MBA PIONEER 2024

QUANTITATIVE APTITUDE

DPP: 10

Coordinate Geometry 1

Q1 If (1,4) and (-5,10) are the coordinates of one of the diagonals of a rhombus, then the equation of the other diagonal of the same rhombus is given by:

(A) y = -3x + 1 (B) y= x + 5
(C) y = -4x - 1 (D) y = x + 9

Q2 If the distance between the points (5, - 2) and (1, a) is 4, what are the values of a?

(A) -1 (B) -2
(C) 1 (D) 2

Q3 In a triangle ABC, if AB = 12 cm, BC = 16 cm, then what should be the length of AC such that the area of the triangle is maximum?

(A) 20 cm (B) 18 cm
(C) 25 cm (D) 24 cm

Q4 If the points A(8,6), B (7,4) and C(p,-2) are collinear, what is the value of p?

(A) -4 (B) 3
(C) 4 (D) 2

Q5 If there are 2 circles that touch each other externally with centers at (5,6) and (12,8), what is the sum of the radii of the two circles taken together?

(A) $\sqrt{45}$ units (B) $\sqrt{53}$ units
(C) 7 units (D) $\sqrt{51}$ units

Q6 If the points A(2,5), B(p,-4) and C(0,q) are collinear, and the relation between p and q is given by pq = Mp + Nq + X, then M + N + X is ______?

(A) 15 (B) 16
(C) 17 (D) 18

Q7 What is the slope of the tangent to the circle with its centre at (1,4) at the point (3,8) on the circle?

(A) 2 (B) -1/2
(C) -2/3 (D) 1/2

Q8 In a right angled triangle ABC, the inradius, r and circumradius R are 5 cm and 11 cm respectively. Then the area of the triangle ABC is _______.

(A) 135 sq. cm
(B) 85 sq. cm
(C) 55 sq. cm
(D) Cannot be determined

Q9 In a Cartesian coordinate system, the vertices of a triangle are given by the coordinates A(1, 4), B(5, - 2), and C(7, 3). Calculate the area of triangle ABC.

(A) 28 sq. units (B) 32 sq. units
(C) 16 sq. units (D) 21 sq. units

Q10 What is the approximate circumference of the circle which has its centre at (1,3) and one of the points which lies on the circle is (-2, -8)?

(A) 82 units (B) 80 units
(C) 62 units (D) 72 units

Q11 The point on the X axis which is equidistant from the points (4,5) and (9,8) is:

(A) $\left(\frac{62}{5}, 0\right)$ (B) $\left(\frac{104}{5}, 0\right)$

(C) $\left(\frac{52}{5}, 0\right)$ (D) $\left(\frac{42}{5}, 0\right)$

Q12 The vertices of a triangle are A(-3, 4), B(-1, 5), and C(3, 4). Find the coordinate of orthocenter of triangle ABC.
(A) (-1,12) (B) (2, -14)
(C) (3,8) (D) (4,5)

Q13 A triangle ABC has angles A = 80°, B = 60° and C = 40°. If the incentre of this triangle is at a point I, then the angle AIC = ?
(A) 110° (B) 130°
(C) 120° (D) 115°

Q14 The base and altitude of the right angled triangle are 8 cm and 6 cm respectively. What is the circumradius of the triangle?
(A) 10 cm (B) 5 cm
(C) 8 cm (D) 4 cm

Q15 What is the distance between the orthocentre and the circumcenter of a triangle who sides measure 48 cm, 52 cm and 20 cm?
(A) 26 cm (B) 24 cm
(C) 10 cm (D) 12 cm

Q16 If in a triangle ABC, the lengths of the sides AB, BC and AC are 7 cm, 12 cm and 11 cm respectively and a median dropped from point A intersects line BC at D, what is the length of median AD?
(A) 9 cm (B) 10 cm
(C) 7 cm (D) 6 cm

Q17 The vertices of a triangle are A(1, 2), B(3, 4), and C(5, 2). Find the coordinates of the centroid of triangle ABC.
(A) (3, 8/3) (B) (2,2)
(C) (4,4) (D) (3,4)

