Arithmetic.	Some of the problems based on real numbers, Euclid's division lemma, fundamental theorems of arithmetic are to be solved.	Activity sheet-10 & 10. Workbook-01 page no 73,74,75,76,77,78,79,80 & 81 solve I,II,III,IV,V,VI, VII,VIII & IX problems.
	November 4th week 2 periods	Irrational numbers	Recalling irrational numbers. Learning to prove the given real number is irrational number.	Activity sheet-12 Workbook-1 page no 83 & 84, solve X main.
		Revisiting rational numbers and their decimal expansions	Recalling rational numbers and their decimal expansion. And also, some of the relative theorems to be solved	Activity sheet-13 Workbook-1 page no 84 Solve XI main.

Coordinate Geometry

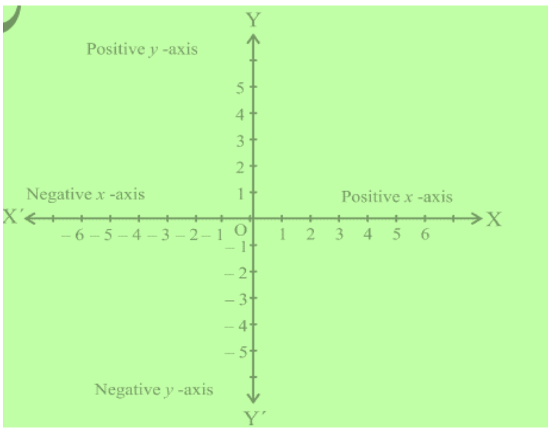
CLASS:10 | **Activity sheet-01** | **NOVEMBER 2021**

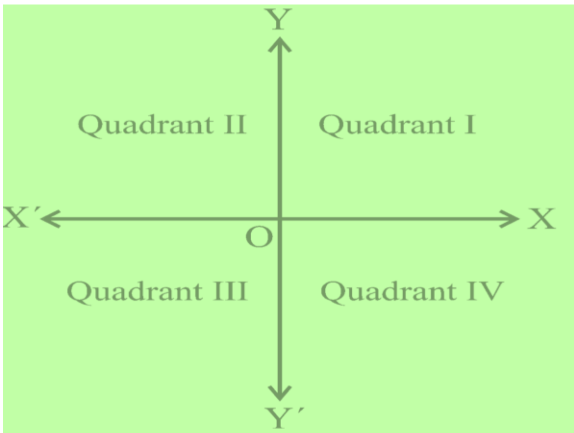
The system of representing the position of any object lying in a plane with the help of two perpendicular lines is known as coordinate Geometry.

Rene Descartes, the great French mathematician of the seventeenth century, liked to lie in bed and think! One day, when resting in bed, he solved the problem of describing the position of a point in a plane. His method was a development of the older idea of latitude and longitude. In honour of Descartes, the system used for describing the position of a point in a plane is also known as the Cartesian system.

Cartesian system: The two perpendicular lines cross each other at their zeroes, or origins. The horizontal line X'X is called the -axis and the vertical line Y'Y is called the y-axis. The point where X'X and Y'Y cross is called the origin. And is denoted by O. Since the positive numbers lie on the directions OX and OY are called the positive directions of x-axis and y-axis respectively. Similarly, OX' and OY' are the negative directions of x-axis and y-axis respectively.

Hence the plane divided into four parts. These four parts are called as Quadrants numbered I, II, III and IV anticlockwise from OX. So, plane consists of the Cartesian plane or the coordinate plane or the xy-plane. The axes are called the coordinate axes.



