RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1: RS Aggarwal Solutions for Class 10 Maths Chapter 16 Co-ordinate Geometry Exercise 16.1 provide detailed explanations and step-by-step solutions to help students understand the fundamentals of coordinate geometry.

This exercise focuses on the basics of plotting points on the Cartesian plane, understanding the concepts of the x-axis and y-axis, and calculating the distance between two points using the distance formula.

These solutions are an excellent resource for reinforcing classroom learning and preparing for exams.

RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1 Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1 prepared by subject experts from Physics Wallah provide a comprehensive overview of coordinate geometry.

With clear explanations and step-by-step instructions, these solutions help students grasp the basics of coordinate geometry, making it easier to solve related problems accurately and confidently.

RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1 PDF

The PDF link for RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1 is available below.

It includes step-by-step explanations to help students understand and master the concepts, making it an invaluable resource for exam preparation and homework help.

RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1 PDF

RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1 for the ease of the students –

Q. Find the distance between the points :

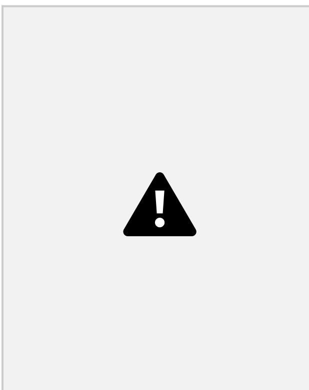
(i) A(9, 3) and B (15, 11) (ii) A (7, -4) and B(-5, 1)

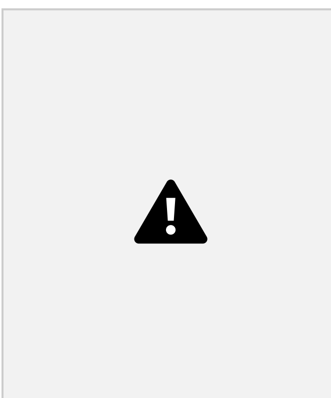
(iii) A(-6, -4) and B(9, -12) (iv) A (1, -3) and B (4, -6)

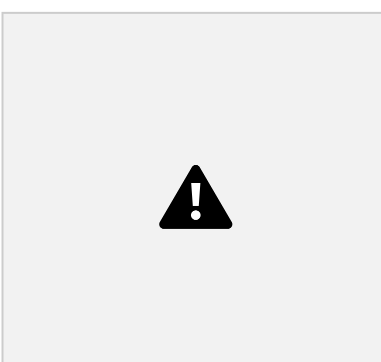
(v) P (a+b, a-b) and Q (a-b, a+b)

(vi) P (a sin α, a cos α) and Q (a cos α, - a sin α)

Solution:







Q. Find the distance of each of the following points from the origin:

(i) A(5, -12) (ii) B (-5, 5) (iii) C (-4, -6).

Solution:

(i) The distance of point (5,-12) from the origin is
Origin (0,0)
point (5,-12)

$\sqrt{[5^2+(-12)^2]} = \sqrt{25+144} = \sqrt{169}=13$

(ii) origin (0,0)
point (-5,5)
$\sqrt{(25+25)}=\sqrt{50}=5\sqrt{2}$

(iii) origin (0,0)
point (-4,-6)
$\sqrt{16+36}=\sqrt{52}=2\sqrt{13}$

Q. Find all possible values of y for which the distance between the points

A (2, -3) and B (10, y) is 10 units.

Solution:

We know that the distance between two points (x1,y1) and (x2,y2) ,

d=√(x2−x1)2+(y2−y1)2

Given d = 10 units and points are A (2, -3) and B (10, y)

∴ √(10−2)2+(y−−3)2=10

82+(y+3)2=100

(y+3)2+64=100

(y+3)2=100−64

(y+3)2=36

(y+3)=√36

(y+3)=±6

y=±6−3

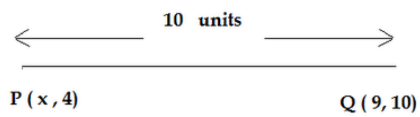
y=6−3 or −6−3

y=3 or −9

Q. Find the values of x for which the distance between the points P(x, 4) and Q(9, 10) is 10 units.

Solution:

Coordinates of P and Q are (x, 4) and (9, 10) and PQ = 10 units



→(PQ)2=(10)2units=100units

⇒9–x2+10–42=100

⇒ 81–x2–18\timesx+36=100

→81–x2–18×x+36=100

→x2–(18×x)+17=0

→(x–1)(x–17)=0

→x=1orx=17

Hence the value of x is either 1 or 17.

