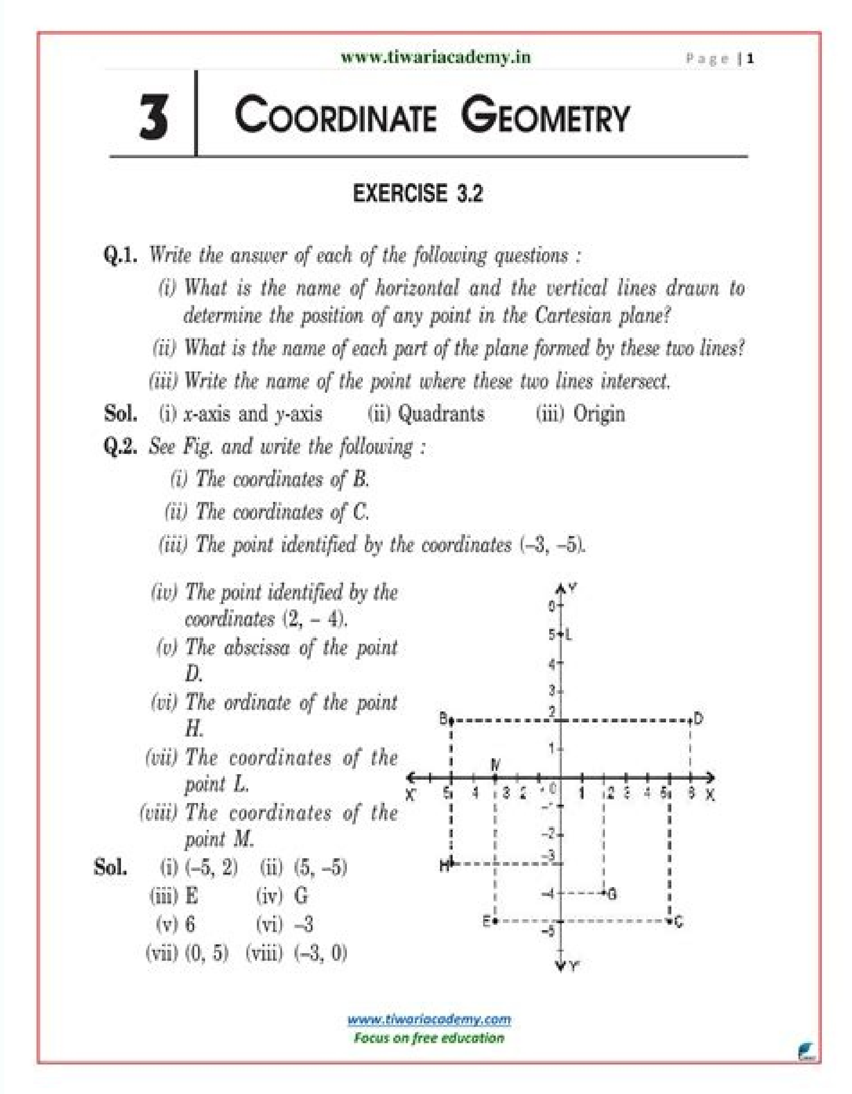
Coordinate geometry class 10 cbse pdf



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3 COORDINATE GEOMETRY

EXERCISE 3.2

Q.1. *Write the answer of each of the following questions :*

(i) What is the name of horizontal and the vertical lines drawn to determine the position of any point in the Cartesian plane?

(ii) What is the name of each part of the plane formed by these two lines?

(iii) Write the name of the point where these two lines intersect.

Sol. (i) x-axis and y-axis (ii) Quadrants (iii) Origin

Q.2. *See Fig. and write the following :*

(i) The coordinates of B.

(ii) The coordinates of C.

(iii) The point identified by the coordinates (–3, –5).

(iv) The point identified by the coordinates (2, – 4).

(v) The abscissa of the point D.

(vi) The ordinate of the point H.

(vii) The coordinates of the point L.

(viii) The coordinates of the point M.

Sol. (i) (–5, 2) (ii) (5, –5)
(iii) E (iv) G
(v) 6 (vi) –3
(vii) (0, 5) (viii) (–3, 0)

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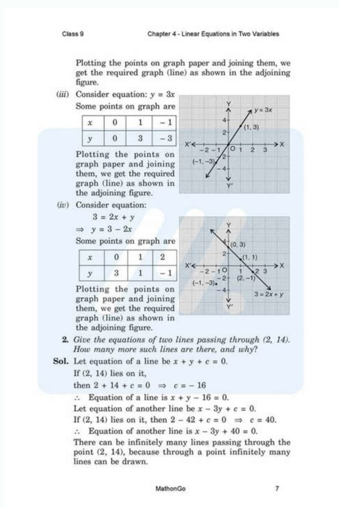
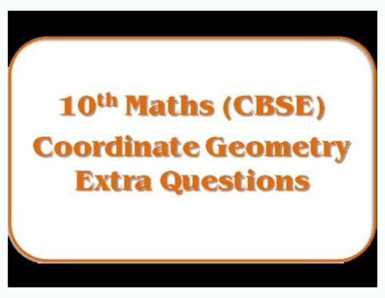
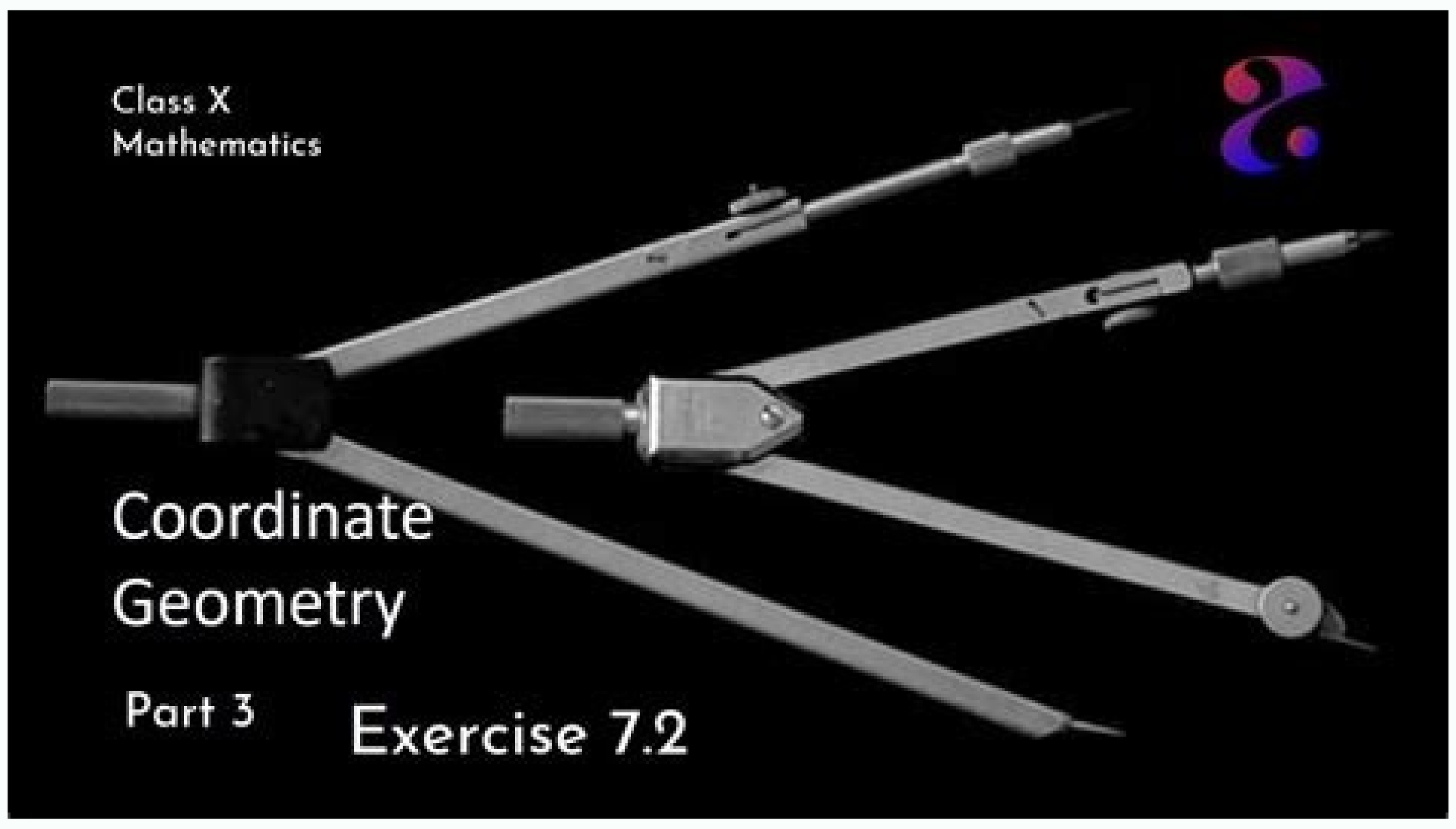






Ans. (i)In $\triangle ABD$ and $\triangle ADC$

AD bisects $\angle A$

$\Rightarrow \quad \angle BAD = \angle CAD$

$\angle ADC = \angle ADB = 90^0$

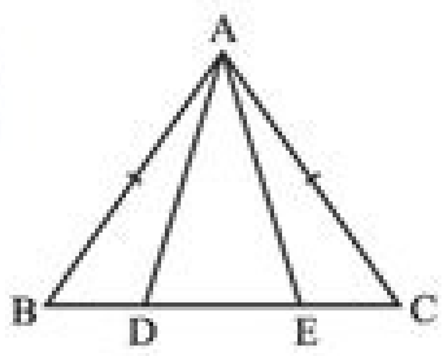
AD=AD (Common Side)

So, $\triangle ABD \cong \triangle ADC$ (by the SAS congruence rule)

AB = AC(CPCT)

$\therefore \triangle ABC$ is isosceles

Q.6 In an isosceles triangle ABC with AB = AC, D and E are points on BC such that BE = CD. Show that AD = AE. (3 Marks)



Ans. In $\triangle$ ABD and $\triangle$ACE,

AB = AC (Given) ..(1)

$\angle B = \angle C$ (Angles opposite to equal sides) ..(2)

Also, BE = CD..(3)

So, BE – DE = CD – DE

That is, BD = CE (3)