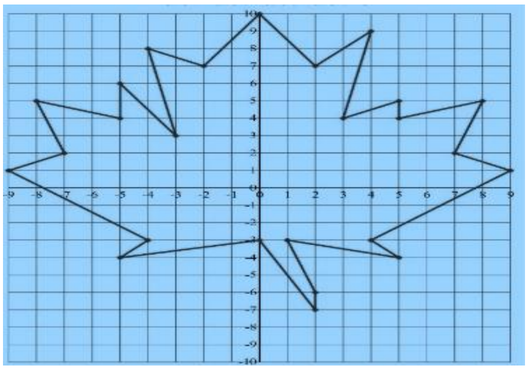


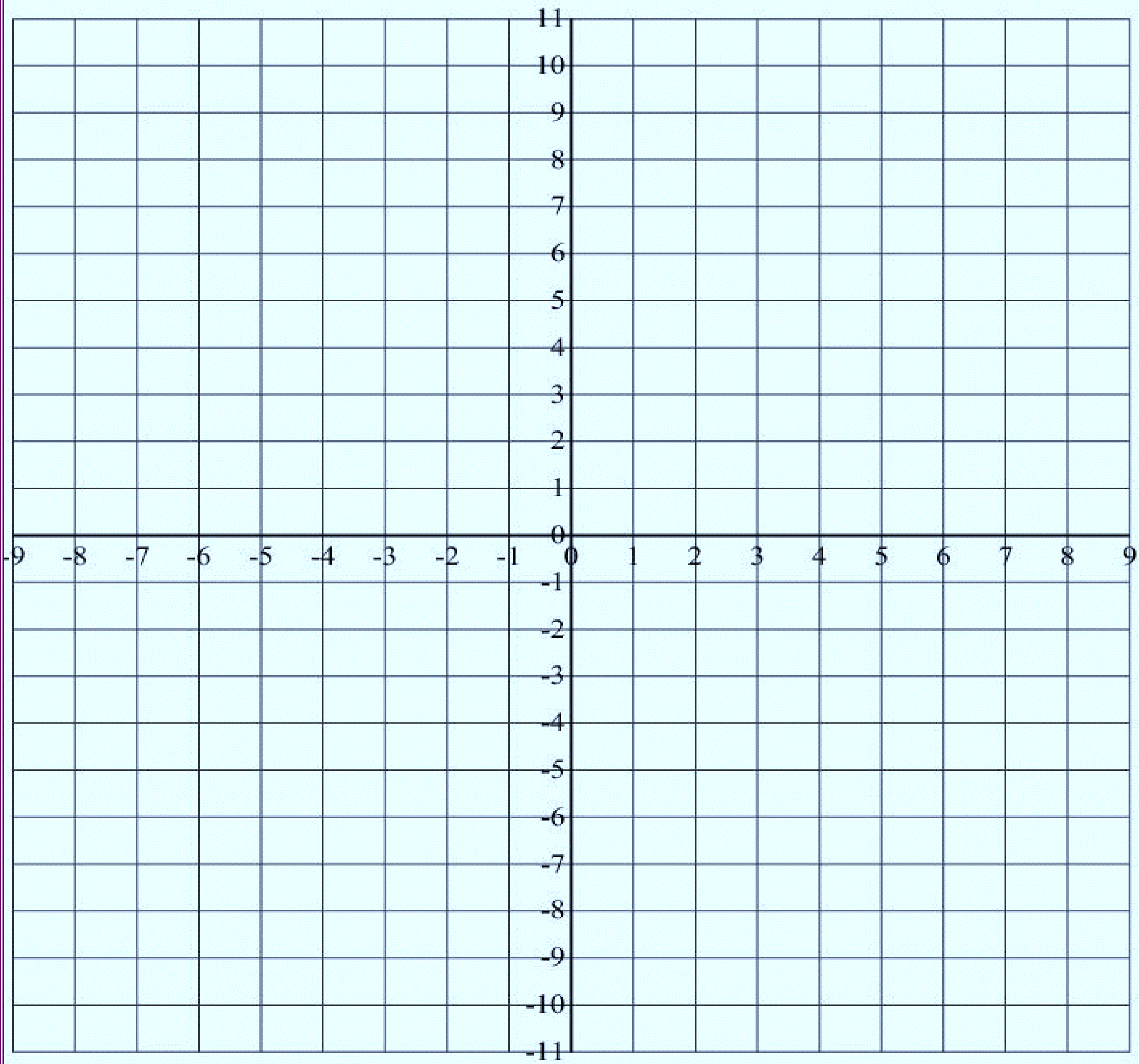
Coordinate Geometry

CLASS:10 | **Activity sheet-02** | **NOVEMBER 2021**

Join these points: Using given graph sheet mark the given points and join them (use pencil only).