Q. Find the coordinates of the point on x-axis which is equidistant from the points (-2, 5) and (2, -3).

Solution:

On x axis, the y coordinate is 0

So, let us assume the point to be (x,0)

Distance from (-2,5) = Distance from (2,-3)

(x+2)2+25=(x−2)2+9

16= -8x

$x = -2$

So, the point required is (-2,0)

Q. Find points on the x-axis, each of which is at a distance of 10 units from the point A(11, -8).

Solution:

$\sqrt{(x-11)^2+(0+8)^2}=10$

Square both sides and expand

$x^2-22x+121+64=100$

$x^2-22x+85=0$

$(x-17)(x-5)=0$

$x=17$ or $x=5$

Q. Find the point on the y-axis which is equidistant from the points A(6, 5) and B(-4, 3).

Solution:

Let the point be (0 , y)

So, $\sqrt{6^2+(5-y)^2}=\sqrt{(-4)^2+(3-y)^2}$

On squaring both sides , we get

$36+25+y^2-10y=16+9+y^2-6y$

$61-10y=25-6y$

$10y-6y=61-25$

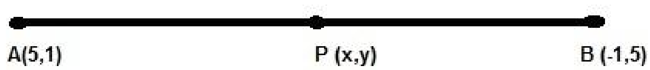
$4y=36$

So, $y = 9$

So, point = (0, 9)

Q. If the point P(x, y) is equidistant from the points A(5, 1) and B(-1, 5) prove that 3x = 2y.

Solution:



If P is equidistant from point A and B
then,AP:PB=1:1

Distance AP = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$=\sqrt{(x-5)^2+(y-1)^2}$
$AP^2=x^2+25-10x+y^2+1-2y$
$AP^2=x^2+y^2+26-10x-2y$

Distance $BP=\sqrt{(-1-x)^2+(5-y)^2}$
$BP^2=1+x^2+2x+25+y^2-10y$
$BP^2=26+x^2+y^2+2x-10y$

Since P is the midpoint.
$AP^2=BP^2$

$x^2+y^2+26-10x-2y=x^2+y^2+2x-10y+26$

$x^2-x^2+y^2-y^2+26-26-10x+2x=-10y+2y$
$-12x=-8y$
$-3x=-2y$
$3x=2y$

hence proved

Q. Find the coordinates of the point equidistant from three given points A(5, 3), B(5, -5) and C(1, -5).

Solution:

Let the required point be P(x,y). Then AP=BP=CP

That is, $(AP)^2=(BP)^2=(CP)^2$

This means, $(AP)^2=(BP)^2$

$\Rightarrow (x-5)^2+(y-3)^2=(x-5)^2+(y+5)^2$

$\Rightarrow x^2-10x+25+y^2-6y+9=x^2-10x+25+y^2+10y+25$

$\Rightarrow x^2+y^2-10x-6y+34=x^2+y^2-10x+10y+50$

$\Rightarrow x^2+y^2-10x-6y-x^2-y^2+10x-10y=50-34$

$\Rightarrow -16y=16$

$\Rightarrow y=-16/16=-1$

And $(BP)^2=(CP)^2$

$\Rightarrow (x-5)^2+(y+5)^2=(x-1)^2+(y+5)^2$

$\Rightarrow x^2-10x+25+y^2+10y+25=x^2-2x+1+y^2+10y+25$

$\Rightarrow x^2+y^2-10x+10y+50=x^2+y^2-2x+10y+26$

$\Rightarrow x^2+y^2-10x+10y-x^2-y^2+2x-10y=26-50$

$\Rightarrow -8x=-24$

$\Rightarrow y=-24/-8=3$

Hence the required point is (3,-1)

Q. If the point C(-2, 3) is equidistant from the points A(3, -1) and B(x, 8), find the values of x. Also, find the distance BC.