So, $\triangle ABD \cong \triangle ACE$

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 NCERT Solutions for Class 10 maths chapter 7 Coordinate Geometry talks about the various aspects of coordinate geometry. Coordinate geometry has been developed as an algebraic tool for studying the geometry of figures. It helps us to study geometry using algebra, and understand algebra with the help of geometry thus, making it widely applicable in fields such as physics, engineering, navigation, and art. The distance of a point from the y-axis is called its x-coordinate, or abscissa. The distance of a point from the x-axis is called its y-coordinate, or ordinate. These are some of the most basic and important terms associated with coordinate geometry that kids must understand. NCERT solutions class 10 maths chapter 7 can also help students develop visualization skills, thus enabling them to analyze graphs precisely. Class 10 maths NCERT Solutions chapter 7 is a very important chapter as it helps students to find the distance between the two points whose coordinates are given, and to find the area of the triangle formed by three given points. Additionally, kids also learn how to find the coordinates of the point which divides a line segment joining in a given ratio. Children must be well-versed with this lesson as it makes its way into several sister topics such as constructions. NCERT Solutions Chapter 7 also lays a foundation for the further study of topics related to graphs in higher classes and also you can find some of these in the exercises given below. NCERT Solutions for Class 10 Maths Chapter 7 PDF Coordinate Geometry is the branch of mathematics that deals with cartesian coordinates. Usually, this system is used to manipulate the equations of various two-dimensional figures such as triangles, squares, circles, etc. The NCERT solutions for class 10 maths chapter 7 Coordinate Geometry help kids in defining and representing geometrical shapes in a numerical way and extracting numerical information from them by drawing logical conclusions. The free PDF of NCERT Solutions Class 10 Maths Chapter 7 Coordinate Geometry is given below. ☛ Download Class 10 Maths NCERT Solutions Chapter 7 Coordinate Geometry NCERT Class 10 Maths Chapter 7 NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry Coordinate Geometry can prove to be a confusing topic due to the use of formulas as well as performing computations in the cartesian plane. Thus, it is highly advised that kids should apply these formulas to sums and practice them regularly so as to recall the required concept whenever required. Children should also have a strong foundation of the Pythagoras theorem as it is used in certain derivations. The analysis of each exercise of NCERT Solutions Class 10 Maths Chapter 7 Coordinate Geometry is below. Class 10 Maths Chapter 7 Ex 7.1 - 10 questions Class 10 Maths Chapter 7 Ex 7.2 - 10 questions Class 10 Maths Chapter 7 Ex 7.3 - 5 questions Class 10 Maths Chapter 7 Ex 7.4 - 8 questions ☛ Download Class 10 Maths Chapter 7 NCERT Book Topics Covered: Topics covered in Class 10 maths NCERT solutions chapter 7 are the calculation of distance between two points on the cartesian plane, internal and external division of a line segment in a particular ratio, calculation of the area of a triangle, and the real-life applications of these formulas. Total Questions: Class 10 Maths Chapter 7 Coordinate Geometry consists of a total of 33 questions, of which 20 are fairly easy, 7 are moderately difficult, and 6 are long answer complicated sums. These problems are distributed across 4 exercises of this chapter. List of Formulas in NCERT Solutions Class 10 Maths Chapter 7 NCERT solutions class 10 maths chapter 7 makes heavy use of three formulas namely, the distance formula, the section formula, and the area of a triangle. Before memorizing them it is necessary for kids to go through the theory and derivations of such formulas to get a clear understanding of the meaning behind them. Without these formulas attempting problems in the scope of the cartesian plane would be very difficult. Thus, they are crucial and will be used in further topics to come. Some important formulas covered in NCERT solutions for class 10 maths chapter 7 are given below : Distance Formula : PQ = √((x2 - x1)2+(y2-y1)2) Section Formula: ((m1x2+m2x1)/m1+m2 , (m1y2+m2y1)/m1+m2) Area of Triangle: 1/2 * [x1 (y2-y3) + x2 (y3 - y1) + x3(y1 - y2)] Important Questions for Class 10 Maths NCERT Solutions Chapter 7 Video Solutions for Class 10 Maths NCERT Chapter 7 NCERT Solutions for Class 10 Maths Chapter 7 lists the explanations for each problem in a step-wise and detailed manner. While attempting a board exam it is required that the students present a well-structured clear paper so that they can get the maximum marks possible. These solutions act as guidelines for children to do the same and are used to give them a good understanding of the topic at hand. Do I Need to Practice all Questions Provided in Class 10 Maths NCERT Solutions Coordinate Geometry? Practicing all questions of NCERT Solutions Class 10 Maths Coordinate Geometry multiple times can be very effective in understanding the key points. All these problems give a fresh perspective of topics and will help students learn how to find the distance between two points with given x and y coordinates, determine the area of a triangle with three given points, and many more. As each sum is framed in a different way and targets a new aspect of the topic it becomes vital for kids to solve all problems. Which Topics are Important in NCERT Class 10 Chapter 7 Coordinate Geometry? Important topics of class 10 chapter 7 Coordinate Geometry are the distance formula, the section formula, and the area of the triangle. Questions related to all three topics have a high weightage in exams; hence students should practice them well. They can also attempt the solved examples and optional exercises to cover this subject matter in detail. How Many Questions are there in Class 10 Maths NCERT Chapter 7 Coordinate Geometry? The total number of questions in NCERT Class 10 Chapter 7 Coordinate Geometry is 33. Out of which 10 are in the 1st exercise, 10 in the 2nd, 5 in the 3rd, and 8 in the 4th exercise. They are both theoretical as well as practical in nature and are based on the cartesian plane along with the associated formulas. Apart from the exercise questions, students can also practice the solved examples to get an idea of the concepts. What are the important formulas in NCERT Class 10 Chapter 7 Coordinate Geometry? NCERT Class 10 chapter 7 consists of three important formulas, those being the distance formula, the section formula, and the area of a triangle. Students need to spend ample time perfecting and memorizing these. This chapter also sees the use of certain formulas and properties that have appeared in earlier lessons and classes. Thus, if required it will be beneficial for kids to have a quick glance at those as well. How CBSE Students can utilize NCERT Solutions Class 10 Maths Chapter 7 effectively? CBSE students can solve the exercises of the NCERT Solutions Class 10 Maths Chapter 7 along with the optional exercise in order to cover all the topics. Students can also refer to the detailed solution set if they get stuck on any topic. In addition to that, the theory section explains each and every concept in a stepwise manner hence, kids should revise this entire segment before solving the exercises. To boost their learning kids can also refer to exam papers from previous years' board examinations. 1. Find the distance between the following pairs of points: (i) \$\left(2,3 \right),\left(4,1 \right)\$Ans:Given that,Let the points be \$\left(2,3 \right)\$ and \$\left(4,1 \right)\$To find the distance between the points \$\left(2,3 \right),\left(4,1 \right)\$.Distance between two points is given by the Distance formula \$=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$Here, \${{x}_{1}}=2\$ \${{x}_{2}}=4\$\${{y}_{1}}=3\$\${{y}_{2}}=1\$ Thus, the distance between \$\left(2,3 \right)\$ and \$\left(4,1 \right)\$ is given by,\$d=\sqrt{{{\left(2-4 \right)}^{2}}+{{\left(3-1 \right)}^{2}}}\$\$=\sqrt{{{\left(-2 \right)}^{2}}+{{\left(2 \right)}^{2}}}\$\$=\sqrt{4+4}\$\$=\sqrt{8}\$\$=2\sqrt{2}\$\$\therefore \$The distance between \$\left(2,3 \right)\$ and \$\left(4,1 \right)\$ is \$2\sqrt{2}\$ units.(ii) \$\left(-5,7 \right),\left(-1,3 \right)\$Ans:Given that,Let the points be \$\left(-5,7 \right)\$ and \$\left(-1,3 \right)\$To find the distance between the points \$\left(-5,7 \right),\left(-1,3 \right)\$.Distance between two points is given by the Distance formula \$=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$Here, \${{x}_{1}}=-5\$\${{x}_{2}}=-1\$\${{y}_{1}}=7\$\${{y}_{2}}=3\$ Thus, the distance between \$\left(-5,7 \right)\$ and \$\left(-1,3 \right)\$ is given by,\$d=\sqrt{{{\left(-5-\left(-1 \right) \right)}^{2}}+{{\left(7-3 \right)}^{2}}}\$\$=\sqrt{{{\left(-4 \right)}^{2}}+{{\left(4 \right)}^{2}}}\$\$=\sqrt{16+16}\$\$=\sqrt{32}\$\$=4\sqrt{2}\$\$\therefore \$The distance between \$\left(-5,7 \right)\$ and \$\left(-1,3 \right)\$ is \$4\sqrt{2}\$ units.(iii) \$\left(a,b \right),\left(-a,-b \right)\$Ans:Given that,Let the points be \$\left(a,b \right)\$ and \$\left(-a,-b \right)\$To find the distance between the points \$\left(a,b \right),\left(-a,-b \right)\$.Distance between two points is given by the Distance formula \$=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$Here, \${{x}_{1}}=a\$\${{x}_{2}}=-a\$\${{y}_{1}}=b\$\${{y}_{2}}=-b\$ Thus, the distance between \$\left(a,b \right)\$ and \$\left(-a,-b \right)\$ is given by,\$d=\sqrt{{{\left(a-\left(-a \right) \right)}^{2}}+{{\left(b-\left(-b \right) \right)}^{2}}}\$\$=\sqrt{{{\left(2a \right)}^{2}}+{{\left(2b \right)}^{2}}}\$\$=\sqrt{4{{a}^{2}}+4{{b}^{2}}}\$\$=\sqrt{4}\sqrt{{{a}^{2}}+{{b}^{2}}}\$\$=2\sqrt{{{a}^{2}}+{{b}^{2}}}\$\$\therefore \$The distance between \$\left(a,b \right)\$ and \$\left(-a,-b \right)\$ is \$2\sqrt{{{a}^{2}}+{{b}^{2}}}\$ units.2. Find the distance between the points \$\left(0,0 \right)\$ and \$\left(36,15 \right)\$. Can you now find the distance between the two towns \$A\$ and \$B\$ discussed in Section 7.2?Ans:Given that,Let the points be \$\left(0,0 \right)\$ and \$\left(36,15 \right)\$To find the distance between the points \$\left(0,0 \right),\left(36,15 \right)\$.Distance between two points is given by the Distance formula \$=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$Here, \${{x}_{1}}=0\$\${{x}_{2}}=36\$\${{y}_{1}}=0\$\${{y}_{2}}=15\$ Thus, the distance between \$\left(0,0 \right)\$ and \$\left(36,15 \right)\$ is given by,\$d=\sqrt{{{\left(0-36 \right)}^{2}}+{{\left(0-15 \right)}^{2}}}\$\$=\sqrt{{{\left(-36 \right)}^{2}}+{{\left(-15 \right)}^{2}}}\$\$=\sqrt{1296+225}\$\$=\sqrt{1521}\$\$=39\$Yes, it is possible to find the distance between the given towns \$A\$ and \$B\$. The positions of this town are \$A\left(0,0 \right)\$ and \$B\left(36,15 \right)\$. And it can be calculated as above.