(1, −3) (5, −4) (4, −3) (9,1) (7,2) (8,5) (5,4) (5,5) (3,4) (4,9) (2,7) (0,10) (−2,7) (−4,8) (−3,3) (−5,6) (−5,4) (−8,5) (−7,2) (−9,1) (−4,−3) (−5,−4) (0,−3) (2,−7) (2,−6) (1,−3)

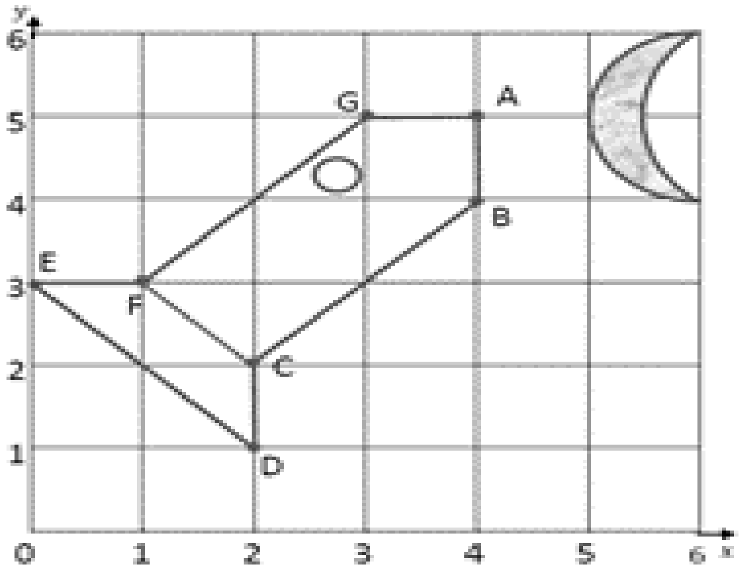




Coordinate Geometry

CLASS:10 | **Activity sheet-03** | **NOVEMBER 2021**

Observe figure and write the coordinates of each point from the first graph. Similarly draw a house in the blank graph and mark the coordinates of its points.



1) Coordinates of points of the figure Rocket are,

A (___, ___)

B (___, ___)

C (___, ___)

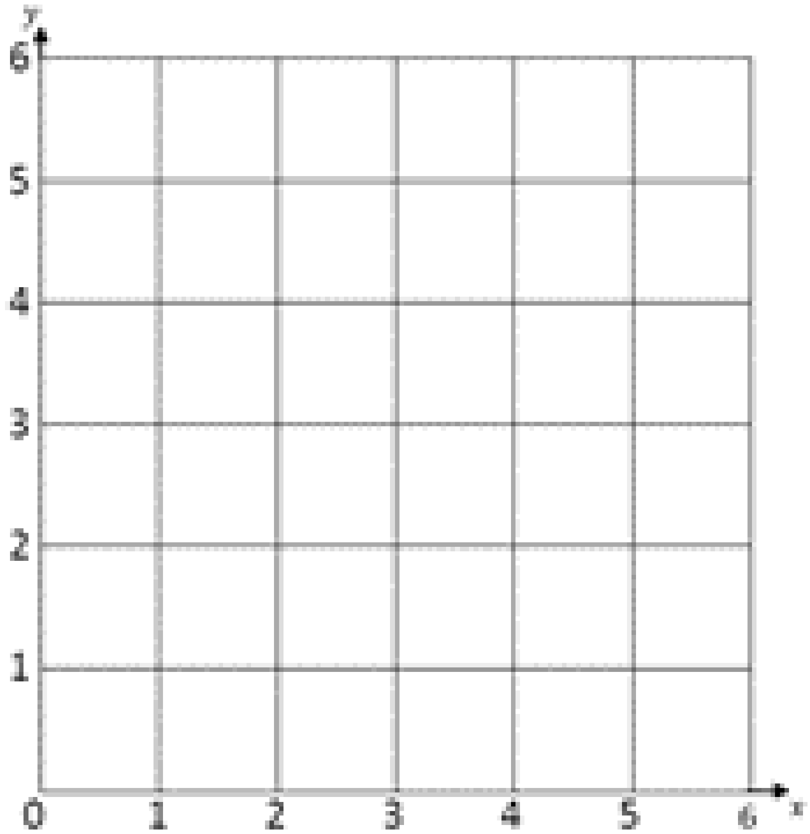
D (___, ___)