Solution:

given distance AC=distance BC

Q. (i) If the point P(2, 2) is equidistant from the points (a+b, b-a) and (a-b, a+b), prove that bx = ay.

(ii) If the distances of P(x, y) from A(5, 1) and B (-1, 5) are equal then prove that 3x = 2y.

Solution:

(i)

Distance between the points (x, y) and (a+b, b-a) & (a-b, a+b) is equal

$\Rightarrow \sqrt{[x-(a+b)]^2+[y-(b-a)]^2}=\sqrt{[x-(a-b)]^2+[y-(a+b)]^2}$

$\Rightarrow x^2+(a+b)^2-2x(a+b)+y^2+(b-a)^2-2y(b-a)=x^2+(a-b)^2-2x(a-b)+y^2+(a+b)^2-2y(a+b)$

$\Rightarrow -2ax-2bx-2by+2ay=-2ax+2bx-2ay-2by$

$\Rightarrow ay-bx=bx-ay$

$\Rightarrow 2ay=2bx$

$\Rightarrow bx=ay$

(ii)

It is given that P is equidistant from A and B.
So, PA = PB
Using distance formula,

then

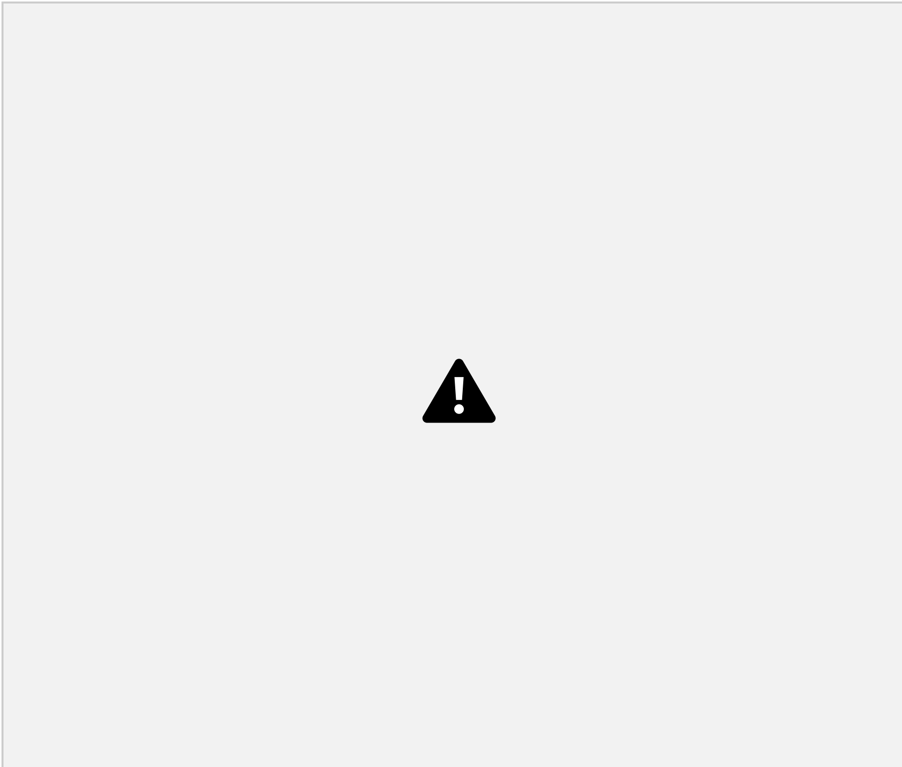
+ 25 - 10x + + 1 - 2y = + 1 + 2x + + 25 - 10y
- 12x = -8y
3x = 2y
Hence proved