\$\therefore \$The distance between \$A\left(0,0 \right)\$ and \$B\left(36,15 \right)\$ is \$39\$ km.3. Determine if the points \$\left(1,5 \right),\left(2,3 \right)\$ and \$\left(-2,-11 \right)\$ are collinear.Ans:Given that,Let the three points be \$\left(1,5 \right),\left(2,3 \right)\$ and \$\left(-2,-11 \right)\$To determine if the given points are collinearLet \$A\left(1,5 \right),B\left(2,3 \right),C\left(-2,-11 \right)\$ be the vertices of the given triangle.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$To find the distance between the points \$A\left(1,5 \right)\$ and \$B\left(2,3 \right)\$\${{x}_{1}}=1\$\${{x}_{2}}=2\$\${{y}_{1}}=5\$\${{y}_{2}}=3\$\$AB=\sqrt{{{\left(1-2 \right)}^{2}}+{{\left(5-3 \right)}^{2}}}\$\$=\sqrt{{{\left(-1 \right)}^{2}}+{{\left(2 \right)}^{2}}}\$\$=\sqrt{1+4}\$\$=\sqrt{5}\$To find the distance between the points \$B\left(2,3 \right)\$ and \$C\left(-2,-11 \right)\$\${{x}_{1}}=2\$\${{x}_{2}}=-2\$\${{y}_{1}}=3\$\${{y}_{2}}=-11\$\$BC=\sqrt{{{\left(2-\left(-2 \right) \right)}^{2}}+{{\left(3-\left(-11 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(4 \right)}^{2}}+{{\left(14 \right)}^{2}}}\$\$=\sqrt{16+196}\$\$=\sqrt{212}\$To find the distance between the points \$A\left(1,5 \right)\$ and \$C\left(-2,-11 \right)\$\${{x}_{1}}=1\$\${{x}_{2}}=-2\$\${{y}_{1}}=5\$\${{y}_{2}}=-11\$\$CA=\sqrt{{{\left(1-\left(-2 \right) \right)}^{2}}+{{\left(5-\left(-11 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(3 \right)}^{2}}+{{\left(16 \right)}^{2}}}\$\$=\sqrt{9+256}\$\$=\sqrt{265}\$Since \$AB+ACe BC\$ and \$ABe BC+AC\$ and \$ACe BC\$\$\therefore \$The points \$A\left(1,5 \right),B\left(2,3 \right),C\left(-2,-11 \right)\$ are not collinear.4. Check whether \$\left(5,-2 \right),\left(6,4 \right)\$ and \$\left(7,-2 \right)\$ are the vertices of an isosceles triangle.Ans:Given that,Let the three points be \$\left(5,-2 \right),\left(6,4 \right)\$ and \$\left(7,-2 \right)\$ are the vertices of the triangle.To determine if the given points are the vertices of an isosceles triangle.Let \$A\left(5,-2 \right),B\left(6,4 \right),C\left(7,-2 \right)\$ be the vertices of the given triangle.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$To find the distance between the points \$A\left(5,-2 \right)\$ and \$B\left(6,4 \right)\$\${{x}_{1}}=5\$\${{x}_{2}}=6\$\${{y}_{1}}=-2\$\${{y}_{2}}=4\$\$AB=\sqrt{{{\left(5-6 \right)}^{2}}+{{\left(-2-4 \right)}^{2}}}\$\$=\sqrt{{{\left(-1 \right)}^{2}}+{{\left(-6 \right)}^{2}}}\$\$=\sqrt{1+36}\$\$=\sqrt{37}\$To find the distance between the points \$B\left(6,4 \right)\$ and \$C\left(7,-2 \right)\$\${{x}_{1}}=6\$\${{x}_{2}}=7\$\${{y}_{1}}=4\$\${{y}_{2}}=-2\$\$BC=\sqrt{{{\left(6-7 \right)}^{2}}+{{\left(4-\left(-2 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(-1 \right)}^{2}}+{{\left(6 \right)}^{2}}}\$\$=\sqrt{1+36}\$\$=\sqrt{37}\$To find the distance between the points \$A\left(5,-2 \right)\$ and \$C\left(7,-2 \right)\$\${{x}_{1}}=5\$\${{x}_{2}}=7\$\${{y}_{1}}=-2\$\${{y}_{2}}=-2\$\$CA=\sqrt{{{\left(5-7 \right)}^{2}}+{{\left(-2-\left(-2 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(-2 \right)}^{2}}+{{\left(0 \right)}^{2}}}\$\$=\sqrt{4+0}\$\$=2\$We can conclude that \$AB=BC\$. Since two sides of the triangle are equal in length, \$ABC\$ is an isosceles triangle.5. In a classroom, \$4\$ friends are seated at the points \$A,B,C\$ and \$D\$ are shown in the following figure. 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 the distance formula, find which of them is correct.Ans:Given that,\$4\$ friends are seated at the points \$A,B,C,D\$To find,If they form square together by using distance formula From the figure, we observe the points \$A\left(3,4 \right),B\left(6,7 \right),C\left(9,4 \right)\$ and \$D\left(6,1 \right)\$ are the positions of the four students.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$To find the distance between the points \$A\left(3,4 \right)\$ and \$B\left(6,7 \right)\$\${{x}_{1}}=3\$\${{x}_{2}}=6\$\${{y}_{1}}=4\$\${{y}_{2}}=7\$\$AB=\sqrt{{{\left(3-6 \right)}^{2}}+{{\left(4-7 \right)}^{2}}}\$\$=\sqrt{{{\left(-3 \right)}^{2}}+{{\left(-3 \right)}^{2}}}\$\$=\sqrt{9+9}\$\$=\sqrt{18}\$\$=3\sqrt{2}\$To find the distance between the points \$B\left(6,7 \right)\$ and \$C\left(9,4 \right)\$\${{x}_{1}}=6\$\${{x}_{2}}=9\$\${{y}_{1}}=7\$\${{y}_{2}}=4\$\$BC=\sqrt{{{\left(6-9 \right)}^{2}}+{{\left(7-4 \right)}^{2}}}\$\$=\sqrt{{{\left(-3 \right)}^{2}}+{{\left(3 \right)}^{2}}}\$\$=\sqrt{9+9}\$\$=\sqrt{18}\$\$=3\sqrt{2}\$To find the distance between the points \$C\left(9,4 \right)\$ and \$\left(6,1 \right)\$\${{x}_{1}}=9\$\${{x}_{2}}=6\$\${{y}_{1}}=4\$\$=2\left(lb+bh+lh \right)\$\[\]\$=2\left(80 \right)CD=\sqrt{{{\left(9-6 \right)}^{2}}+{{\left(4-1 \right)}^{2}}}\$\$\therefore =\sqrt{9+9}\$\$=\sqrt{18}\$\$=3\sqrt{2}\$To find the distance between the points \$A\left(3,4 \right)\$ and \$D\left(6,1 \right)\$\${{x}_{1}}=3\$\${{x}_{2}}=6\$\${{y}_{1}}=4\$\${{y}_{2}}=1\$\$AB=\sqrt{{{\left(3-6 \right)}^{2}}+{{\left(4-1 \right)}^{2}}}\$\$=\sqrt{{{\left(-3 \right)}^{2}}+{{\left(3 \right)}^{2}}}\$\$=\sqrt{9+9}\$\$=\sqrt{18}\$\$=3\sqrt{2}\$Since all sides of the squares are equal, now find the distance between the diagonals \$AC\$ and \$BD\$.To find the distance between the points \$A\left(3,4 \right)\$ and \$C\left(9,4 \right)\$\$=13\text{ cm}{{x}_{1}}=3\$\${{x}_{2}}=9\$\${{y}_{1}}=4\$\${{y}_{2}}=4\$Diagonal \$AC=\sqrt{{{\left(3-9 \right)}^{2}}+{{\left(4-4 \right)}^{2}}}\$\$=\sqrt{{{\left(-6 \right)}^{2}}+{{\left(0 \right)}^{2}}}\$\$=\sqrt{36+0}\$\$=6\$Diagonal To find the distance between the points \$B\left(6,7 \right)\$ and \$D\left(6,1 \right)\$\${{x}_{1}}=6\$\${{x}_{2}}=6\$\${{y}_{1}}=7\$\${{y}_{2}}=1\$Diagonal \$BD=\sqrt{{{\left(6-6 \right)}^{2}}+{{\left(7-1 \right)}^{2}}}\$\$=\sqrt{{{\left(0 \right)}^{2}}+{{\left(6 \right)}^{2}}}\$\$=\sqrt{0+36}\$\$=6\$Thus, the four sides \[\] and \$DA\$ are equal and its diagonals \$AC\$ and \$BD\$ are also equal.\$\therefore ABCD\$ form a square and hence Champa was correct.6. Name the type of quadrilateral forms, if any, by the following points, and give reasons for your answer.(i) \$\left(-1,-2 \right),\left(1,0 \right),\left(-1,2 \right),\left(-3,0 \right)\$-Ans:Given that,Let the given points denote the vertices \$A\left(-1,-2 \right),B\left(1,0 \right),C\left(-1,2 \right),D\left(-3,0 \right)\$ denote the vertices of the quadrilateral.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$To find the distance between the points \$A\left(-1,-2 \right)\$ and \$B\left(1,0 \right)\$\${{x}_{1}}=-1\$\${{x}_{2}}=1\$\${{y}_{1}}=-2\$\${{y}_{2}}=0\$\$AB=\sqrt{{{\left(-1-1 \right)}^{2}}+{{\left(-2-0 \right)}^{2}}}\$\$=\sqrt{{{\left(-2 \right)}^{2}}+{{\left(-2 \right)}^{2}}}\$\$=\sqrt{4+4}\$\$=3.5\text{ cm}=\sqrt{8}\$\$=2\sqrt{2}\$To find the distance between the points \$B\left(1,0 \right)\$ and \$C\left(-1,2 \right)\$\${{x}_{1}}=1\$\${{x}_{2}}=-1\$\${{y}_{1}}=0\$\${{y}_{2}}=2\$\$BC=\sqrt{{{\left(1-\left(-1 \right) \right)}^{2}}+{{\left(0-2 \right)}^{2}}}\$\$=\sqrt{{{\left(2 \right)}^{2}}+{{\left(-2 \right)}^{2}}}\$\$=\sqrt{4+4}\$\$=\sqrt{8}\$\$=2\sqrt{2}\$To find the distance between the points \$C\left(-1,2 \right)\$ and \[\]\$=137.5{{x}_{1}}=-1\$\${{x}_{2}}=-3\$\${{y}_{1}}=2\$\${{y}_{2}}=0\$\$CD=\sqrt{{{\left(-1-\left(-3 \right) \right)}^{2}}+{{\left(2-0 \right)}^{2}}}\$\$=\sqrt{{{\left(2 \right)}^{2}}+{{\left(2 \right)}^{2}}}\$\$=\sqrt{4+4}\$\$=\sqrt{8}\$\$=2\sqrt{2}\$To find the distance between the points \$D\left(-3,0 \right)\$ and \$A\left(-1,-2 \right)\$ \${{x}_{1}}=-3\$\${{x}_{2}}=-1\$\${{y}_{1}}=0\$\${{y}_{2}}=-2\$\$AD=\sqrt{{{\left(-3-\left(-1 \right) \right)}^{2}}+{{\left(0-\left(-2 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(-2 \right)}^{2}}+{{\left(2 \right)}^{2}}}\$\$=\sqrt{4+4}\$\$=\sqrt{8}\$\$=2\sqrt{2}\$To find the diagonals of the given quadrilateralTo find the distance between the points \$A\left(-1,-2 \right)\$ and \$C\left(-1,2 \right)\$\${{x}_{1}}=-1\$\${{x}_{2}}=-1\$\$=l{{y}_{1}}=-2\$\${{y}_{2}}=2\$Diagonal \$AC=\sqrt{{{\left(-1-\left(-1 \right) \right)}^{2}}+{{\left(-2-2 \right)}^{2}}}\$\$=\sqrt{{{\left(0 \right)}^{2}}+{{\left(-4 \right)}^{2}}}\$\$=\sqrt{0+16}\$\$=4\$To find the distance between the points \$B\left(1,0 \right)\$ and \$D\left(-3,0 \right)\$\${{x}_{1}}=1\$\${{x}_{2}}=-3\$\${{y}_{1}}=0\$\${{y}_{2}}=0\$Diagonal \$BD=\sqrt{{{\left(1-\left(-3 \right) \right)}^{2}}+{{\left(0-0 \right)}^{2}}}\$\$=\sqrt{{{\left(4 \right)}^{2}}+{{\left(0 \right)}^{2}}}\$\$=\sqrt{16+0}\$\$=4\$Since all sides of the given quadrilateral are of the same measure and the diagonals are also the same length. \$\therefore \$The given points of the quadrilateral form a square.(ii) \$\left(-3,5 \right),\left(3,1 \right),\left(0,3 \right),\left(-1,-4 \right)\$-Ans:Given that,Let the given points denote the vertices \$A\left(-3,5 \right),B\left(3,1 \right),C\left(0,3 \right),D\left(-1,-4 \right)\$ denote the vertices of the quadrilateral.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$To find the distance between the points \$A\left(-3,5 \right)\$ and \$B\left(3,1 \right)\$\${{x}_{1}}=-3\$\${{x}_{2}}=3\$\${{y}_{1}}=5\$\${{y}_{2}}=1\$\$AB=\sqrt{{{\left(-3-3 \right)}^{2}}+{{\left(5-1 \right)}^{2}}}\$\$=\sqrt{{{\left(-6 \right)}^{2}}+{{\left(4 \right)}^{2}}}\$\$=\sqrt{36+16}\$\$=\sqrt{52}\$\$=2\sqrt{13}\$To find the distance between the points \[\] and \$C\left(0,3 \right)\$\${{x}_{1}}=3\$\${{x}_{2}}=0\$\${{y}_{1}}=1\$\${{y}_{2}}=3\$\$BC=\sqrt{{{\left(3-0 \right)}^{2}}+{{\left(1-3 \right)}^{2}}}\$\$=\sqrt{{{\left(3 \right)}^{2}}+{{\left(-2 \right)}^{2}}}\$\$=\sqrt{9+4}\$\$=\sqrt{13}=14-5\$To find the distance between the points \$C\left(0,3 \right)=45\pi \$ and \$\therefore D\left(-1,-4 \right)\$\${{x}_{1}}=0\$\${{x}_{2}}=-1\$\${{y}_{1}}=3\$\${{y}_{2}}=-4\$\$CD=\sqrt{{{\left(0-\left(-1 \right) \right)}^{2}}+{{\left(3-\left(-4 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(1 \right)}^{2}}+{{\left(7 \right)}^{2}}}\$\$=\sqrt{1+49}\$\$=\sqrt{50}\$\$=5\sqrt{2}\$To find the distance between the points \$A\left(-3,5 \right)\$ and \$D\left(-1,-4 \right)\$ \${{x}_{1}}=-344\text{ }{{\text{m}}^{2}}\$\${{x}_{2}}=-1\$\${{y}_{1}}=5\$\${{y}_{2}}=-4\$\$AD=\sqrt{{{\left(-3-\left(-1 \right) \right)}^{2}}+{{\left(5-\left(-4 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(-2 \right)}^{2}}+{{\left(9 \right)}^{2}}}\$\$=\sqrt{4+81}\$\$=\sqrt{85}\$From the distance we found that,\$ABe BCe CDe AD\$By plotting the graph, we get, From the graph above, we can note that the points \$ABC\$ are collinear. \$\therefore \$The quadrilateral cannot be formed by using the above points.(iii) \$\left(4,5 \right),\left(7,6 \right),\left(4,3 \right),\left(1,2 \right)\$-Ans:Given that,Let the given points denote the vertices \$A\left(4,5 \right),B\left(7,6 \right),C\left(4,3 \right),D\left(1,2 \right)\$ denote the vertices of the quadrilateral.