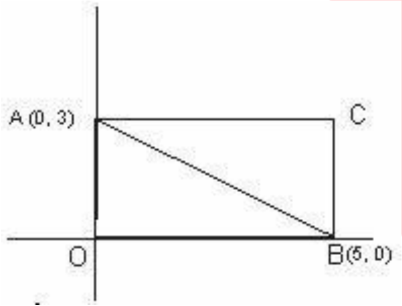
CBSE Test Paper 05
Chapter 7 Coordinate Geometry

1. The distance of the point (-5, 12) from the y-axis is **(1)**
   a. 12 units
   b. 5 units
   c. 13 units
   d. -5 units
2. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is **(1)**
   a. 15 units
   b. 10 units
   c. 9 units
   d. 12 units
3. AOBC is a rectangle whose three vertices are A(0, 3), O(0, 0) and B(5, 0). The length of its diagonal is **(1)**



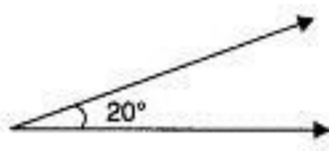
   a. $2\sqrt{34}$ units
   b. 3 units
   c. $\sqrt{34}$ units
   d. 4 units
4. A circle has its centre at the origin and a point P(5, 0) lies on it. Then the point Q(8, 6) lies_________the circle. **(1)**
   a. in side
   b. out side
   c. on
   d. None of these
5. The point where the medians of a triangle meet is called the_________of the triangle **(1)**
   a. circumcentre

b. centroid
c. orthocentre
d. None of these

6. Find the points X-axis which are at a distance of $2\sqrt{5}$ from the point(7,-4). How many such points are there? **(1)**

7. Find the coordinates of the midpoint of the line segment joining A(3, 0) and B(-5, 4). **(1)**

8. Find the complement of the given angle. **(1)**



9. Find the distance between the points A and B in A(5, - 8), B (-7, - 3) **(1)**

10. Find the distance between the following pairs of points: (a, b), (-a, -b) **(1)**

11. Find the distance of the point P(6, -6) from the origin. **(2)**

12. Find the distance between the points P(-6, 7) and Q(-1, -5). **(2)**

13. In what ratio does the point C(4, 5) divide the join of A(2, 3) and B(7, 8)? **(2)**

14. Show that quadrilateral PQRS formed by vertices P(22,5), Q(7,10), R(12,11) and S(3,24) is not a parallelogram. **(3)**

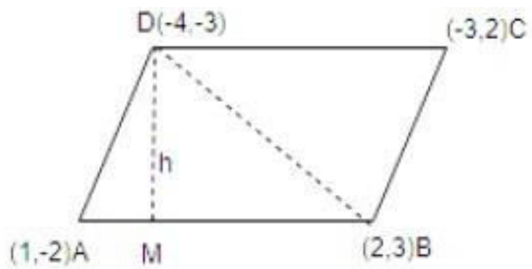
15. Find the coordinates of points which trisect the line segment joining (1, -2) and (-3, 4). **(3)**

16. Find the value(s) of p, if the points A(2, 3), B(4, k), C(6, - 3) are collinear. **(3)**

17. Show that the points A (2,-2), B(14,10), C (11, 13) and D(-1, 1) are the vertices of a rectangle. **(3)**

18. Find the coordinates of the points which divide the line segment joining A(-2, 2) and B(2, 8) into four equal parts. **(4)**

19. If the points A(1,-2), B(2,3), C(-3,2) and D(-4,-4) are the vertices of the parallelogram ABCD, then taking AB as the base, find the height of the parallelogram. **(4)**



20. Find the area of the triangle whose sides are along the lines x = 2, y = 0 and 4x + 5y = 20. **(4)**

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Solution

1. b. 5 units

   Explanation: The distance of any point from y-axis is its abscissa. Therefore, the required distance is 5 units.

2. d. 12 units

   Explanation: Given: the vertices of a triangle ABC, A(0, 4), B (0, 0) and C (3, 0).