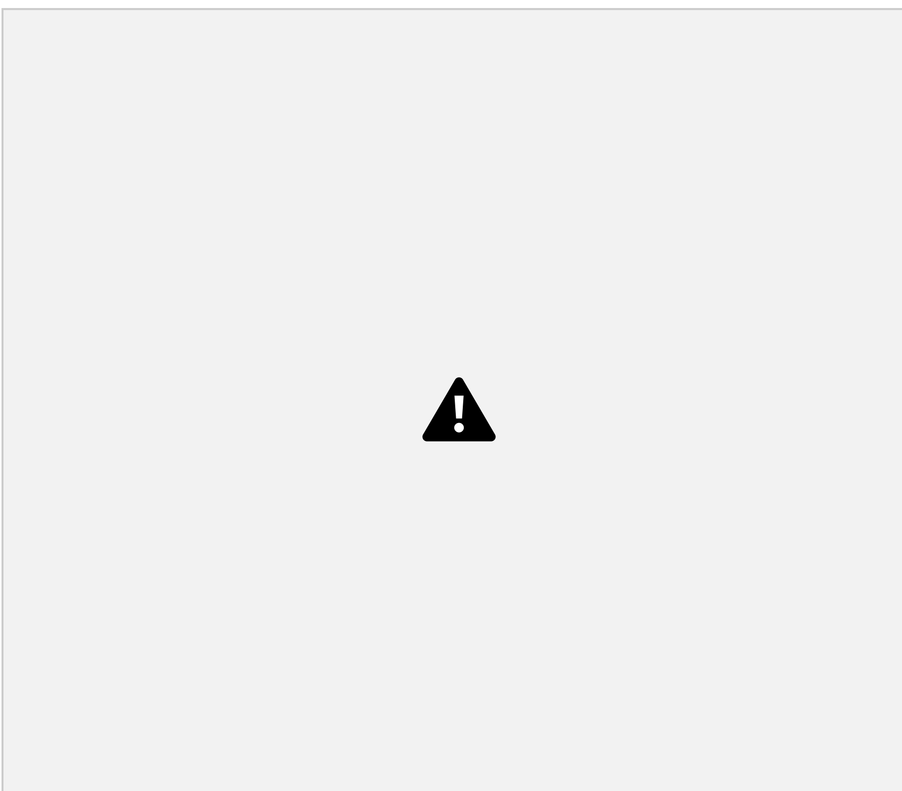
Q. Using the distance formula, show that the given points are collinear:

(i) (1, -1), (5, 2) and 9, 5 (ii) (6, 9), (0, 1) and (-6, -7)

(iii) (-1, -1), (2, 3) and (8, 11) (iv) (-2, 5), (0, 1) and (2, 3).

Solution:





Q. Show that the points A(7 , 10), B(-2, 5) and C(3, -4) are the vertices of an isosceles right triangle.

Solution:

The given points are A(7,10), B(-2,5) and C(3,-4)

AB =$\sqrt{(-2-7)^2+(5-10)^2}$

= $\sqrt{(-9)^2+(-5)^2}$

=$\sqrt{81+25}$=$\sqrt{106}$ units

BC = $\sqrt{(3-(-2))^2+(-4-5)^2}$

=$\sqrt{(5)^2+(-9)^2}$

= $\sqrt{25+81}$ =$\sqrt{106}$ units

AC =$\sqrt{(3-7)^2+(-4-10)^2}$

=$\sqrt{(-4)^2+(-14)^2}$

= $\sqrt{16+196}$ =$\sqrt{212}$units

Since, AB and BC are equal, they form the vertices of an isosceles triangle

Also,$(AB)^2+(BC)^2$
= $\sqrt{(106)^2}+\sqrt{(106)^2}$ = $\sqrt{212}$

and $(AC)^2$ = $(\sqrt{212})^2$= 212

Thus, $(AB)^2$ +$(BC)^2$ =$(AC)^2$

This shows that ΔABC is right angled at B

Therefore, the given points A(7,10), B(-2,5) and C(3,-4) are the vertices of an isosceles right-angled triangle.