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$To find the distance between the points \$A\left(4,5 \right)\$ and \$B\left(7,6 \right)\$\${{x}_{1}}=4\$\${{x}_{2}}=7\$\${{y}_{1}}=5\$\${{y}_{2}}=6\$\$AB=\sqrt{{{\left(4-7 \right)}^{2}}+{{\left(5-6 \right)}^{2}}}\$\$=\sqrt{{{\left(-3 \right)}^{2}}+{{\left(-1 \right)}^{2}}}\$\$=\sqrt{9+1}\$\$=\sqrt{10}\$To find the distance between the points \$B\left(7,6 \right)\$ and \$C\left(4,3 \right)\$\${{x}_{1}}=7\$\${{x}_{2}}=4\$\${{y}_{1}}=6\$\${{y}_{2}}=3\$\$BC=\sqrt{{{\left(7-4 \right)}^{2}}+{{\left(6-3 \right)}^{2}}}\$\$=\sqrt{{{\left(3 \right)}^{2}}+{{\left(3 \right)}^{2}}}\$\$=\frac{1.4}{2}=\sqrt{9+9}\$\$=\sqrt{18}\$\$=3\sqrt{2}\$To find the distance between the points \$C\left(4,3 \right)\$ and \$D\left(1,2 \right)\$\${{x}_{1}}=4\$\${{x}_{2}}=1\$\${{y}_{1}}=3\$\${{y}_{2}}=2\$\$CD=\sqrt{{{\left(4-1 \right)}^{2}}+{{\left(3-2 \right)}^{2}}}\$\$=\sqrt{{{\left(3 \right)}^{2}}+{{\left(1 \right)}^{2}}}\$\$=\sqrt{9+1}\$\$=\sqrt{10}\$To find the distance between the points x\$A\left(4,5 \right)\$ and \$D\left(1,2 \right)\$ \${{x}_{1}}=4\$\${{x}_{2}}=1\$\${{y}_{1}}=5\$\${{y}_{2}}=2\$\$AD=\sqrt{{{\left(4-1 \right)}^{2}}+{{\left(5-2 \right)}^{2}}}\$\$=\sqrt{{{\left(3 \right)}^{2}}+{{\left(3 \right)}^{2}}}\$\$=\sqrt{9+9}\$\$=\sqrt{18}\$\$=3\sqrt{2}\$To find the diagonals of the given quadrilateralTo find the distance between the points \$A\left(4,5 \right)\$ and \$C\left(4,3 \right)\$\${{x}_{1}}=4\$\${{x}_{2}}=4\$\${{y}_{1}}=5\$\${{y}_{2}}=3\$Diagonal \$AC=\sqrt{{{\left(4-4 \right)}^{2}}+{{\left(5-3 \right)}^{2}}}\$\$=\sqrt{{{\left(0 \right)}^{2}}+{{\left(2 \right)}^{2}}}\$\$=\sqrt{0+4}\$\$=2\$To find the distance between the points \$B\left(7,6 \right)\$ and \$D\left(1,2 \right)\$\${{x}_{1}}=7\$\${{x}_{2}}=1\$\${{y}_{1}}=6\$\${{y}_{2}}=2\$Diagonal \$BD=\sqrt{{{\left(7-1 \right)}^{2}}+{{\left(6-2 \right)}^{2}}}\$\$=\sqrt{{{\left(6 \right)}^{2}}+{{\left(4 \right)}^{2}}}\$\$=\sqrt{36+16}\$\$=\sqrt{52}\$\$=2\sqrt{13}\$From the above calculation, the opposite sides of the quadrilateral are of same length and the diagonals are not of same length\$\therefore \$The given points of the quadrilateral form a parallelogram.Question 7:Find the point on the \$x\$-axis which is equidistant from \$\left(2,-5 \right)\$ and \$\left(-2,9 \right)\$.Ans:Given that,\$\left(2,-5 \right)\$\$\left(-2,9 \right)\$To find,The point that is equidistant from the points \$\left(2,-5 \right)\$ and \$\left(-2,9 \right)\$Let us consider the points as \$A\left(2,-5 \right)\$ and \$B\left(-2,9 \right)\$ and to find the equidistant point \$P\$.Since the point is on \$x\$-axis, the coordinates of the required point is of the form \$P\left(x,0 \right)\$.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$To find the distance between the points \$P\left(x,0 \right)\$ and \$A\left(2,-5 \right)\$ \${{x}_{1}}=x\$\${{x}_{2}}=2\$\${{y}_{1}}=0\$\${{y}_{2}}=-5\$\$PA=\sqrt{{{\left(x-2 \right)}^{2}}+{{\left(0-\left(-5 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(x-2 \right)}^{2}}+25}\$To find the distance between the points \$A\left(x,0 \right)\$ and \$B\left(-2,9 \right)\$\${{x}_{1}}=x\$\${{x}_{2}}=-2\$\${{y}_{1}}=0\$\${{y}_{2}}=9\$\$PB=\sqrt{{{\left(x-\left(-2 \right) \right)}^{2}}+{{\left(0-9 \right)}^{2}}}\$\$=\sqrt{{{\left(x+2 \right)}^{2}}+{{\left(-9 \right)}^{2}}}\$\$=\sqrt{{{\left(x+2 \right)}^{2}}+81}\$Since the distance are equal in measure,\$PA=PB\$\$\sqrt{{{\left(x-2 \right)}^{2}}+25}\$ \$=\sqrt{{{\left(x+2 \right)}^{2}}+81}\$Taking square on both sides,\${{(x-2)}^{2}}+25= \${{(x+2)}^{2}}+81By solving, we get,\${{x}^{2}}+4-4x+25={{x}^{2}}+4+4x+81\$\$8x=-56\$\$x=-7\$The coordinate is \$\left(-7,0 \right)\$.\$\therefore \$The point that is equidistant from \$\left(2,-5 \right)\$ and \$\left(-2,9 \right)\$ is \$\left(-7,0 \right)\$.8. Find the values of \$y\$for which the distance between the points \$P\left(2,-3 \right)\$ and \$Q\left(10,y \right)\$ is \$10\$units.Ans:Given that,\$P\left(2,-3 \right)\$\$Q\left(10,y \right)\$The distance between these points is \$10\$ units.The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$.To find the distance between the points \$P\left(2,-3 \right)\$ and \$Q\left(10,y \right)\$\${{x}_{1}}=2\$\${{x}_{2}}=10\$\${{y}_{1}}=-3\$\${{y}_{2}}=y\$\$PQ=\sqrt{{{\left(10-2 \right)}^{2}}+{{\left(y-\left(-3 \right) \right)}^{2}}}\$\$=\sqrt{{{\left(-8 \right)}^{2}}+{{\left(y+3 \right)}^{2}}}\$\$=\sqrt{64+{{\left(y+3 \right)}^{2}}}\$Since the distance between them is \$10\$ units,\$\sqrt{64+{{\left(y+3 \right)}^{2}}}=10\$Squaring on both sides, we get,\$64+{{\left(y+3 \right)}^{2}}=100\$\${{\left(y+3 \right)}^{2}}=36\$\$y+3=\pm 6\$So, \$y+3=6\$\$y=3\$And, \$y+3=-6\$\$y=-9\$\$\therefore \$The possible values of \$y\$ are \$y=3\$ or \$y=-9\$.9. If \$Q\left(0,1 \right)\$ is equidistant from \$P\left(5,-3 \right)\$ and \$R\left(x,6 \right)\$, find the values of \$x\$. Also find the distance of \$QR\$ and \$PR\$.Ans:Given that,\$Q\left(0,1 \right)\$\$P\left(5,-3 \right)\$\$R\left(x,6 \right)\$To find,The values of \$x\$The distance of \$QR\$ and \$PR\$\$Q\$ is equidistant between \$P\$ and \$R\$.SO \$PQ=QR\$The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$\$\sqrt{{{\left(5-0 \right)}^{2}}+{{\left(-3-1 \right)}^{2}}}\$\$=\sqrt{{{\left(0-x \right)}^{2}}+{{\left(1-6 \right)}^{2}}}\$\$\sqrt{{{\left(5 \right)}^{2}}+{{\left(-4 \right)}^{2}}}\$\$=\sqrt{{{\left(-x \right)}^{2}}+{{\left(-5 \right)}^{2}}}\$\$\sqrt{25+16}=\sqrt{{{x}^{2}}+25}\$Squaring on both sides, we get,\$41={{x}^{2}}+25\$\${{x}^{2}}=16\pi \$ x = ±4Thus the point \$R\$ is \$R\left(4,6 \right)\$ or \$\left(-4,6 \right)\$.To find the distance \$PR\$ and \$QR\$Case (1):When the point is \$R\left(4,6 \right)\$Distance between the point \$P\left(5,-3 \right)\$ and \$R\left(4,6 \right)\$ is,\$PR=\sqrt{{{\left(5-4 \right)}^{2}}+{{\left(-3-6 \right)}^{2}}}\$\$=\sqrt{{{\left(1 \right)}^{2}}+{{\left(-9 \right)}^{2}}}\$\$=\sqrt{1+81}\$\$=\sqrt{82}\$Distance between the point \$Q\left(0,1 \right)\$ and \$R\left(4,6 \right)\$,\$QR=\sqrt{{{\left(0-4 \right)}^{2}}+{{\left(1-6 \right)}^{2}}}\$\$=\sqrt{{{\left(-4 \right)}^{2}}+{{\left(-5 \right)}^{2}}}\$\$=\sqrt{16+25}\$\$=\sqrt{41}\$Case (2):When the point is \$R\left(-4,6 \right)\$Distance between the point \$P\left(5,-3 \right)\$ and \$R\left(4,6 \right)\$,\$PR=\sqrt{{{\left(5-\left(-4 \right) \right)}^{2}}+{{\left(-3-6 \right)}^{2}}}\$\$=\sqrt{{{\left(9 \right)}^{2}}+{{\left(-9 \right)}^{2}}}\$\$=\sqrt{81+81}\$\$=\sqrt{162}\$\$=9\sqrt{2}\$Distance between the point \$Q\left(0,1 \right)\$ and \$R\left(4,6 \right)\$,\$QR=\sqrt{{{\left(0-\left(-4 \right) \right)}^{2}}+{{\left(1-6 \right)}^{2}}}\$\$=\sqrt{{{\left(4 \right)}^{3}}+{{\left(-5 \right)}^{2}}}\$\$=\sqrt{16+25}\$\$=\sqrt{41}\$10. Find a relation between \$x\$ and \$y\$ such that the point \$\left(x,y \right)\$ is equidistant from the point \$\left(3,6 \right)\$ and \$\left(-3,4 \right)\$.Ans:Given that,\$\left(x,y \right)\$ is equidistant from \$\left(3,6 \right)\$ and \$\left(-3,4 \right)\$To find,The value of \$\left(x,y \right)\$Let \$P\left(x,y \right)\$ is equidistant from \$A\left(3,6 \right)\$ and \$B\left(-3,4 \right)\$Since they are equidistant,\$PA=PB\$\$=66\text{ c}{{\text{m}}^{3}}\sqrt{{{\left(x-3 \right)}^{2}}+{{\left(y-6 \right)}^{2}}}=\sqrt{{{\left(x-\left(-3 \right)^{2}} \right)}+{{\left(y-4 \right)}^{2}}}\$\$\sqrt{{{\left(x-3 \right)}^{2}}+{{\left(y-6 \right)}^{2}}}=\sqrt{{{\left(x+3 \right)}^{2}}+{{\left(y-4 \right)}^{2}}}\$Squaring on both sides, we get,\${{\left(x-3 \right)}^{2}}+{{\left(y-6 \right)}^{2}}={{\left(x+3 \right)}^{2}}+{{\left(y-4 \right)}^{2}}\$\${{x}^{2}}+9-6x+{{y}^{2}}+36-12y={{x}^{2}}+9+6x+{{y}^{2}}+16-8y\$\$36-16=12x+4y\$\$3x+y=5\$\$3x+y-5=0\$\$\therefore \$The relation between \$x\$ and \$y\$ is given by \$3x+y-5=0\$Exercise (7.2)1.Find the coordinates of the point which divides the join of \$\left(-1,7 \right)\$ and \$\left(4,-3 \right)\$ in the ratio \$2:3\$Ans:Given that,The points \$A\left(-1,7 \right)\$ and \$B\left(4,-3 \right)\$Ratio \$m:n=\$ \$2:3\$To find,The coordinatesLet \$P\left(x,y \right)\$ be the required coordinate By section formula,\$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]\$\$P\left(x,y \right)=\left[\frac{2\left(4 \right)+3\left(-1 \right)}{2+3},\frac{2\left(-3 \right)+3\left(7 \right)}{2+3} \right]\$\$=\left[\frac{8-3}{5},\frac{-6+21}{5} \right]\$\$=\left[\frac{5}{5},\frac{15}{5} \right]\$\$=\left(1,3 \right)\$\$\therefore \$The coordinates of \$P\$ is \$P\left(1,3 \right)\$.2. Find the coordinates of the point of trisection of the line segment joining \$\left(4,-1 \right)\$ and \$\left(-2,-3 \right)\$.Ans:Given that,The line segment joining \$\left(4,-1 \right)\$ and \$\left(-2,-3 \right)\$To find,The coordinates of the point Let the line segment joining the points be \$A\left(4,-1 \right)\$ and \$B\left(-2,-3 \right)\$Let \$P\left({{x}_{1}},{{y}_{1}} \right)\$ and \$Q\left({{x}_{2}},{{y}_{2}} \right)\$ are the points of trisection of the line segment joining the points \$AP=PQ=QB\$ From the diagram, the point \$P\$ divides \$AB\$ internally in the ratio of \$1:2\$Hence \$m:n=1:2\$By section formula,\$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]\$\$P\left({{x}_{1}},{{y}_{1}} \right)=\left[\frac{1\left(-2 \right)+1\left(4 \right)}{1+2},\frac{1\left(-3 \right)+2\left(-1 \right)}{1+2} \right]\$\$=\left[\frac{-2+8}{3},\frac{-3-2}{3} \right]\$\$=\left[\frac{6}{3},\frac{-5}{3} \right]\$\$=\left(2,-\frac{5}{3} \right)\$\$\therefore \$The coordinates of \$P\$ is \$P\left(2,-\frac{5}{3} \right)\$.From the diagram, the point \$Q\$ divides \$AB\$ internally in the ratio of \$2:1\$Hence \$m:n=2:1\$By section formula,\$Q\left({{x}_{2}},{{y}_{2}} \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]\$\$Q\left({{x}_{2}},{{y}_{2}} \right)=\left[\frac{2\left(-2 \right)+1\left(4 \right)}{2+1},\frac{2\left(-3 \right)+3\left(-1 \right)}{2+1} \right]\$\$=\left[\frac{-4+4}{3},\frac{-6-1}{3} \right]\$\$=\left[0,-\frac{7}{3} \right]\$\$\therefore \$The coordinates of \$Q\$ is \$Q\left(0,-\frac{7}{3} \right)\$.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\text{ m}\$ each. \$100\$ flower pots have been placed at a distance of \$1\text{ m}\$ from each other along \$AD\$, as shown in the following figure. Niharika runs \$\frac{1}{4}\text{ th}\$ the distance \$AD\$ on the \$2\text{nd}\$ line and posts a green flag. Preet runs \$\frac{1}{5}\text{ th}\$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:Given that,Niharika posted her green flag at a distance of \$P\$which is \$\frac{1}{4}\times 100=25\text{ m}\$from the starting point of the second line. The coordinate of \$P\$ is \$P\left(2,25 \right)\$Preet posted red flag at \$\frac{1}{5}\$ of a distance \$Q\$ which is \$\frac{1}{5}\times 100=20\text{ m}\$from the starting point of the eighth line. The coordinate of \$Q\$ is \$\left(8,20 \right)\$ The distance between any two points is given by the Distance formula,\$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}\$The distance between the flags \$P\left(2,25 \right),Q\left(8,20 \right)\$ is given by,\$PQ=\sqrt{{{\left(8-2 \right)}^{2}}+{{\left(25-20 \right)}^{2}}}\$\$=\sqrt{{{\left(6 \right)}^{2}}+{{\left(5 \right)}^{2}}}\$\$=\sqrt{36+25}\$\$=\sqrt{61}\text{ m}\$Rashmi should post her blue flag in the mid-point of the line joining points \$P\$ and \$Q\$. Let this point be \$M\left(x,y \right)\$.By section formula,\$M\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]\$\$M\left(x,y \right)=\left[