Q18 The coordinates of the point which divides the line joining (2,7) and (7,8) in the ratio 3:2 externally is _______.
(A) (17,11) (B) (10,17)
(C) (17,10) (D) (11,17)

Q19 Point P divides segment AB internally in the ratio 3:2. If coordinates of A and B are (2, 1) and (5, 4) respectively, then coordinates of P are:
(A) (3, 2) (B) (4, 3)
(C) $\left(\frac{19}{5}, \frac{14}{5}\right)$ (D) $\left(\frac{21}{5}, \frac{24}{5}\right)$

Q20 The 3 vertices of a triangle are (1, -5), (4, -1), (7, p). For what value of p, do the centroid, orthocenter, circumcenter and incenter lie on the same point?
(A) 3 (B) 5
(C) 2 (D) -3

Q21 What is the Y-intercept of the straight line given by the equation:
2y = 3x - 6
(A) 3 (B) -2
(C) 2 (D) -3

Q22 What is the angle (in degrees) between the straight lines 4y = 3x + 8 and 3y + 4x = 3?

Q23 Find the equation of a straight line that has its x intercept as 4 and is perpendicular to 2x+4y =5 ?
(A) y = 2x + 8 (B) y + 2x = 8
(C) y = 2x - 8 (D) y = x - 4

Q24 Find the equation of the line parallel to the line passing through (2,7) and (5,11) and having x intercept as -5.
(A) 3y = 4x + 20 (B) 4x = 3y + 20
(C) 4y = 3x + 20 (D) 3y + 20 = 4x

Q25 If x - ay + 4 = 0 and 3x + 9y + b =0 denote the same straight line, then the values of a and b are ?
(A) a = 3 and b = 12

(B) $a = -3$ and $b = 12$
(C) $a = -3$, and $b = -12$
(D) $a = 3$ and $b = -12$

Q26 Find the value of k for which the lines $2x + ky + 6$ and $8x - 12y + 8$ are parallel to each other.

(A) 3 (B) -3
(C) -4 (D) 4

Q27 Find the equation of a line intersecting the x-axis at a distance of 5 units to the left of the origin with a slope of - 3.

(A) $y = -3x - 12$ (B) $y = -3x + 15$
(C) $y = 3x - 15$ (D) $y = -3x - 15$

Q28 If the lines $2x + 3y + 8 = 0$ and $2y - 3x + 1 = 0$ intersect each other at (a,b).
Then $a + b = ?$

(A) -3 (B) -4
(C) 3 (D) 4

Q29 If the 3 lines $2x + 3y = 13$, $mx - y = 1$ and $x + 2y = 8$ intersect at 1 point, what is the value of m?

(A) 3 (B) -2
(C) 2 (D) 4

Q30 The slope of the line joining the midpoint of the line joining points (6,5) and (-2,1) and the point of intersection of lines $x + y = 8$ and $2x - y = 1$ is ?

(A) 2 (B) -2
(C) 3 (D) -3

Answer Key

Q1	(D)
Q2	(B)
Q3	(A)
Q4	(C)
Q5	(B)
Q6	(A)
Q7	(B)
Q8	(A)
Q9	(C)
Q10	(D)
Q11	(C)
Q12	(A)
Q13	(C)
Q14	(B)
Q15	(A)
Q16	(C)
Q17	(A)
Q18	(C)
Q19	(C)
Q20	(A)
Q21	(D)
Q22	90
Q23	(C)
Q24	(A)
Q25	(B)
Q26	(B)
Q27	(D)
Q28	(A)
Q29	(C)
Q30	(A)

Hints & Solutions

Q1 Text Solution:

The diagonals of a rhombus bisect each other, so the midpoint of the given diagonal is the midpoint of the other diagonal. The midpoint of the given diagonal is:

((1 - 5) / 2, (4 + 10) / 2) = (-2, 7)

Now, the other diagonal of the rhombus must be passing through (-2,7) and we know that the diagonals in a rhombus intersect each other at 90 degrees.