E (___, ___)

F (___, ___)

G (___, ___)

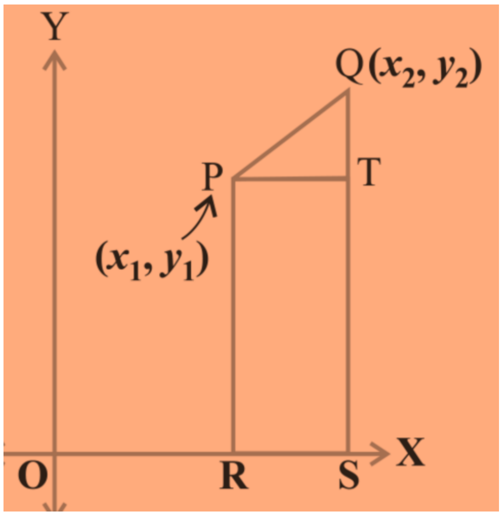
2)



Coordinate Geometry

CLASS:10 **Activity sheet-04** **NOVEMBER 2021**

Distance formula:



Let us now find the distance between any two points P (x_1, y_1) and Q (x_2, y_2). Draw PR and QS perpendicular to the x-axis. A perpendicular from the point P on QS is drawn to meet it at the point T.

Then, OR=x_1, OS=x_2 So, RS= x_2- x_1

Also, SQ= y_1 ST= PR= y_2

Now applying the Pythagoras theorem inΔPTQ we get,

$PQ^2 = PT^2 + QT^2$

$= (x_2 - x_1)^2 + (y_2 - y_1)^2$,

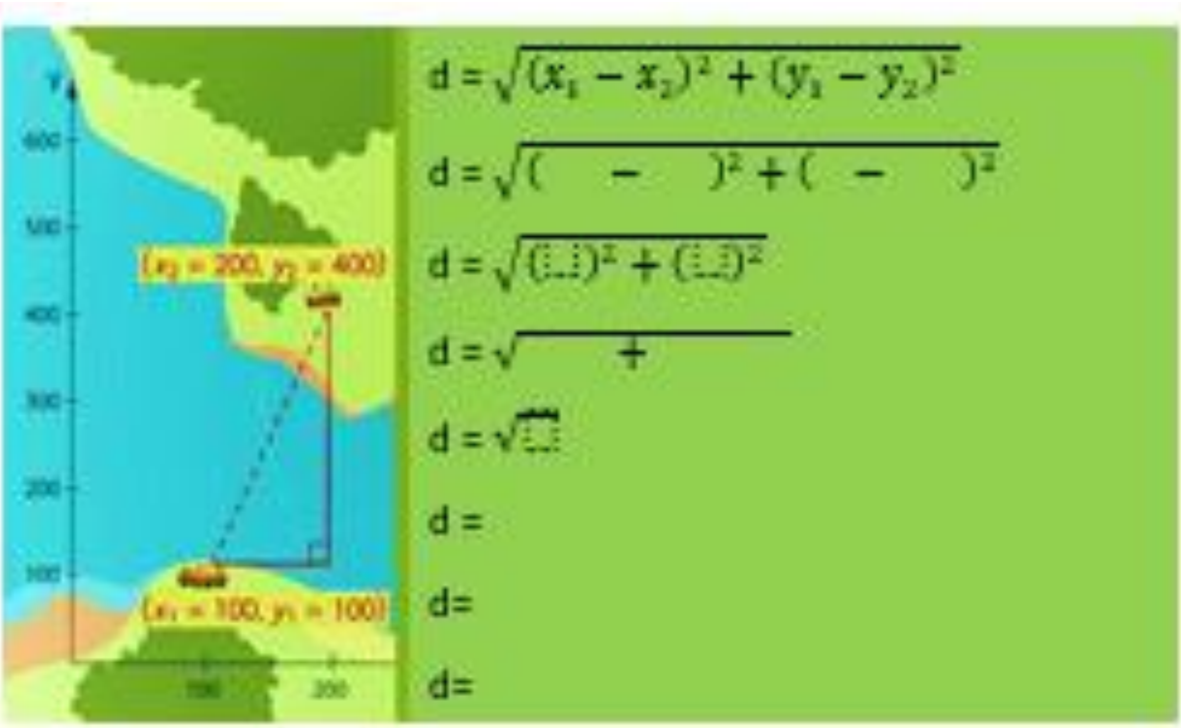
Therefore, $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Note: 1. The distance between a point P (x, y) from the origin is always equal to $\sqrt{x^2 + y^2}$.