\frac{1\left(2 \right)+1\left(8 \right)}{1+1},\frac{1\left(25 \right)+1\left(20 \right)}{1+1} \right]$$=\left[\frac{2+8}{2},\frac{25+20}{2} \right]$$=\left[\frac{10}{2},\frac{45}{2} \right]$$=\left(5,22.5 \right)$$\therefore $Rashmi should place her blue flag at 22.5 m in the fifth line.4. Find the ratio in which the line segment joining the points $\left(-3,10 \right)$ and $\left(6,-8 \right)$ is divided by $\left(-1,6 \right)$Ans:Given that,The line segment $\left(-3,10 \right)$ and $\left(6,-8 \right)$The point $\left(-1,6 \right)$ divides the line segmentTo find,The ratio of dividing line segment Let the line segment be $A\left(-3,10 \right)$ and $B\left(6,-8 \right)$ divided by point $P\left(-1,6 \right)$in the ratio of $k:1$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$Equating the $x$term,$-1=\frac{6k-3}{k+1}$$-k-1=6k-3$$7k=2$$k=\frac{2}{7}$$\therefore $The point P divides the line segment AB in the ratio of $2:7$5. Find the ratio in which the line segment joining $A\left(1,-5 \right)$ and $B\left(-4,5 \right)$ is divided by the x axis. Also find the coordinates of the point of division.Ans:Given that,The line segment joining the points $A\left(1,-5 \right)$ and $B\left(-4,5 \right)$To find,The ratioThe coordinates of the point of division Let the ratio be $k:1$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$P\left(x,y \right)=\left[\frac{k\left(-4 \right)+1\left(1 \right)}{k+1},\frac{k\left(5 \right)+1\left(-5 \right)}{k+1} \right]$$=\left[\frac{-4k+1}{k+1},\frac{5k-5}{k+1} \right]$We know that y coordinate on x axis is zero.$\frac{5k-5}{k+1}=0$$5k-5=0$$5k=5$$k=1$Therefore x axis divides it in the ratio of $1:1$Division point, $P=\left(\frac{-4\left(1 \right)+1}{1+1},\frac{5\left(1 \right)-5}{1+1} \right)$$=\left(\frac{-4+1}{2},\frac{5-5}{2} \right)$$=\left(-\frac{3}{2},0 \right)$$\therefore $The ratio at which the line segment is divided is $1:1$ and the point of division is $\left(-\frac{3}{2},0 \right)$.6. If $\left(1,2 \right),\left(4,y \right),\left(x,6 \right)$ and $\left(3,5 \right)$ are the vertices of the parallelogram taken in order, find x and y.Ans:Given that,The vertices of the parallelogram are $A\left(1,2 \right),B\left(4,y \right),C\left(x,6 \right),D\left(3,5 \right)$To find,The value of x and y The diagonals of the parallelogram bisect each other at O. Intersection point O of diagonal AC and BDdivides these diagonals. So O is the midpoint of AC and BD.If O is the midpoint of AC,$O=\left(\frac{1+x}{2},\frac{2+6}{2} \right)$$=\left(\frac{1+x}{2},\frac{8}{2} \right)$$=\left(\frac{1+x}{2},4 \right)$If O is the midpoint of BD,$O=\left(\frac{4+3}{2},\frac{5+y}{2} \right)$$=\left(\frac{7}{2},\frac{5+y}{2} \right)$Equating the points of O,$\frac{x+1}{2}=\frac{7}{2}$ and $4=\frac{5+y}{2}$Finding x term,$\frac{x+1}{2}=\frac{7}{2}$$x+1=7$$x=6$Finding y term,$4=\frac{5+y}{2}$$5+y=8$$y=3$The value of x and y are $x=6$ and $y=3$7. Find the coordinates of point A, where AB is the diameter of circle whose center is $\left(2,-3 \right)$ and B is $\left(1,4 \right)$Ans:Given that,Center is $C\left(2,-3 \right)$The coordinate of B is $B\left(1,4 \right)$To find,The coordinate of ALet the coordinate of A be $A\left(x,y \right)$ Midpoint of AB is $C\left(2,-3 \right)$and so,$\left(2,-3 \right)=\left(\frac{x+1}{2},\frac{y+4}{2} \right)$Equating x term,$\frac{x+1}{2}=2$$x+1=4$$x=3$Equating y term,$\frac{y+4}{2}=-3$$y+4=-6$$y=-10$$\therefore $The coordinate of A is $A\left(3,-10 \right)$8. If A and B are $\left(-2,-2 \right)$ and $\left(2,-4 \right)$ respectively, find the coordinates of P such that $AP=\frac{3}{7}AB$ and P lies on the line segment AB.Ans:Given that,The coordinates are $A\left(-2,-2 \right)$ and $B\left(2,-4 \right)$$AP=\frac{3}{7}AB$To find, The coordinate of P $AP=\frac{3}{7}AB$$\frac{AB}{AP}=\frac{7}{3}$From the figure, $AB=AP+PB$$\frac{AP+PB}{AP}=\frac{3+4}{3}$$1+\frac{PB}{AP}=1+\frac{4}{3}$$\frac{PB}{AP}=\frac{4}{3}$$\therefore AP:PB=3:4$Thus, the point $P\left(x,y \right)$ divides the line segment AB in the ratio of $3:4$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$P\left(x,y \right)=\left[\frac{3\left(2 \right)+4\left(-2 \right)}{3+4},\frac{3\left(-4 \right)+4\left(-2 \right)}{3+4} \right]$$=\left[\frac{6-8}{7},\frac{-12-8}{7} \right]$$=\left[-\frac{2}{7},-\frac{20}{7} \right]$$\therefore $The coordinates of P is $P\left(-\frac{2}{7},-\frac{20}{7} \right)$.7. Find the coordinates of the points which divide the line segment joining $A\left(-2,2 \right)$ and $B\left(2,8 \right)$ into four equal parts.Ans;Given that,The line segment $A\left(-2,2 \right)$ and $B\left(2,8 \right)$To find,The coordinate that divides the line segment into four equal parts Form the figure, ${{P}_{1}},{{P}_{2}},{{P}_{3}}$ be the points that divide the line segment AB into four equal parts.Point ${{P}_{1}}$ divides the line segment AB in the ratio of $1:3$, so, By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$${{P}_{1}}\left(x,y \right)=\left[\frac{1\left(2 \right)+3\left(-2 \right)}{1+3},\frac{1\left(8 \right)+3\left(2 \right)}{1+3} \right]$$=\left[\frac{-4}{4},\frac{14}{4} \right]$$=\left(-1,\frac{7}{2} \right)$Point ${{P}_{2}}$ divides the line segment AB in the ratio of $1:1$, so, By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$${{P}_{2}}\left(x,y \right)=\left[\frac{1\left(2 \right)+1\left(-2 \right)}{1+1},\frac{1\left(8 \right)+1\left(2 \right)}{1+1} \right]$$=\left[\frac{2+\left(-2 \right)}{2},\frac{2+8}{2} \right]$$=\left(0,5 \right)$Point ${{P}_{3}}$ divides the line segment AB in the ratio of $3:1$, so, By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$${{P}_{3}}\left(x,y \right)=\left[\frac{3\left(2 \right)+1\left(-2 \right)}{3+1},\frac{3\left(8 \right)+1\left(2 \right)}{3+1} \right]$$=\left[\frac{6-2}{4},\frac{24+2}{4} \right]$$=\left(1,\frac{13}{2} \right)$The coordinates that divide the line segment into four equal parts are ${{P}_{1}}\left(-1,\frac{7}{2} \right),{{P}_{2}}\left(0,5 \right)$ and ${{P}_{3}}\left(1,\frac{13}{2} \right)$10. Find the area of the rhombus if its vertices are $\left(3,0 \right),\left(4,5 \right),\left(-1,4 \right)$ and $\left(-2,-1 \right)$ taken in order. (Hint: Area of a rhombus = $\frac{1}{2}$(Product of its diagonals))Ans:Given that,The vertices of the rhombus are $A\left(3,0 \right),B\left(4,5 \right),C\left(-1,4 \right)$ and $D\left(-2,-1 \right)$To find, The area of the rhombus The distance between any two points is given by the Distance formula,$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}$Distance between the diagonal AC is given by,$AC=\sqrt{{{\left(3-\left(-1 \right) \right)}^{2}}+{{\left(0-4 \right)}^{2}}}$$=\sqrt{{{\left(4 \right)}^{2}}+{{\left(-4 \right)}^{2}}}$$=\sqrt{16+16}$$=\sqrt{32}$$=4\sqrt{2}$Distance between the diagonal BD si given by,$BD=\sqrt{{{\left(4-\left(-2 \right) \right)}^{2}}+{{\left(5-\left(-1 \right) \right)}^{2}}}$$=\sqrt{{{\left(6 \right)}^{2}}+{{\left(6 \right)}^{2}}}$$=\sqrt{36+36}$$=\sqrt{72}$$=6\sqrt{2}$Area of the rhombus = $\frac{1}{2}\times $(Products of lengths of diagonals$=\frac{1}{2}\times AC\times BD$$=\frac{1}{2}\times 4\sqrt{2}\times 6\sqrt{2}$$=24$ square unitsExercise (7.3)1.Find the area of the triangle whose vertices are (i) $\left(2,3 \right),\left(-1,0 \right),\left(2,-4 \right)$Ans:Given that,The vertices of the triangle whose points are $A\left(2,3 \right),B\left(-1,0 \right),C\left(2,-4 \right)$To find,The area of the triangleArea of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Substitute the value of ${{x}_{1}},{{x}_{2}},{{x}_{3}}$ in the above formula,Area of given triangle$=\frac{1}{2}\left[2\left(0-\left(-4 \right) \right)+-1\left(-4-3 \right)+2\left(3-0 \right) \right]$$=\frac{1}{2}\left[8+7+6 \right]$$=\frac{21}{2}$ square unitsArea of the triangle with vertices $A\left(2,3 \right),B\left(-1,0 \right),C\left(2,-4 \right)$ is $\frac{21}{2}$ square units(ii) $\left(-5,-1 \right),\left(3,-5 \right),\left(5,2 \right)$Ans:Given that,The vertices of the triangle whose points are $A\left(-5,-1 \right),B\left(3,-5 \right),C\left(5,2 \right)$To find,The area of the triangleArea of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Substitute the value of ${{x}_{1}},{{x}_{2}},{{x}_{3}}$ in the above formula,Area of given triangle$=\frac{1}{2}\left[-5\left(-5-\left(-2 \right) \right)+3\left(2-\left(-1 \right) \right)+5\left(-1-\left(-5 \right) \right) \right]$$=\frac{1}{2}\left(35+9+20 \right)$$=32$ square unitsArea of the triangle with vertices $A\left(-5,-1 \right),B\left(3,-5 \right),C\left(5,2 \right)$ is 32 square units..2. In each of the following find the value of 'k', for which the points are collinear.(i) $\left(7,-2 \right),\left(5,1 \right),\left(3,-k \right)$Ans:Given that, The vertices of the triangle are $A\left(7,-2 \right),B\left(5,1 \right),C\left(3,-k \right)$The points are collinearTo find,The value of kIf the points are collinear, then,Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]=0$Substitute the value of ${{x}_{1}},{{x}_{2}},{{x}_{3}}$ in the above equation,$\frac{1}{2}\left[7\left(1-k \right)+5\left(k-\left(-2 \right) \right)+3\left(-2-1 \right) \right]=0$$7-7k+5k+10-9=0$$-2k+8=0$$2k=8$$k=4$$\therefore $The value of k is 4 (ii) $\left(8,1 \right),\left(k,-4 \right),\left(2,-5 \right)$Ans:Given that, The vertices of the triangle are $A\left(8,1 \right),B\left(k,-4 \right),C\left(2,-5 \right)$The points are collinearTo find,The value of kIf the points are collinear, then,Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]=0$Substitute the value of ${{x}_{1}},{{x}_{2}},{{x}_{3}}$ in the above equation,$\frac{1}{2}\left[8\left(-4-\left(-5 \right) \right)+k\left(-5-1 \right)+2\left(1-\left(-4 \right) \right) \right]=0$$8-6k+10=0$$6k=18$$k=3$$\therefore $The value of k is 3 3. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are $\left(0,-1 \right),\left(2,1 \right)$ and $\left(0,3 \right)$. Find the ratio of this area to the area of the given triangle.Ans:Given that,The vertices of the triangle are $A\left(0,-1 \right),B\left(2,1 \right),C\left(0,3 \right)$To find,The ratio of areas of two trianglesArea of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Area of the triangle $ABC=\frac{1}{2}\left[0\left(1-3 \right)+2\left(3-\left(-1 \right) \right)+0\left(-1-1 \right) \right]$$=\frac{1}{2}\left[8 \right]$$=4$square unitsA triangle is formed by joining the midpoints of the triangle ABC.Let D,E,F be the midpoints of the sides AB,BC,CA of the triangle respectively.$D=\left(\frac{0+2}{2},\frac{-1+!}{2} \right)$$=\left(1,0 \right)$$E=\left(\frac{0+0}{2},\frac{3-1}{2} \right)$$=\left(0,1 \right)$$F=\left(\frac{2+0}{2},\frac{1+3}{2} \right)$$=\left(1,2 \right)$Area of triangle DEF$=\frac{1}{2}\left[1\left(2-1 \right)+1\left(1-0 \right)+0\left(0-2 \right) \right]$$=\frac{1}{2}\left(2 \right)$$=1$ square unit$\therefore $Ratio of the triangle DEF to the ratio of the triangle ABC is $1:4$4. Find the area of the quadrilateral whose vertices, taken in order, are $\left(-4,-2 \right),\left(-3,-5 \right),\left(3,-2 \right)$ and $\left(2,3 \right)$Ans:Given that,The vertices of the triangle are $A\left(-4,-2 \right),B\left(-3,-5 \right),C\left(3,-2 \right),D\left(2,3 \right)$To find,The area of the quadrilateral $ABCD$Join AC so that it forms two triangles $\vartriangle ABC$ and $\vartriangle ACD$ Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Substituting the value of $A\left(-4,-2 \right),B\left(-3,-5 \right),C\left(3,-2 \right)$ in the above formula,Area of $\vartriangle ABC=\frac{1}{2}\left[-4\left(-5-\left(-2 \right) \right)+-3\left(-2-\left(-2 \right) \right)+3\left(-2-\left(-2 \right) \right) \right]$$=\frac{1}{2}\left[12+0+9 \right]$$=\frac{21}{2}$ square unitSubstituting the value of $A\left(-4,-2 \right),C\left(3,-2 \right),D\left(2,3 \right)$ in the above formula,Area of $\vartriangle ACD=\frac{1}{2}\left[-4\left(-2-\left(-3 \right) \right)+3\left(3-\left(-2 \right) \right)+2\left(-2-\left(-2 \right) \right) \right]$$=\frac{1}{2}\left[20+15+0 \right]$$=\frac{35}{2}$ square unitArea of quadrilateral $ABCD=$Area of $\vartriangle ABC+$Area of $\vartriangle ACD$$=\frac{21}{2}+\frac{35}{2}$$=\frac{56}{2}$$=28$ square unitThe area of the quadrilateral $ABCD$ is 28 square units.5. You have studied in Class IX that a median of a triangle divides it into two triangles of equal areas. Verify this result for $\vartriangle ABC$ whose vertices are $A\left(4,-6 \right),B\left(3,-2 \right)$ and $C\left(5,2 \right)$Ans:Given that,The vertices of the triangle are $A\left(4,6 \right),B\left(3,-2 \right),C\left(5,2 \right)$To verify,The median of the triangle divides the triangle into two triangles of equal areas. Let D be the midpoint of BC.