Hence,

Slope of the given diagonal $m_1 = \frac{y2-y1}{x2-x1} = \frac{10-4}{-5-1} = -1$

Let the slope of the other diagonal be m_2

For perpendicular lines, $m_1 . m_2 = -1$

So, $m_2 = 1$

Therefore the other diagonal passes through (-2,7) and has a slope of 1.

Equation of the other diagonal:

(y - 7) = m(x - (-2))

or, y - 7 = 1(x + 2)

or, y = x + 2 + 7

or, y = x + 9

Q2 Text Solution:

To find the value of 'a' in the given scenario, we can use the distance formula between two points in a two-dimensional coordinate system:

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

In this case, the given points are (5, -2) and (1, a), and the distance is 4. We can substitute these values into the formula and solve for 'a':

$$4 = \sqrt{((1 - 5)^2 + (a - (-2))^2)}$$

Simplifying the equation:

$16 = (1 - 5)^2 + (a + 2)^2$

$16 = (-4)^2 + (a + 2)^2$

$16 = 16 + (a + 2)^2$

$0 = (a + 2)^2$

To have a real solution, the expression on the right side of the equation must be zero. Therefore:

$(a + 2)^2 = 0$

Taking the square root of both sides:

a + 2 = 0

Subtracting 2 from both sides:

a = -2

Q3 Text Solution:

The area of a triangle with 2 given sides is:

$\frac{1}{2}$ AB.BC. Sin (∠ ABC)

The maximum value of Sin (∠ ABC) is 1 when ∠ABC = 90 degrees

Hence, for the area to be maximum, the triangle ABC has to be a right angled triangle.

So, AC becomes the hypotenuse of the triangle and its length is given by:

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

$AC^2 = 144 + 256$

$AC^2 = 400$

Therefore, AC = 20 cm.

Q4 Text Solution:

If points A(8,6), B (7,4) and C(p,-2) are collinear, then the slope of line segment AB must equal to the slope of line segment BC.

The slope of line segment AB is:

$\frac{6-4}{8-7} = 2$

The slope of line segment BC is:

$\frac{4-(-2)}{7-p} = \frac{6}{7-p}$

Since the slopes must be equal,

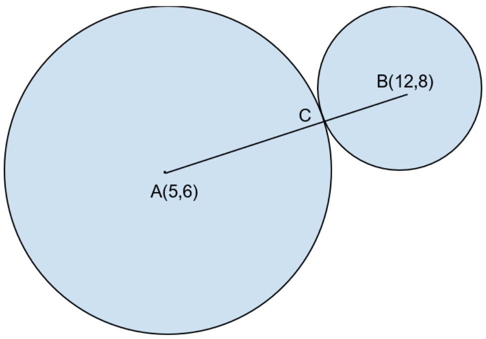
$\frac{6}{7-p} = 2$

or, 6= 14 - 2p

or, 2p = 8

Therefore p = 4

Q5 Text Solution:



The sum of the radii is AC + BC, which is the distance between the two centres (A and B)

So, using the distance formula,

$$AB = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$
$$= \sqrt{(8-6)^2 + (12-5)^2}$$
$$= \sqrt{4+49}$$
$$= \sqrt{53}\ units$$

Q6 Text Solution:

If the given 3 points are collinear, then the slopes between any 2 points must be equal.

Slope of AB $= \frac{5-(-4)}{2-p} = \frac{9}{2-p}$

Slope of AC $= \frac{5-q}{2-0} = \frac{5-q}{2}$

Equating the slopes, we have

$\frac{9}{2-p} = \frac{5-q}{2}$

or, 18 = 2(5 - q) - p(5 - q)

or, 18 = 10 - 2q -5p + pq

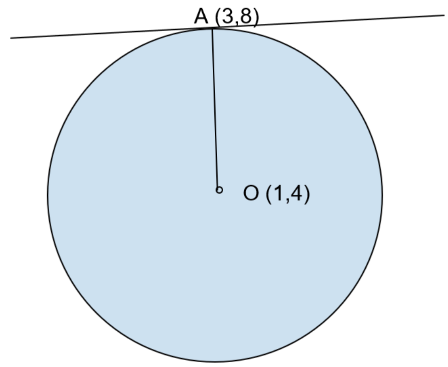
or, pq = 8 + 2q + 5p

Relating this to pq = Mp + Nq + X,

we see that M = 5, N = 2 and X = 8

Therefore M+N+X = 15

Q7 Text Solution:



We know that the tangent at the point on the circle is always perpendicular to the line joining the centre and the point of contact.