2. The distance formula can also be written as,

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

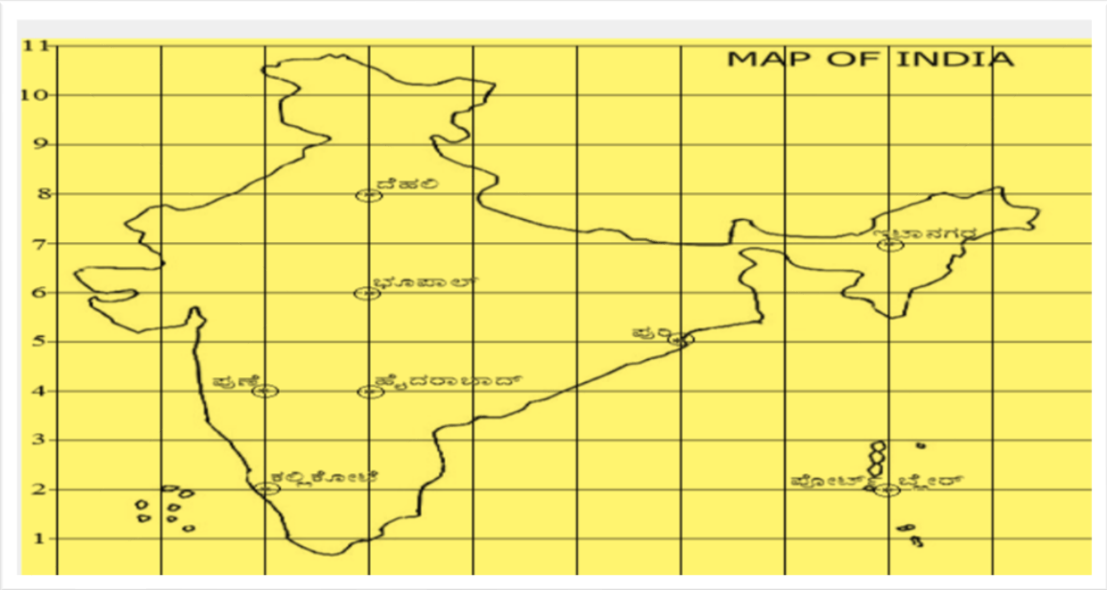
Observe the given figure and find the distance between the given points.



<u>Coordinate Geometry</u>

CLASS:10 **Activity sheet-05** **NOVEMBER 2021**

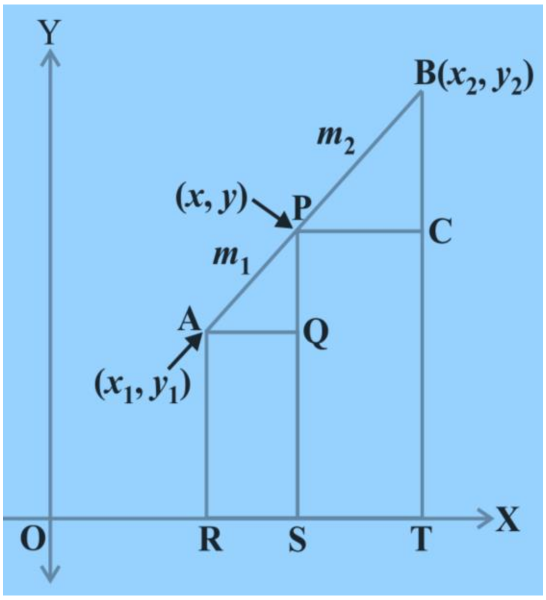
By observing the India map write the coordinates of the places given and find the distance between any two places in the given table.