   $\therefore$ Perimeter of triangle ABC = AB + BC + AC

   = $\sqrt{(0-0)^2+(0-4)^2}$+$\sqrt{0-3)^2+(0-0)^2}$ +$\sqrt{0-3)^2+(4-0)^2}$

   = $\sqrt{0+16}+\sqrt{9+0}+\sqrt{9+16}$

   = $\sqrt{16}+\sqrt{9}+\sqrt{25}$

   = 4 + 3 + 5 = 12 units

3. c. $\sqrt{34}$ units

   Explanation: In rectangle AOBC, AB is a diagonal.

   $\therefore$ AB = $\sqrt{(5-0)^2+(0-3)^2}$

   = $\sqrt{25+9}$ = $\sqrt{34}$ units

4. b. out side

   Explanation: Given: Coordinates of centre O (0, 0) and Radius is OP.

   $\therefore$ OP = $\sqrt{(5-0)^2+(0-0)^2}$

   = $\sqrt{25+0}$ = $\sqrt{25}$ = 5 units

   Now, OQ = $\sqrt{(8-0)^2+(6-0)^2}$ = $\sqrt{64+36}$ = $\sqrt{100}$ = 10 units

   Since OQ > OP

   Therefore, point Q lies outside the circle.

5. b. centroid

   Explanation: The point where three medians of a triangle meet is called the centroid of the triangle.it is the centre of gravity of the triangle. it divides the median in the ratio 2 :1

6. We have to find the points on X-axis which are at a distance of $2\sqrt{5}$ from the

point(7,-4). Also,we will how many such points are there.

Let, the point on X-axis be (x,0).

Now, by using distance formula,

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

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

Squaring both sides,

$\Rightarrow (x-7)^2 + 4^2 = (2\sqrt{5})^2$

$\Rightarrow x^2 - 14x + 49 + 16 = 20$

$\Rightarrow x^2 - 14x + 45 = 0$

$\Rightarrow$ (x - 9) (x - 5) = 0

$\Rightarrow x = 9 \; or \; x = 5$

Hence, two points exists (9,0) and (5,0)

7. Mid-point of the line segment joining the points A(3, 0) and B(-5, 4)

$= \frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}$

$= \left(\frac{3-5}{2}, \frac{0+4}{2}\right)$

$= \left(\frac{-2}{2}, \frac{4}{2}\right)$

=(-1, 2)

Hence the coordinate of mid point of line segment is (-1, 2).

8. Complement of the angle 20° = 90° – 20° = 70°

9. AB = $\sqrt{(-7-5)^2 + (-3+8)^2}$ = 13.

10. Applying Distance Formula to find distance between points (a, b) and (-a, -b), we get

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

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

11. Let P(6, -6) be the given point and O(0, 0) be the origin.

Then, $OP = \sqrt{(6-0)^2 + (-6-0)^2} = \sqrt{6^2 + (-6)^2}$

$= \sqrt{36+36} = \sqrt{72} = \sqrt{36 \times 2} = 6\sqrt{2} \; units.$

12. Here, x_1 = -6, y_1 = 7 and x_2 = -1, y_2 = -5

Therefore,by distance formula,we have,

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

$\Rightarrow \quad PQ = \sqrt{(-1+6)^2 + (-5-7)^2} = \sqrt{25+144} = \sqrt{169}$ = 13

13. Let the point C(4, 5) divides the join of A(2, 3) and B(7, 8) in the ratio k:1

The point C is $\left(\frac{7k+2}{k+1}, \frac{8k+3}{k+1}\right)$

But C is (4, 5)

$\Rightarrow \frac{7k+2}{k+1} = 4$ or 7k + 2 = 4k + 4

or 3k = 2 $\therefore k = \frac{2}{3}$

Thus, C divides AB in the ratio 2:3

14. Given vertices of quadrilateral are P(22, 5), Q(7, 10), R(12, 11) and S(3, 24).

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

$\sqrt{(7-22)^2 + (10-5)^2} = \sqrt{(-15)^2 + (5)^2} = \sqrt{(225) + (25)} = 5\sqrt{10}\ units$

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

$\sqrt{(12-7)^2 + (11-10)^2} = \sqrt{(5)^2 + (1)^2} = \sqrt{(25) + (1)} = \sqrt{26}\ units$

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

$\sqrt{(3-12)^2 + (24-11)^2} = \sqrt{(-9)^2 + (13)^2} = \sqrt{(81) + (169)} = 5\sqrt{10}\ units$

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

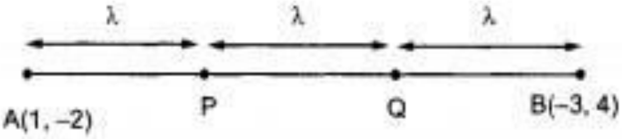
$\sqrt{(22-3)^2 + (5-24)^2} = \sqrt{(-19)^2 + (-19)^2} = 19\sqrt{2}\ units$

Here, we see that opposite sides of a quadrilateral are not equal i.e. $QR \neq SP$.