$D=\left(\frac{3+5}{2},\frac{-2+2}{2} \right)$$=\left(\frac{8}{2},0 \right)$$=\left(4,0 \right)$$AD$ is the median of the $\vartriangle ABC$ and it divides the triangle into two triangles.Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Substituting the values of $A\left(4,6 \right),B\left(3,-2 \right)$ and $D\left(4,0 \right)$ in the above formula,Area of $\vartriangle ABD=\frac{1}{2}\left[4\left(-2-0 \right)+3\left(0-\left(-6 \right) \right)+\left(-6-\left(-2 \right) \right) \right]$$=\frac{1}{2}\left[-8+18-16 \right]$$=\frac{1}{2}\left(6 \right)$$=3$ square unitSubstituting the values of $A\left(4,6 \right),D\left(4,0 \right),C\left(5,2 \right)$ in the above formula,Area of $\vartriangle ADC=\frac{1}{2}\left[4\left(0-\left(-2 \right) \right)+4\left(2-\left(-6 \right) \right)+5\left(-6-0 \right) \right]$$=\frac{1}{2}\left(-8+32-30 \right)$$=-3$ square unitArea cannot be in negative value. So ignore the negative value.Both the areas are equal.$\therefore $Median AD of the triangle divides the triangle into two triangles of equal areasExercise (7.4)1.Determine the ratio in which the line $2x+y-4=0$ divides the line segment joining the points $A\left(2,-2 \right)$and $B\left(3,7 \right)$.Ans:Given that,A line x2x+y-4=0$A line segment joining the point $A\left(2,-2 \right)$ and $B\left(3,7 \right)$To determine,The ratioThe given line $2x+y-4=0$ divides the line segment joining the points $A\left(2,-2 \right)$ and $B\left(3,7 \right)$ in a ratio of $k:1$ at the point CBy section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$C\left(x,y \right)=\left[\frac{k\left(3 \right)+1\left(2 \right)}{k+1},\frac{k\left(7 \right)+1\left(-2 \right)}{k+1} \right]$$=\left[\frac{3k+2}{k+1},\frac{7k-2}{k+1} \right]$The point C also lies on the line $2x+y-4=0$Substituting the value of $C\left(x,y \right)$ in the given line, we get,$2\left(\frac{3k+2}{k+1} \right)+\left(\frac{7k-2}{k+1} \right)-4=0$By solving this, we get,$\frac{6k+4+7k-2-4k-4}{k+1}=0$$9k-2=0$$k=\frac{2}{9}$$\therefore $The ratio in which the line $2x+y-4=0$ divides the line joining two points $A\left(2,-2 \right)$ and $B\left(3,7 \right)$ is $2:9$ internally.2. Find a relation between x and y if the points $\left(x,y \right),\left(1,2 \right)$ and $\left(7,0 \right)$ are collinear.Ans:Given that,The points $A\left(x,y \right),B\left(1,2 \right),C\left(7,0 \right)$The points are collinearTo find,The relation between x and ySince the given points are collinear, then the area of the triangle formed by these points is equal to zero.Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Substituting the above points in the above formula, w get,Area $=\frac{1}{2}\left[x\left(2-0 \right)+1\left(0-y \right)+7\left(y-2 \right) \right]$$\frac{1}{2}\left[2x-y+7y-14 \right]=0$$2x+6y-14=0$$x+3y-7=0$$\therefore $The relation between x and y is $x+3y-7=0$3. Find the center of the circle passing through the points $\left(6,-6 \right),\left(3,-7 \right)$ and $\left(3,3 \right)$.Ans:Given that,Center passing through the points $A\left(6,-6 \right),B\left(3,-7 \right),C\left(3,3 \right)$To find,The center of the circleLet $O\left(x,y \right)$ be the center of the circle Distance from center $O$to the points A,B,C is the same since they form the radius of the circle.The distance between any two points is given by the Distance formula,$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}$$OA=\sqrt{{{\left(x-6 \right)}^{2}}+{{\left(y+6 \right)}^{2}}}$$OB=\sqrt{{{\left(x-3 \right)}^{2}}+{{\left(y+7 \right)}^{2}}}$$OC=\sqrt{{{\left(x-3 \right)}^{2}}+{{\left(y-3 \right)}^{2}}}$Equate $OA=OB$ since it represents radius$\sqrt{{{\left(x-6 \right)}^{2}}+{{\left(y+6 \right)}^{2}}}=\sqrt{{{\left(x-3 \right)}^{2}}+{{\left(y+7 \right)}^{2}}}$Squaring on both sides and solving them, we get,${{x}^{2}}+36-12x+{{y}^{2}}+36+12y={{x}^{2}}+9-6x+{{y}^{2}}+49+14y$$-6x-2y+14=0$$3x+y=7$ ......(1)Similarly, $OA=OC$ since it represents radius$\sqrt{{{\left(x-6 \right)}^{2}}+{{\left(y+6 \right)}^{2}}}=\sqrt{{{\left(x-3 \right)}^{2}}+{{\left(y-3 \right)}^{2}}}$Squaring on both sides and solving them, we get,${{x}^{2}}+36-12x+{{y}^{2}}+36+12y={{x}^{2}}+9-6x+{{y}^{2}}+9-6y$$-6x+18y+54=0$$-3x+9y=-27$ ......(2)By adding (1) and (2), w get,$10y=-20$$y=-2$Substituting $y=-2$ in the equation (1), we get,$3x-2=7$$3x=9$$x=3$$\therefore $The center of the circle is $C\left(3,-2 \right)$.4. The two opposite vertices of a square are $\left(-1,2 \right)$ and $\left(3,2 \right)$. Find the coordinates of the two other two verticesAns:Given that,The two opposite vertices of the square are $A\left(1,-2 \right)$ and $C\left(3,2 \right)$To find,The other two coordinatesLet $ABCD$ be a square having the vertices $A\left(-1,2 \right),B\left({{x}_{1}},{{y}_{1}} \right),C\left(3,2 \right),D\left({{x}_{2}},{{y}_{2}} \right)$ We know that,Sides of a square are equal$AB=BC$The distance between any two points is given by the Distance formula,$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}$The distance between AB and BC is given by,$\sqrt{{{\left(x-1 \right)}^{2}}+{{\left(y-2 \right)}^{2}}}=\sqrt{{{\left(x-3 \right)}^{2}}+{{\left(y-2 \right)}^{2}}}$Squaring on both sides and solving them, we get,${{x}^{2}}+2x+1+{{y}^{2}}-4y+4={{x}^{2}}+9-6x+{{y}^{2}}+4-4y$$8x=8$$x=1$We know that,All interior angles in a square are of angle $90{}^\circ $Consider $\vartriangle ABC$,By Pythagoras theorem,${{\left(AB \right)}^{2}}+{{\left(BC \right)}^{2}}={{\left(AC \right)}^{2}}$Distance formula is used to find the distance of AB,BC,AC and substituting them in the Pythagoras theorem,${{\left(\sqrt{{{\left(1+1 \right)}^{2}}+{{\left(y-2 \right)}^{2}}} \right)}^{2}}+{{\left(\sqrt{{{\left(1-3 \right)}^{2}}+{{\left(y-2 \right)}^{2}}} \right)}^{2}}={{\left(\sqrt{{{\left(3+1 \right)}^{2}}+{{\left(2-2 \right)}^{2}}} \right)}^{2}}$$4+{{y}^{2}}+4-4y+4+{{y}^{2}}-4y+4=16$$2{{y}^{2}}+16-8y=16$$2{{y}^{2}}-8y=0$$2y\left(y-4 \right)=0$$y=0\text{ or }4$$\therefore $The other two vertices are $B\left(1,0 \right)$ and $D\left(1,4 \right)$5. The class X students of a secondary school in Krishinagar have been allotted a rectangular plot of land for their gardening activity. Saplings of Gulmohar are plotted on the boundary at a distance of 1 m from each other. There is a triangular grassy lawn in the plot as shown in the following figure. The students are to sow seeds of flowering plants on the remaining area of the plot. (i) Taking A as origin, find the coordinates of the vertices of the triangleAns:Given that,Saplings are plotted 1 m from each otherBy taking A as origin, To find the coordinates of the vertices of the triangleFrom the diagram, it can be observed that the coordinates are $P\left(4,6 \right),Q\left(3,2 \right),R\left(6,5 \right)$Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Substitute the values of P,Q,R in the above formula, we get,Area of triangle $PQR=\frac{1}{2}\left[4\left(2-5 \right)+3\left(5-6 \right)+6\left(6-2 \right) \right]$$=\frac{1}{2}\left(-12-3+24 \right)$$=\frac{9}{2}$ square unit$\therefore $The coordinates are $P\left(4,6 \right),Q\left(3,2 \right),R\left(6,5 \right)$(ii) What will be the coordinates of the vertices of M PQR if C is the origin? Also calculate the areas of the triangles in these cases. What do you observe?Ans:Given that,Saplings are plotted 1 m from each otherTaking C as origin, CB as $x$axis, CD as y axisFrom the diagram, it can be observed that the coordinates are $P\left(4,6 \right),Q\left(3,2 \right),R\left(6,5 \right)$Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Substitute the value of P,Q,R in the above formula, we get,Area of the triangle $PQR=\frac{1}{2}\left[12\left(6-3 \right)+13\left(3-2 \right)+10\left(2-6 \right) \right]$$=\frac{1}{2}\left[36-13+40 \right]$$=\frac{9}{2}$ square unit$\therefore $The coordinates are $P\left(4,6 \right),Q\left(3,2 \right),R\left(6,5 \right)$The area of triangles are the same in both cases.6. The vertices of a $\vartriangle ABC$ are $A\left(4,6 \right),B\left(1,5 \right)$ and $C\left(7,2 \right)$. A line is drawn to intersect sides $AB$and AC at D and Erespectively, such that$\frac{AD}{AB}=\frac{AE}{AC}=\frac{1}{4}$. Calculate the area of the $\vartriangle ADE$ and compare it with the area of $\vartriangle ABC$. (Recall the converse of basic proportionality theorem and Theorem 6.6 related to Ratio of areas of two similar triangles.)Ans:Given that,The vertices of $\vartriangle ABC$ are $A\left(4,6 \right),B\left(1,5 \right),C\left(7,2 \right)$$\frac{AD}{AB}=\frac{AE}{AC}=\frac{1}{4}$To calculate the area of $\vartriangle ADE$ and compare it with $\vartriangle ABC$ From the diagram, we observe that D and $E$are the mid-points of AB and AC respectively so that they divide the line segment AB and AC in the ratio of $1:3$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$D\left(x,y \right)=\left[\frac{1\left(1 \right)+3\left(4 \right)}{1+3},\frac{1\left(5 \right)+3\left(6 \right)}{1+3} \right]$$=\left[\frac{1+12}{4},\frac{5+18}{4} \right]$$=\left[\frac{13}{4},\frac{23}{4} \right]$$E\left(x,y \right)=\left[\frac{1\left(7 \right)+3\left(4 \right)}{1+3},\frac{1\left(2 \right)+3\left(6 \right)}{1+3} \right]$$=\left[\frac{7+12}{4},\frac{2+18}{4} \right]$$=\left[\frac{19}{4},\frac{20}{4} \right]$Area of the triangle $=\frac{1}{2}\left[{{x}_{1}}\left({{y}_{2}}-{{y}_{3}} \right)+{{x}_{2}}\left({{y}_{3}}-{{y}_{1}} \right)+{{x}_{3}}\left({{y}_{1}}-{{y}_{2}} \right) \right]$Area of $\vartriangle ADE=\frac{1}{2}\left[4\left(\frac{23}{4}-\frac{20}{4} \right)+\frac{13}{4}\left(\frac{20}{4}-6 \right)+\frac{19}{4}\left(6-\frac{23}{4} \right) \right]$$=\frac{1}{2}\left[2-\frac{13}{4}+\frac{19}{16} \right]$$=\frac{1}{2}\left[\frac{67-52}{16} \right]$$=\frac{15}{32}$square unit.Area of $\vartriangle ABC=\frac{1}{2}\left[4\left(5-2 \right)+1\left(2-6 \right)+7\left(6-5 \right) \right]$$=\frac{1}{2}\left(12-4+7 \right)$$=\frac{15}{2}$ square unitThus the ratio of areas of $\vartriangle ADE$ to $\vartriangle ABC$ is $1:16$If a line segment in a triangle divides its two sides in the same ratio, then the line segment is parallel to the third side of the triangle. Thus these triangles are similar to each other.And the ratio between the areas of two triangles will be equal to the square of the ratio between the sides of the triangle.$\therefore $The ratio between the areas of the $\vartriangle ADE$ and $\vartriangle ABC$ is $1:16$7. Let $A\left(4,2 \right),B\left(6,5 \right)$ and $C\left(1,4 \right)$ be the vertices of the $\vartriangle ABC$(i) The median from A meets BC at D. Find the coordinates of point DAns:Given that,$A\left(4,2 \right),B\left(6,5 \right),C\left(1,4 \right)$ are the vertices of the given triangle.To find,The coordinates of point D Let AD be the median of the given triangle.So median D is the midpoint of BCSo, $D\left(x,y \right)=\left(\frac{6+1}{2},\frac{5+4}{2} \right)$$=\left(\frac{7}{2},\frac{9}{2} \right)$$\therefore $The coordinate of D is $\left(\frac{7}{2},\frac{9}{2} \right)$(ii) Find the coordinates of point P on AD such that $AP:PD=2:1$Ans:Given that,$A\left(4,2 \right),B\left(6,5 \right),C\left(1,4 \right)$ are the vertices of the given triangle.