	Cities	Distance between the cities
01	Delhi and puri	
02	Itanagar and Kallikote	
03	Puri and Pune	
04	Hyderabad and Itanagar	
05	Delhi and Pune	

Coordinate Geometry

CLASS:10 | **Activity sheet-06** | **NOVEMBER 2021**



Consider any two points A (x1, y1) and B (x2, y2) and assume that P (x, y) divides AB internally in the ratio m1: m2,

Then, $\frac{PA}{PB} = \frac{m_1}{m_2}$

Draw AR, PS and BT perpendicular to the x-axis.

Draw AQ and PC parallel to the x-axis. Then, by the AA similarity criterion,

Δ PAQ ~ Δ BPC

$\frac{PA}{PB} = \frac{AQ}{PC} = \frac{PQ}{BC} \longrightarrow (1)$

then, AQ = RS = OS - OR = $x - x_1$

PC = ST = OT - OS = $x_2 - x$

PQ = PS - QS = PS - AR = $y - y_1$

BC = BT - CT = BT - PS = $y_2 - y$

Substituting these values in (1), we get

$$\frac{m_1}{m_2} = \frac{x-x_1}{x_2-x} = \frac{y-y_1}{y_2-y}$$

$\frac{m_1}{m_2} = \frac{x-x_1}{x_2-x}$ we get, $x = \frac{m_1x_2+m_2x_1}{m_1+m_2}$

$\frac{m_1}{m_2} = \frac{y-y_1}{y_2-y}$ we get, $y = \frac{m_1y_2+m_2y_1}{m_1+m_2}$

Hence, the coordinates of the point P are $\left(\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$

The mid-point of a line segment divides the line segment in the ratio 1:1.

Therefore, the coordinates of the mid-point P of the join of the points A (x1, y1) and B (x2, y2) is,

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

Example:

Solve by using Section formula:

1. Find the coordinates of the point which divides the line segment joining the points (4, – 7) and (8, 5) in the ratio 3:1 internally. Solution: Let P (x, y) be the required point. Using the section formula, we get x = $\frac{3(8) + 1(4)}{3+ 1}$ = 7, y = $\frac{3(5) + 1(-7)}{3+ 1}$=2 Therefore, (7, 3) are the required points.
2. Find the coordinates of the point which divides the join of (–1, 7) and (4, –3) in the ratio 2:3.

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Coordinate Geometry

CLASS:10

Activity sheet-07

NOVEMBER 2021

Solve the following using Section formula:

1) Find the coordinates of the points of trisection (i.e., points dividing in three equal parts) of the line segment joining the points (4, -1) and (-2, -3)

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

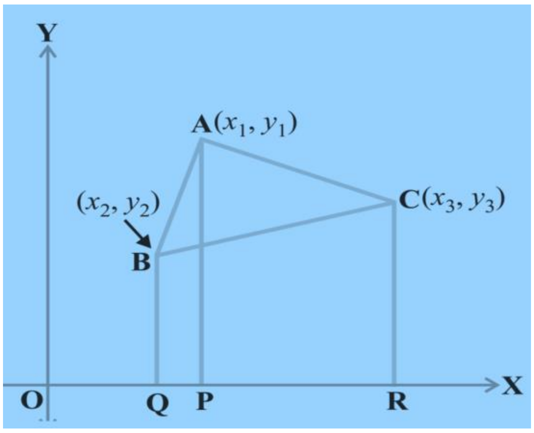
3) Find the coordinates of the points which divide the line segment joining A (– 2, 2) and B (2, 8) into four equal parts.

4) 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).

Coordinate Geometry

CLASS:10 | **Activity sheet-08** | **NOVEMBER 2021**

Finding of Area of triangle using the coordinates of the triangle vertices:



Let ABC be any triangle whose vertices are A (x1, y1), B (x2, y2) and C (x3, y3). Draw AP, BQ and CR perpendiculars from A, B and C, respectively, to the x-axis. Clearly ABQP, APRC and BQRC are all trapezium.