Hence, given vertices of a quadrilateral are not forming a parallelogram.

15. Let A (1, -2) and B (-3,4) be the given points.

Let the points of trisection be P and Q. Then, AP = PQ = QB = X(say)



PB = PQ + QB = 2λ and AQ = AP + PQ = 2λ

$\Rightarrow$ AP : PB = λ : 2λ = 1 : 2 and AQ : QB = 2λ : λ = 2 : 1

So, P divides AB internally in the ratio 1 : 2 while Q divides internally in the ratio 2: 1.

Thus, the coordinates of P and Q are

$P\left(\frac{1\times -3+2\times 1}{1+2}, \frac{1\times 4+2\times -2}{1+2}\right)$ = $P\left(\frac{-1}{3}, 0\right)$

$Q\left(\frac{2\times -3+1\times 1}{2+1}, \frac{2\times 4+1\times(-2)}{2+1}\right)$ = $Q\left(\frac{-5}{3}, 2\right)$

Hence, the two points of trisection are (-1/3, 0) and (-5/3, 2)

16. Let the points A (2, 3), B$(4, k)$ and C$(6, -3)$ be collinear.

If the points are collinear then area of triangle ABC formed by these three points is 0.

$\therefore \text{ar}(\Delta \text{ABC}) = \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] = 0$

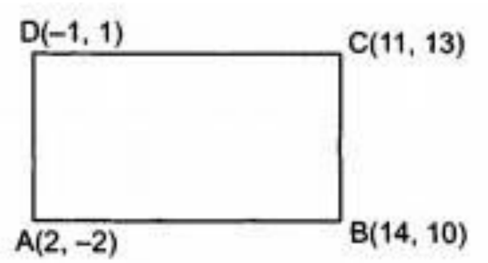
$\Rightarrow \frac{1}{2}[2(k+3) + 4(-3-3) + 6(3-k)] = 0$

$\Rightarrow [2k + 6 - 24 + 18 - 6k] = 0$

$\Rightarrow [-4k] = 0$

$\Rightarrow k = 0$

17. According to the question, A (2,-2), B(14,10), C (11, 13) and D(-1, 1)



AB = $\sqrt{(14-2)^2 + (10+2)^2} = 12\sqrt{2}$ units+

BC = $\sqrt{(11-14)^2 \quad (13-10)^2} = 3\sqrt{2}$ units

CD = $\sqrt{(-1-11)^2 + (1+13)^2}$ units $= 12\sqrt{2}$

AD AB = CD and BC = AD $\sqrt{(1 \quad 2)^2} = 3\sqrt{2}$

$\therefore$ ABCD is a parallelogram.

Now, AC = $\sqrt{(11-2)^2 + (13+2)^2} = \sqrt{306}$

$\Rightarrow$ AC^2 = 306 units, AB^2 = 288 units.

BC^2 = 18 units

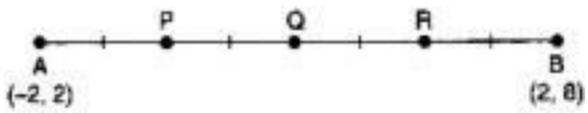
$AB^2 + BC^2$ = 306 units.

$\Rightarrow AC^2 = AB^2 + BC^2$

$\Rightarrow \angle ABC = 90^\circ$

$\Rightarrow$ ABCD is a rectangle

18. Let P (x_1, y_1) Q(x_2, y_2) and R(x_3, y_3) be the points which divide the line segment AB into four equal parts.



Then, P divides AB in the ratio 1 : 3 internally.