Using this, the slope of $AO = \frac{8-4}{3-1} = 2$

Therefore the slope of the tangent must be -1/2 (Product of slope of two perpendicular lines is -1)

Q8 Text Solution:

For a right angled triangle, the area can be directly found out using inradius and circumradius. We can use the following formula:

Area = r(r + 2R)

= 5(5 + 22)

= 5*27

= 135 sq. cm

Q9 Text Solution:

Area = 1/2* $|x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$

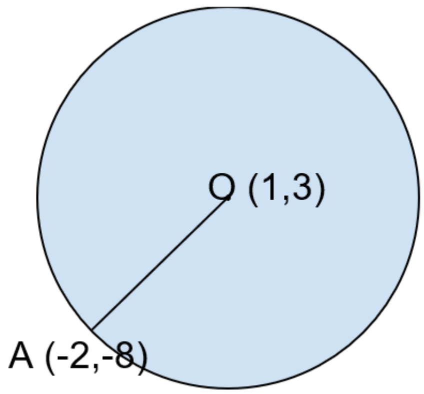
= 1/2* |1(-2 - 3) + 5(3 - 4) + 7(4 - (-2))|

= 1/2 * |-5 – 5 + 42|

= 1/2 * 32

= 16 sq. units

Q10 Text Solution:



Given the center of the circle (1, 3) and a point on the circle (-2, -8), we can use the distance formula to find the radius of the circle.

$$r = \sqrt{\left(3-(-8)\right)^2 + \left(1-(-2)\right)^2}$$
$$= \sqrt{121 + 9}$$
$$= \sqrt{130}$$

Now, The circumference of the circle is given by:

c = 2πr = 2 * π * $\sqrt{130}$ ≈ 71.60 units = 72 units(approx)

Q11 Text Solution:

The point on X axis can be taken as (x,0).

Using the distance formula, since the distance of (x,0) is equal between (4,5) and (9,8), we have:

$$\sqrt{5^2 + (4-x)^2} = \sqrt{8^2 + (9-x)^2}$$

or, 25 + 16 -8x + x^2 = 64 + 81 -18x + x^2

or, 41 -8x = 145 -18x

or, 10x = 104

or, $x = \frac{104}{10} = \frac{52}{5}$.

Q12 Text Solution:

To find the orthocenter of triangle ABC, we need to determine the point where the altitudes of the triangle intersect.

The altitude of a triangle is a perpendicular line segment drawn from a vertex to the opposite side or its extension.

Given the vertices:

A(-3, 4)

B(-1, 5)

C(3, 4)

Step 1: Find the slopes of the sides of the triangle.

The slope of AB:

m_{AB} = (y_2 - y_1) / (x_2 - x_1) = (5 - 4) / (-1 - (-3)) = 1 / 2

The slope of BC:

m_{BC} = (y_2 - y_1) / (x_2 - x_1) = (4 - 5) / (3 - (-1)) = -1 / 4

The slope of AC:

m_{AC} = (y_2 - y_1) / (x_2 - x_1) = (4 - 4) / (3 - (-3)) = 0

Step 2: Find the equations of the perpendicular lines (altitudes) passing through each vertex.

The equation of the altitude from vertex A (perpendicular to BC):

Since the slope of BC is -1/4, the slope of the altitude from A will be the negative reciprocal, which is 4 (perpendicular to BC).