Now, from Figure it is clear that,

area of Δ ABC = area of trapezium ABQP + area of trapezium APRC – area of trapezium BQRC.

Area of $\Delta ABC = \frac{1}{2}$(BQ+AP) QP + $\frac{1}{2}$(AP+CR) PR - $\frac{1}{2}$(BQ+CR) QR

$$= \frac{1}{2}(y_2 + y_1)(x_2 - x_1) + \frac{1}{2}(y_1 + y_3)(x_3 - x_1) - \frac{1}{2}(y_2 + y_3)(x_3 - x_2)$$

$$= \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$$

∴ Area of triangle == $\frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$

Solve the following using formula to find area of triangle.

1) Find the area of a triangle whose vertices are (1,2) (4,6) and (3,5)

Sol: Area of triangle = $\frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$

$$= \frac{1}{2}\,[(1)\ (6-5)\ + (4)\ (5-2)\ +\ (3)\ (2-6)]$$

$$= \frac{1}{2}\,(1+12-12)\ =\ \frac{1}{2}x1$$

∴ Area of triangle = $\frac{1}{2}$ sq units.

2) Find the area of triangle whose vertices are A (5,2) B (3,7) and C (6,4)

3) Find the value of k for which A (2,3) B (4, k) and C (6, -3) points are collinear.

Coordinate Geometry

CLASS:10 **Activity sheet-09** **NOVEMBER 2021**

1.Find the area of the triangle whose vertices are (2,3) (-1,0) and (2, -4)

2.Find the area of the quadrilateral whose vertices, taken in order, are (– 4, – 2), (– 3, – 5), (3, – 2) and (2, 3).

3.Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are (0, –1), (2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle.

4.Find the area of a quadrilateral whose vertices are A (-5,7) B (-4, -5) C (-1, -6) and D (4,5).

REAL NUMBERS

CLASS:10 | **Activity sheet-10** | **NOVEMBER 2021**

Real Numbers:

The set of numbers which includes rational and irrational numbers is known as real numbers.

Any real number can be represented on number line.

Euclid's Division Lemma:

Given positive integers a and b, there exist unique integers q and r satisfying $a = bq + r, 0 \leq r < b$.

Euclid's division algorithm is a technique to compute the Highest Common Factor (HCF) of two given positive integers. Recall that the HCF of two positive integers *a* and *b* is the largest positive integer *d* that divides both *a* and *b*.

Steps of Euclid's division algorithm:

To obtain the HCF of two positive integers, say c and d, with c > d, follow the steps below:

Step 1: Apply Euclid's division lemma, to *c* and *d*. So, we find whole numbers, *q* and r such that $c = dq + r$, $0 \leq r < d$.

Step 2: If $r = 0$, *d* is the HCF of *c* and *d*. If $r \neq 0$, apply the division lemma to *d* and *r*.

Step 3: Continue the process till the remainder is zero. The divisor at this stage will be the required HCF.

Find the HCF of 135 and 225 using Euclid's division algorithm. $225 = 135\times1 + 90$ $\Rightarrow 135= 90\times 1 + 45$ $\Rightarrow 90= 45 \times 2 + 0$ HCF of 135 and 225 is 45.
Find the HCF of 420 and 272 using Euclid's division algorithm.
Find the HCF of 867 and 255 using Euclid's division algorithm.

<u>Coordinate Geometry</u>

CLASS:10 | **Activity sheet-11** | **NOVEMBER 2021**

The Fundamental Theorem of Arithmetic

Every composite number can be expressed (factorised) as a product of primes, and this factorisation is unique, apart from the order in which the prime factors occur.

its factors.

In general,

given a composite number *x*, we factorise it as *x* = *p*1 *p*2 ... *pn*,

where*p*1, *p*2..., *pn* are primes and written in ascending order, i.e., *p*1 ≤ *p*2≤ . . . ≤ *pn.* If we combine the same primes, we will get powers of primes.