Q. Show that the points (-3 , 3), (3, 3) and ($-3\sqrt{3}$, $3\sqrt{3}$) are the vertices of an equilateral triangle.

Solution:

The given points are A (-3,-3), B(3,3) and C($-3\sqrt{3}$,$3\sqrt{3}$). Now,

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

$= \sqrt{[(-6)^2+(-6)^2]}$

$= \sqrt{(36+36)}=\sqrt{72} = 6\sqrt{2}$

$BC = \sqrt{[(3+3\sqrt{3})^2+(3-3\sqrt{3})^2]}$

$=\sqrt{[9+27+18\sqrt{3}+9+27-18\sqrt{3}]}$

$= \sqrt{72}=6\sqrt{2}$

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

$=\sqrt{[9+27-18\sqrt{3}+9+27+18\sqrt{3}]}$

$= \sqrt{72}= 6\sqrt{2}$

AB=BC=AC

Hence the given points are the vertices of an equilateral triangle

Q. In the given figure P(5, -3) and Q(3, y) are the points of trisection of the line segment joining A(7, -2) and B(1, -5). Then y equals

(a) 2 (b) 4 (c) -4 (d) −52

Solution:

option a

Q. The area of a triangle with vertices A(5, 0), B(8, 0) and C(8, 4) in square units is

(a) 20 (b) 12 (c) 6 (d) 16

Solution:

Area of the triangle $=12|x1(y2-y3)+x2(y3-y1)+x3(y1-y2)|$

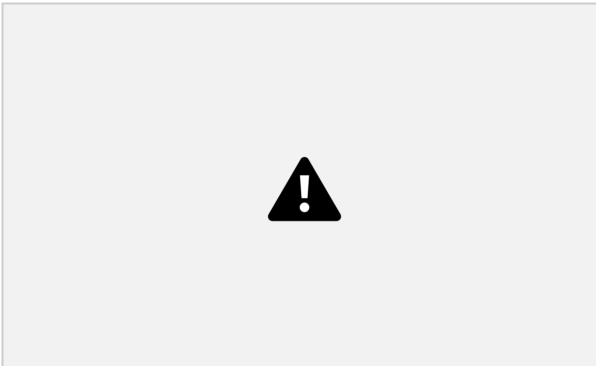
$=12|5(0-4)+8(4-0)+8(0-0)|$

$=12|-20+32|=6$ sq. units

Q. If A(-6, 7) and B(-1, -5) are two given points then the distance 2AB is

(a) 13 (b) 26 (c) 169 (d) 238

Solution:



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

(a) 3 units (b) 4 units (c) 5 units (d) 1 unit

Solution:

A pair of Cartesian coordinates (a,b) identifies the position of a point. That point is defined as being on the line x=a where it crosses the line y=b.

So by definition, that point is |b| from the X axis, and |a| from the y axis.
so the answer is 4 unit
option b is correct

Q. If P(-1, 1) is the midpoint of the line segment joining A(-3, b) and B(1, b+4) then b=?

(a) 1 (b) -1 (c) 2 (d) 0

Solution:

The given ports are A(-3,b) and B(1, b+4)

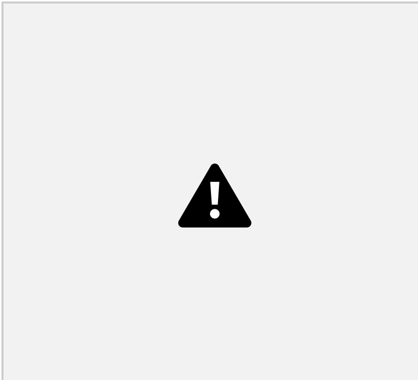
$y=b+b+421=2b+421=b+2b=-1$

Option B

Q. If A(4, 2), B(6, 5) and C(1, 4) be the vertices of △ABC and AD is a median, then the coordinates of D are

(a) (52, 3) (b) (5, 72) (c) (72, 92) (d) none of these

Solution:



Median AD of the triangle will divide the side BC in two equal parts.

Therefore, D is the mid-point of side BC.

D(x,y) = {(6+1)/2 , (5+4)/2} = {7/2 ,9/2}

(c) (7/2,9/2) is correct answer

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 16 Exercise 16.1

- **Clear Explanations:** The solutions provide detailed step-by-step explanations making complex concepts in coordinate geometry easy to understand.
- **Enhanced Understanding:** By working through these solutions students can deepen their understanding of plotting points understanding the Cartesian plane and using the distance formula.
- **Exam Preparation:** These solutions align with the Class 10 syllabus helping students prepare effectively for exams by focusing on the key concepts and types of questions that may appear.
- **Confidence Building:** With comprehensive solutions and explanations, students can build confidence in their ability to tackle coordinate geometry problems, leading to better performance in tests and exams.