$AP:PD=2:1$To find,The coordinate of P Point P divides AB in the ratio of $m:n=2:1$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$P\left(x,y \right)=\left[\frac{2\left(\frac{7}{2} \right)+1\left(4 \right)}{2+1},\frac{2\left(\frac{9}{2} \right)+1\left(2 \right)}{2+1} \right]$$=\left[\frac{7+4}{3},\frac{9+2}{3} \right]$$=\left(\frac{11}{3},\frac{11}{3} \right)$$\because $The coordinates of p is $P\left(\frac{11}{3},\frac{11}{3} \right)$.(iii) Find the coordinate of point Q and R on medians BE and CF respectively such that $BQ:QE=2:1$ and $CR:RF=2:1$. What do you observe?Ans:Given that,$A\left(4,2 \right),B\left(6,5 \right),C\left(1,4 \right)$ are the vertices of the given triangle.$BQ:QE=2:1$$CR:RF=2:1$To find,Coordinate of Q and R 4to find the coordinate of EMedian BE of the triangle will divide the side AC in two equal parts.So E is the midpoint of $AC$$E=\left(\frac{4+1}{2},\frac{2+4}{2} \right)$$=\left(\frac{5}{2},\frac{6}{2} \right)$$=\left(\frac{5}{2},3 \right)$$Q$ divides BE in the ratio of $2:1$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$Q\left(x,y \right)=\left[\frac{2\left(\frac{5}{2} \right)+1\left(6 \right)}{2+1},\frac{2\left(3 \right)+1\left(5 \right)}{2+1} \right]$$=\left[\frac{5+6}{3},\frac{6+5}{3} \right]$$=\left(\frac{11}{3},\frac{11}{3} \right)$Median CF divide AB in the ratio of $2:1$.So F is the midpoint of $AB$$F=\left(\frac{4+6}{2},\frac{2+5}{2} \right)$$=\left(\frac{10}{2},\frac{7}{2} \right)$$=\left(5,\frac{7}{2} \right)$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$R\left(x,y \right)=\left[\frac{2\left(5 \right)+1\left(1 \right)}{2+1},\frac{2\left(\frac{7}{2} \right)+1\left(4 \right)}{2+1} \right]$$=\left[\frac{10+1}{3},\frac{7+4}{3} \right]$$=\left(\frac{11}{3},\frac{11}{3} \right)$The coordinates of Q and that of R is $\left(\frac{11}{3},\frac{11}{3} \right)$(iv) What do you observe?Ans:Given that,$A\left(4,2 \right),B\left(6,5 \right),C\left(1,4 \right)$ are the vertices of the given triangle.From the above observation, we found that the coordinates of P,Q,R are all the same. So, all these points are representing the same point on the same plane which is the centroid of the triangle.(v) If $A\left({{x}_{1}},{{y}_{1}} \right),B\left({{x}_{2}},{{y}_{2}} \right)$ and $C\left({{x}_{3}},{{y}_{3}} \right)$ are the vertices of $\vartriangle ABC$, find the coordinates of the centroid of the triangle.Ans:Given that,$A\left({{x}_{1}},{{y}_{1}} \right),B\left({{x}_{2}},{{y}_{2}} \right)$and $C\left({{x}_{3}},{{y}_{3}} \right)$ are the vertices of the $\vartriangle ABC$To find,The coordinate of the centroid of the triangleMedian AD divides the side BC into two equal parts. So D is the midpoint of $BC$$D=\left(\frac{{{x}_{2}}+{{x}_{3}}}{2},\frac{{{y}_{2}}+{{y}_{3}}}{2} \right)$Let the centroid of this triangle be O and O divides the side AD in the ratio of $2:1$By section formula,$P\left(x,y \right)=\left[\frac{m{{x}_{2}}+n{{x}_{1}}}{m+n},\frac{m{{y}_{2}}+n{{y}_{1}}}{m+n} \right]$$O\left(x,y \right)=\left[\frac{2\left(\frac{{{x}_{2}}+{{x}_{3}}}{2} \right)+1\left({{x}_{1}} \right)}{2+1},\frac{2\left(\frac{{{y}_{2}}+{{y}_{3}}}{2} \right)+1\left({{x}_{1}} \right)}{2+1} \right]$$=\left[\frac{{{x}_{1}}+{{x}_{2}}+{{x}_{3}}}{3},\frac{{{y}_{1}}+{{y}_{2}}+{{y}_{3}}}{3} \right]$The centroid of the triangle ABC with vertices $A\left({{x}_{1}},{{y}_{1}} \right),B\left({{x}_{2}},{{y}_{2}} \right)$,$C\left({{x}_{3}},{{y}_{3}} \right)$ is $\left[\frac{{{x}_{1}}+{{x}_{2}}+{{x}_{3}}}{3},\frac{{{y}_{1}}+{{y}_{2}}+{{y}_{3}}}{3} \right]$8. $ABCD$ is a rectangle formed by the points $A\left(-1,-1 \right),B\left(-1,4 \right),C\left(5,4 \right)$ and $D\left(5,-1 \right)$. P,Q,R and S are the midpoints of AB,BC,CD and DA respectively. Is the quadrilateral $PQRS$a square? A rectangle? Or a rhombus? Justify your answer.Ans:Given that,$A\left(-1,-1 \right),B\left(-1,4 \right),C\left(5,4 \right),D\left(5,-1 \right)$ are the vertices of the rectangle.To find,If $PQRS$ is a square or rectangle or rhombus Form the figure,P is the midpoint of $AB$$P=\left(\frac{-1-1}{2},\frac{-1+4}{2} \right)$$=\left(-\frac{2}{2},\frac{3}{2} \right)$$=\left(-1,\frac{3}{2} \right)$$Q=\left(\frac{-1+5}{2},\frac{4+4}{2} \right)$$=\left(2,4 \right)$$R=\left(\frac{5+5}{2},\frac{4+\left(-1 \right)}{2} \right)$$=\left(5,\frac{3}{2} \right)$$S=\left(\frac{-1+5}{2},\frac{-1-1}{2} \right)$$=\left(2,-1 \right)$The distance between any two points is given by the Distance formula,$d=\sqrt{{{\left({{x}_{1}}-{{x}_{2}} \right)}^{2}}+{{\left({{y}_{1}}-{{y}_{2}} \right)}^{2}}}$Distance between the points P and Q is,$PQ=\sqrt{{{\left(-1-2 \right)}^{2}}+{{\left(\frac{3}{2}-4 \right)}^{2}}}$$=\sqrt{9+\frac{25}{4}}$$=\sqrt{\frac{61}{4}}$Distance between the points Q and R is,$QR=\sqrt{{{\left(2-5 \right)}^{2}}+{{\left(4-\frac{3}{2} \right)}^{2}}}$$=\sqrt{9+\frac{25}{4}}$$=\sqrt{\frac{61}{4}}$Distance between the points R and S is,$RS=\sqrt{{{\left(5-2 \right)}^{2}}+{{\left(\frac{3}{2}+1 \right)}^{2}}}$$=\sqrt{9+\frac{25}{4}}$$=\sqrt{\frac{61}{4}}$Distance between the points S and P is,$SP=\sqrt{{{\left(2+1 \right)}^{2}}+{{\left(-1-\frac{3}{2} \right)}^{2}}}$$=\sqrt{9+\frac{25}{4}}$$=\sqrt{\frac{61}{4}}$Distance between the diagonals P and R is,$PR=\sqrt{{{\left(-1-5 \right)}^{2}}+{{\left(\frac{3}{2}-\frac{3}{2} \right)}^{2}}}$$=\sqrt{{{6}^{2}}}$$=6$Distance between the diagonals Q and S is,$QS=\sqrt{{{\left(2-2 \right)}^{2}}+{{\left(4+1 \right)}^{2}}}$$=\sqrt{{{5}^{2}}}$$=5$From the above calculation, we observe that all sides of the quadrilateral are of the same length but the diagonals are different lengths. $\therefore PQRS$ is a rhombus..NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry - PDF DownloadYou can opt for Chapter 7 - Coordinate Geometry NCERT Solutions for Class 10 Maths PDF for Upcoming Exams, and also You can Find the Solutions of All the Maths Chapters below.NCERT Solutions for Class 10 Maths PDFs (Chapter-wise)Coordinate GeometryCoordinate Geometry is the branch of Mathematics that helps us exactly locate a given point with the help of an ordered pair of numbers. Coordinate geometry is also known as Cartesian Geometry. It helps you find the distance between two points whose coordinates are given. You can also find the coordinates of the point which divides the line segment joining two given points in the given ratio. Also you will learn how to find the area of a triangle in terms of the coordinate of its vertices.There are five sections and four exercises covered under Class 10 Maths Chapter 7 NCERT Solutions. The five sections are introduction to coordinate geometry, formula to calculate distance between two pints, finding the coordinate of the point dividing the line in a particular ratio called section formula and finding the area of triangle in the form of coordinates of their vertices.And the Related Four Exercises Based on These Concepts are:Exercise 7.1 Introduction and Distance FormulaExercise 7.2 Section FormulaExercise 7.3 area of TriangleExercise 7.4 Miscellaneous examplesExercise 7.1 consisted of the basic Coordinate Geometry problems and problems on distance between two points. It helps you to find the distance between any two points given on a plane.Exercise 7.2 consisted of Section Formula. Section Formula deals with finding the coordinates of a point dividing the line in the particular ratio.Exercise 7.3 has problems on the area of the triangle in the form of coordinates of the vertices.Exercise 7.4 has then miscellaneous problems on Distance Formula, Section Formula and Area of Triangle.NCERT Solutions for Class 10 Maths Chapter 7 ExcercisesWhat is Coordinate GeometryWe have studied number lines to mark any point. Descartes invented the idea of placing two perpendicular lines to each other on a plane, and locating points on the lines of the plane. The perpendicular lines may be in any direction but usually one line is horizontal and the other vertical.Coordinate Geometry is the branch of mathematics that helps us to exactly locate a given point with the help of an ordered pair of numbers. Coordinate geometry is the combination of geometry and algebra to solve the problems.Coordinate geometry is also said to be the study of graphs. Graphs are visual representations of our data. It can be in different forms like bar graphs, histograms, line graphs, etc.In these NCERT Solutions for Chapter 7 Maths Class 10, students will study different concepts and formulas related to coordinate geometry. Terms Related to Coordinate GeometryWhile studying coordinate geometry the students must be aware of some important terms related to coordinate geometry they are well explained in this chapter. From this figure, let us understand some important terms used in the coordinate formula of geometry.Axes of CoordinatesIn the above figure OX and OY are called X-axis and Y-axis respectively and both together are known as axes of coordinates.OriginThe point of intersection of the axes is called the origin; it is O.AbscissaThe distance of any point on the plane from the Y-axis is called the abscissa.OrdinateThe distance of any point on the plane from the X-axis is said to be ordinate.Coordinate of the OriginIt has zero distance from both the axes. Therefore the coordinates of the origin are (0, 0).QuadrantThe axes divide the plane into four parts. These four parts are said to be quadrants.A quadrant is ¼ th part of a plane divided by coordinate axes. The plane is called the coordinate plane or the XY-plane and the axes are called the coordinate axes. In the first quadrant, both the coordinates are positive.In the second quadrant, the y-coordinate is positive and x-coordinate is negative.In the third quadrant, both the coordinates are negative.In the fourth quadrant, the y-coordinate is negative and the x-coordinate is positive.Distance FormulaIn chapter 7 Maths Class 10 we learn about distance formulas for finding distance between two points. Finding the distance between the two points by using formula when the two coordinates of the points are given.Distance between two points O(x1,y1) and B(x2, y2) =OB = \[\sqrt{[(x_{2}-x_{1})^{2}+(y_{2}-y_{1})^{2}]}\] Section FormulaSection formula helps us in finding the coordinates of the point dividing the line in the ratio m:n.If P is the point dividing the line AB in the ratio m:n where coordinates of A(x1, y1) and B(x2, y2).The coordinates of P will be (mx2 + nx1/ m+ n , my2 + ny1/ m+ n) Area of TriangleIt will let us find the area of any triangle in terms of coordinates of its vertices. This formula will also be used in finding the area of quadrilaterals.Area of a Triangle = ½ |x1(y2−y3)+x2(y3−y1)+x3(y1−y2)| All the basic formulas of coordinate geometry will help you to solve your geometry and algebra problems. Chapter 7 maths Class 10 provides you the list of all formulas of coordinate geometry to solve all the related problems.Table of All Formulas of Coordinate GeometryGeneral Form of a LineAx + By + C = 0Where A , B, C are real numbers and x and y are variablesSlope Intercept Form of a Liney = mx + cWhere x and y are variables, c is constant and m is the slopePoint-Slope Formy− y1= m(x − x1)x1 ,y1,x2,y2 are the X Y coordinates and m is the slopeThe slope of a Line Using Coordinatesm = Δy/Δx = (y2 − y1)/(x2 − x1)The slope of a Line Using General Equationm = −(A/B)Intercept-Intercept Formx/a + y/b = 1Distance between two points O(x1,y1) and B(x2, y2)OB = \[\sqrt{[(x_{2}-x_{1})^{2}+(y_{2}-y_{1})^{2}]}\]For Parallel Lines,m1 = m2For Perpendicular Lines,m1m2 = -1Midpoint Formula/Section Formula M (x, y) = [½(x1 + x2), ½(y1 + y2)]Angle between Two Lines θ = tan-1 [(m1 – m2)/ 1 + m1m2]Area of a Triangle½ |x1(y2−y3)+x2(y3−y1)+x3(y1−y2)|Perpendicular Distance from a Point to a Lined = [|ax1 + by1 + c| / √(a2 + b2)]It is very important to get acquainted with these basic formulas of coordinate geometry. Chapter 7 Maths Class 10 coordinate formulas have been proven very helpful for students to solve the problems at a competitive level.Historical FactsRene Descartes, the Great French Mathematician of the seventeenth century, liked to lie in bed and think. One day, when lying in the bed he solved the problem of describing the position of a point in a plane. His method was based on the old concept of latitude and longitudeRene Descartes(1596-1650), a French Mathematician, came up with a system known as the cartesian coordinate system to describe the positions of points and lines in a plane. His latin name was Renatius Cartesius, hence the name cartesian plane was derived. He was referred to as the father of analytical geometry.Through cartesian coordinate or rectangular coordinate system, we can study the problems involving both geometry and algebra,Cartesian geometry is also termed as analytic geometry.Regular Practice Is The Key To Success."Success isn't something that just happens, success is learned, success is practiced." -Sparky AndersonToday it is strongly believed that success comes from regular practice. Intelligence also sometimes fails if not practiced. Maths needs a regular practice for perfection. Some people think Maths as a very tough subject, but if they have a regular practice of solving the problems they can crack any problem. Regular practice reduces the silly mistakes done during the examinations. Practising lots of problems makes you aware of all the possible questions related to any topic. It makes it easier to solve any problem during your final exams.NCERT syllabus is designed according to the caliber of the students. Practicing NCERT problems after understanding the concept makes the students more confident in that area. Practicing NCERT solutions brings more accuracy and increases the speed of problem-solving skills. Practicing not only improves your conceptual understanding but also improves your logical reasoning.Understanding the concept thoroughly and then solving the NCERT question will definitely increase your score in examinations.NCERT Solutions Provide the Following BenefitsImproves your accuracyMakes the concepts more clearIncreases your speed.It improves your logical reasoning.It makes you more confident in a particular area.What is Special About Vedantu's NCERT Solutions? Vedantu is a team of expert teaching professionals. Vedantu always tries to make the learning of any concept at the student level easy to understand. It explains the concept stepwise and more precisely along with the pictorial representation of the concept. The NCERT solutions are cross-checked by expert Mathematicians. Vedantu is a strong believer to impart quality education to students. NCERT solutions are given in simple language with alternate solutions and diagrammatic representation for easy understanding of the problem. Along with these Vedantu tries to make the learning fun by lowering the pressure of studies.The Main Features of Vedantu's NCERT Solution for Class 10 Coordinate Geometry are as Follows:Vedantu's NCERT solution for Class 10 coordinate geometry is designed in a very simple language.The solutions are divided into parts so that they can be easily understood by the students.The explanation is given in stepwise format.All the solutions are given at the student's level of understanding.The solutions are precise, brief and with relevant diagrams.They are given in proper stepwise format along with the necessary comments.The solutions are based on the latest NCERT syllabus and modern exam specifications.The solutions are properly formatted to reduce the unnecessary burden of lengthy solutions.Vedantu is a No.1 online teaching app. It provides you free pdf for Coordinate Geometry Class 10 NCERT Solutions. It also has the potential to help you score more in the examination. Vedantu tries their level best to provide quality education, by providing NCERT solutions for coordinate geometry Class 10. It also provides more practice questions for bringing the perfection in the concepts. NCERT solutions are 100% accurate. And they will be very helpful in the examination. Keep this Vedantu NCERT solution handy so that there will be no inconvenience during your study of coordinate geometry. NCERT solutions for Class 10 will help you to increase your score in the final examination.Why is Coordinate Geometry Important?Coordinate geometry helps you to locate the exact location of a point in a plane. Coordinate geometry provides us the link between algebra and geometry through lines, graphs, curves and equations.Coordinate geometry is also said to be the study of graphs. Graphs are visual representations of our data. It can be in different forms like bar graphs, histograms, line graphs, etc. Coordinate geometry Class 10 hlds a weightage of total 6 marks in the final board examination.Coordinate geometry basically explains four concepts introduction to coordinate geometry, distance formula, section formula and area of triangle.Deeper into ExercisesEach exercise is solved by vedantu experts. Every concept is followed by well defined exercises.Exercises are aimed to test your conceptual knowledge. All the problems of the exercises are based on the concepts explained earlier. Every problem has a step wise explanation. Students can easily understand the concept used behind the problems.besides these problems more examples are given to solve.Different types of problems are given to understand the concept thoroughly.Vedantu has studied all the exercise and variety of problems involved in each exercise.Exercise 7.1Exercise one is based on how to find distance between two points given on a plane. Exercise 7.1 contains a total 10 questions each of different types.By the end of this exercise the student will be able to find the distance between two points. With this property there are different types of problems in the exercise 7.1.We can calculate the distance between points and prove the types of triangle are isosceles, equilateral or types quadrilateral square, rhombus, rectangle or whether the points are collinear or not.Vedantu provides step wise solutions for every problem with relevant diagrams. Diagrams help us visualize the problem. With the distance formula we can even find the unknown values of x and y coordinate if the distance between the two points are given. Vedantu provides a stepwise explanation of the solution so that you can solve any similar problems..Exercise 7.2Exercise 7.2 deals with the section formula that is finding the coordinates of the point which divides the given line any any specific ratio. Section formula is derived by a well defined theorem. Exercise 7.2 has a total of 10 questions.It is basically given on four types of problems.Type1: Finding the section ratio or the end points of the segment when the section point is given.Type 2: Finding the section point when the section ratio is given.Type 3: Determination of the type of a given quadrilateral.Type 4: Finding the unknown vertex from given points. Every problem is based on distance formula and section formula. The solutions are given step wise with the conceptual explanation. Which will make the concepts more clear.Exercise 7.3Earlier we calculated the area of the triangle using formula. In these chapter 7 Coordinate geometry students have to find the area of the triangle in terms of the coordinates of its vertices.We can find the area of a triangle by finding the sides of the triangle by distance formula and then finding the area of the triangle by Heron's formula. But it becomes tedious if the length of the sides are in the form of irrational numbers. So we prefer to calculate the area in the terms of the coordinates of the vertices of the triangle. It will also help us to find the type of polygon when the coordinates are given.Using the formula for the area of the triangle we can even calculate the area of the quadrilateral, as the quadrilateral breaks up into two triangles.This exercise covers a total of 10 questions. They are based on four different types. Type 1: Finding the area of a triangle when the coordinates of the vertices are given.Type 2: finding the area of a quadrilateral when coordinates of its vertices are givenType 3: Finding collinearity of three pointsType 4: finding the desired results when the three points are collinear.It has a total of 5 questions.Exercise 7.4Exercise 7.4 is based on the miscellaneous concepts which is covered that is distance formula, section formula and area of triangle. There are a total of 8 questions. Which will be helpful for you to check your knowledge regarding the concepts. Exercise 7 is the test of your knowledge on overall coordinate geometry, students study the concepts and solve therealted problems, but when all the problems related to different concepts are given they get confused. Hence Exercise 7.4 is given to check your knowledge for the concepts are clear or not. All the 8 questions are of different types.Solving all these exercises will help you to master the coordinate geometry for Class 10. Vedantu's NCERT solutions will prove very helpful in solving these exercises with more ease.SummaryTo locate the position of an object or a point in a plane we require two perpendicular lines. One of them is horizontal and the other is vertical.The plane is called the cartesian plane or the coordinate plane and the lines are called the coordinate axes.The horizontal line is called the X-axis and the vertical line is called the Y-axis.The abscissa and ordinate of a given point are the distances of the point from Y-axis and X-axis respectively.The coordinates of any point on x-axis are of the form(x , 0).The coordinates of any point on x-axis are of the form(0, y).The distance between points P(x1 , y1) and Q(x2 , y2) is given by PQ = √[(x2 − x1)2 + (y2 − y1)2]Distance of point P(x, y) from the origin(0, 0) is given by OP = (x2 + y2)The coordinates of the point which divides the line joining the points P(x1, y1) and Q(x2, y2) internally in the ration m : n The coordinates of point will be (mx2 + nx1/ m+ n , my2 + ny1/ m+ n)The coordinates of the mid-point of the line segment joining the points P(x1, y1) and Q(x2, y2) .The coordinates of point will be (x1 + x2/2 , y1 + y2/ 2) The coordinates of the centroid of triangle formed by the points A(x1 , y1) , B(x2, y2) and C(x3, y3) are (x1 + x2 + x3/3 , y1 + y2 + y3/ 3)The area of the triangles formed by the points A(x1 , y1) , B(x2, y2) and C(x3, y3) is Area of a Triangle = ½ |x1(y2−y3)+x2(y3−y1)+x3(y1−y2)|If points A(x1 , y1) , B(x2, y2) and C(x3, y3) are collinear, then x1(y2−y3)+x2(y3−y1)+x3(y1−y2) = 0 This was the complete discussion of the NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry. Here, students have learnt about the important topics covered in the chapter along with the NCERT solutions to the exercise, examples, and miscellaneous. To get a proper understanding of the chapter, we highly recommend you download and practise the NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry. You can also download the PDF files for revision notes and important questions of Class 10 Maths Chapter 7 for enhanced preparation and improved performance.

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