For example,

$32760 = 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 7 \times 13 = 2^3 \times 3^2 \times 5 \times 7 \times 13$

Once we have decided that the order will be ascending, then the way the number is factorised, is unique.

For any integer a and b, HCF (a, b) X LCM (a, b) = aXb

Find HCF and LCM of 96 and 40 by prime factorisation. Sol: $96 = 2^2X3$ $40 = 2^3X5$ HCF of 96 and 40 = $2^2=4$ LCM of 96 and 40 = $\frac{96X40}{4}$= 960
Find HCF and LCM of 12 and 21 by prime factorisation
Find HCF and LCM of 9 and 25 by prime factorisation
Find the HCF and LCM of 26 and 91 and verify HCF X LCM = product of the two numbers.

REAL NUMBERS

CLASS:10 | **Activity sheet-12** | **NOVEMBER 2021**

Revisiting Irrational Number

Let p be a prime number. If p divides a2, then p divides a, were

a is a positive integer.

Theorem: ***Prove that*** $\sqrt{2}$ *is irrational.*

Proof: Let us assume, to the contrary, that 2 is rational.

So, we can find integers *r* and *s* (≠ 0) such that $\sqrt{2} = \frac{r}{s}$

Suppose *r* and *s* have a common factor other than 1. Then, we divide by the common factor to get $\sqrt{2} = \frac{a}{b}$ where *a* and *b* are coprime.

So, $b\sqrt{2} = a$.

Squaring on both sides and rearranging, we get $2b^2 = a^2$

Therefore, 2 divides a^2, it follows that 2 divides *a*.

So, we can write $a = 2c$ for some integer *c*.

for *a*, we get $2b^2 = 4c^2$, that is, $b^2 = 2c^2$

This means that 2 divides b^2, and so 2 divides *b*.

Therefore, *a* and *b* have at least 2 as a common factor.

But this contradicts the fact that *a* and *b* have no common factors other than1.

This contradiction has arisen because of our incorrect assumption that 2 is rational.

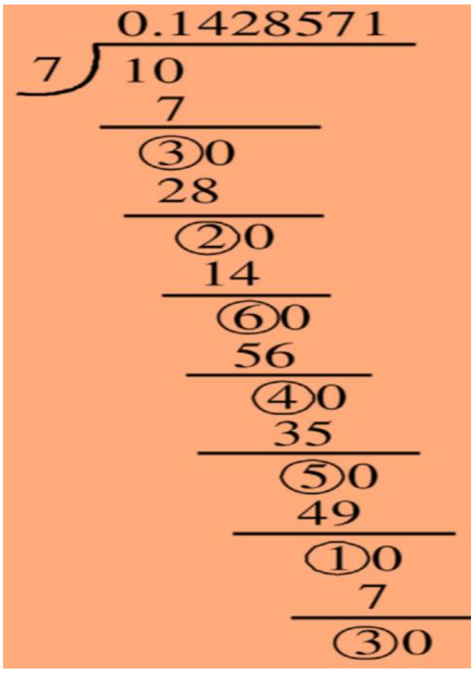
So, we conclude that 2 is irrational.

: ***Prove that*** $\sqrt{5}$ *is irrational*

REAL NUMBERS

CLASS:10 | **Activity sheet-13** | **NOVEMBER 2021**

Revisiting Rational Numbers and Their Decimal Expansions



Let x be a rational number whose decimal expansion terminates.

Then x can be expressed in the form $\frac{p}{q}$ *where p and q are coprime, and the* prime *factorisation of q is of the form* 2^n5^m, *where n, m are non-negative integers.*

EX: $\frac{17}{20}$= 0.85= = $\frac{17}{2^2 \times 5}$

Theorem: *Let x=*$\frac{p}{q}$ *be a rational number, such that the prime factorisation of q is of the form* 2^n5^m, *where n, m are non-negative integers. Then x has a decimal expansion which terminates.*

Without actually performing the long division, state whether the following rational numbers will have a terminating decimal expansion or a non-terminating repeating decimal expansion:

$\frac{17}{8}$	$\frac{35}{50}$	$\frac{6}{15}$	$\frac{77}{210}$