$x=\frac{mx_2+nx_1}{m+n}$

$\therefore x_1=\frac{(1)(2)+(3)(-2)}{1+3}$

$=\frac{2-6}{4}=-\frac{4}{4}=-1$

$y=\frac{my_2+ny_1}{m+n}$

$y_1=\frac{(1)(8)+(3)(2)}{1+3}$

$=\frac{8+6}{4}=\frac{14}{4}=\frac{7}{2}$

So, P $\rightarrow\left(-1,\frac{7}{2}\right)$

Also, Q divides AB in the ratio 1 : 1 i.e.

Q is the mid point of AB

$x_2=\frac{-2+2}{2}=0$

$y_2=\frac{2+8}{2}=\frac{10}{2}=5$

So, $Q\rightarrow(0,5)$

and, R divides AB in the ratio 3 : 1

$\therefore x_2=\frac{(3)(2)+(1)(-2)}{3+1}$

$=\frac{6-2}{4}=\frac{4}{4}=1$

$y_3=\frac{(3)(8)+(1)(2)}{3+1}$

$=\frac{24+2}{4}=\frac{26}{4}=\frac{13}{2}$

So, R $\rightarrow\left(1,\frac{13}{2}\right)$

19. Let DM = h be the height of the parallelogram ABCD when AB is taken as the base.

Area of $\triangle ABD=\frac{1}{2}\times(AB\times DM)$

$\Rightarrow\triangle ABD=\frac{1}{2}\times(AB\times h)$

$\Rightarrow h=\frac{2(area\ \triangle ABD)}{AB}$ ...(i)

Now, first find the length of AB by using distance formula,

AB = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ = $\sqrt{(2-1)^2+(3+2)^2)}=\sqrt{26}$

Since, the coordinates of vertices of $\triangle ABD$ are A(-1, 2),B(2, 3) and D(-4, -3).

Therefore,area of $\triangle ABD$ = $\frac{1}{2}$ |1(3 + 3) + 2(- 3 + 2) + (- 4)(- 2 - 3)|

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

= $\frac{1}{2}$ [6 -2 + 20]

= $\frac{1}{2}$ [24]

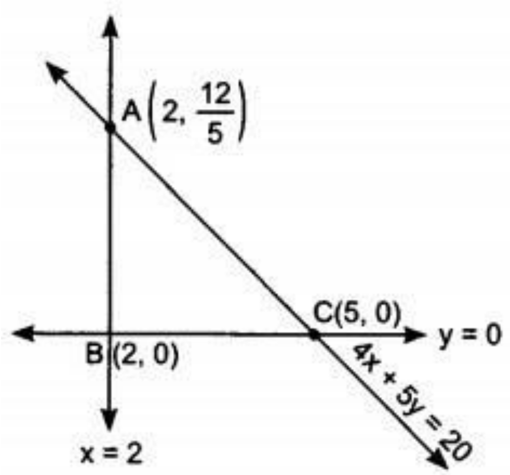
= 12 sq units

Now, putting the value of AB and area of $\triangle ABD$ in Eq(i), we get

$h = \frac{2\times12}{\sqrt{26}} = \frac{24}{\sqrt{26}} \times \frac{\sqrt{26}}{\sqrt{26}}$

$= \frac{24\sqrt{26}}{26}$

$= \frac{12\sqrt{26}}{13} units$

20. 

A is point of intersection of line x = 2 and 4x + 5y = 20

$\Rightarrow \quad 4 \times 2 + 5y = 20$

$\Rightarrow \quad y = \frac{12}{5}$

$\therefore$ Coordinates of A are $\left(2, \frac{12}{5}\right)$

B is the point of intersection of x = 2 and y = 0

$\therefore$ Coordinates of B are (2, 0).

C is point of intersection y = 0 and 4x + 5y = 20

$\Rightarrow \quad 4x + 5 \times 0 = 20$

$\Rightarrow$ x = 5

$\Rightarrow$ Coordinates of C are (5, 0)

Area $\triangle$ABC = $\frac{1}{2}\left|x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right|$

= $\frac{1}{2}\left|2(0-0) + 2\left(0 - \frac{12}{5}\right) + 5\left(\frac{12}{5} - 0\right)\right|$

= $\frac{1}{2}\left|\frac{-24}{5} + 12\right|$

= $\frac{1}{2} \times \frac{36}{5}$

= $\frac{18}{5}$ sq. units

= 3.6 sq. units