Using point-slope form:

y - 4 = 4(x - (-3))

y - 4 = 4x + 12

y = 4x + 16

The equation of the altitude from vertex B (perpendicular to AC):

Since the slope of AC is 0, the slope of the altitude from B will be undefined (vertical line).

The equation is simply x = -1.

The equation of the altitude from vertex C (perpendicular to AB):

Since the slope of AB is 1/2, the slope of the altitude from C will be the negative reciprocal, which is -2 (perpendicular to AB).

Using point-slope form:

y - 4 = -2(x - 3)

y - 4 = -2x + 6

y = -2x + 10

Step 3: Find the intersection point of the altitudes.

To find the orthocenter, we need to find the intersection point of the three altitudes.

Solving the equations:

4x + 16 = -2x + 10 (equation of altitude from vertex A)

x = -1

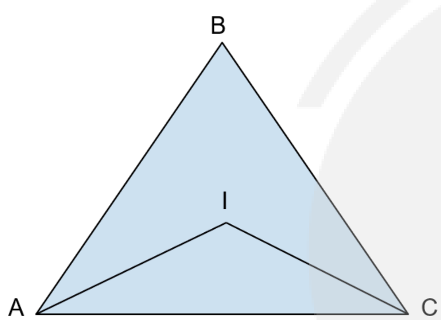
Substituting x = -1 into any of the equations (e.g., y = -2x + 10):

y = -2(-1) + 10

y = 12

Therefore, the orthocenter of triangle ABC is H(-1, 12).

Q13 Text Solution:



Incenter is the meeting point of angle bisectors.

AIC will form a triangle.

∠IAC = 40°, ∠ICA = 20°

Therefore, ∠AIC = 180° - (40° + 20°)

∠AIC = 120°

Q14 Text Solution:

For a right-angled triangle, the circumradius is given by:

R = Hypotenuse/2

The 2 sides of the triangle are 8 cm and 6 cm.

Hypotenuse = $\sqrt{8^2 + 6^2} = \sqrt{100}$ = 10 cm.

Therefore, the circumradius for the triangle is 10/2 cm = 5 cm.

Q15 Text Solution:

The sides measure 48 cm, 52 cm and 20 cm. 20, 48, 52 is a Pythagorean triplet!

So it is a right angled triangle we are talking about.

Draw the perpendicular bisectors to get the circumcenter. Orthocenter is the point where all altitudes meet.

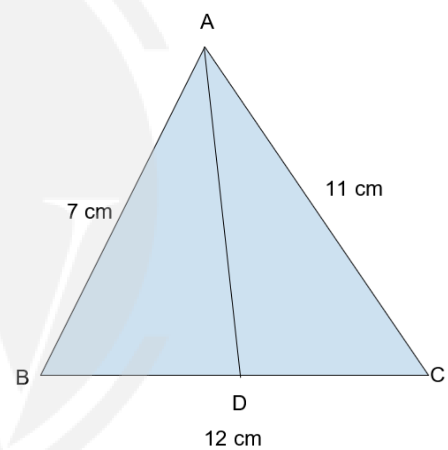
In a right angled triangle it is the vertex that makes 90 deg angle.

The distance between the orthocentre and circumcentre in a right angled triangle is nothing but the circumaradius.

Thus, the required distance will be 52/2 = 26

Q16 Text Solution:

We can use the Apollonius theorem here to calculate the length of the medium.



$$(AB)^2 + (BC)^2 = 2((AD)^2 + (BD)^2)$$
$$\Rightarrow (49 + 121 = 2((AD)^2 + (36))$$
$$\Rightarrow 170 = 2((AD)^2 + (36))$$
$$\Rightarrow 85 - 36 = (AD)^2$$
$$\Rightarrow 49 = (AD)^2$$

Therefore, AD = 7 cm.

Q17 Text Solution:

Here is a numerical question on the concept of centroid of a triangle:

The vertices of a triangle are A(1, 2), B(3, 4), and C(5, 2). Find the coordinates of the centroid of triangle ABC.

The centroid of a triangle is the point that is located at the intersection of the medians of the triangle. A median of a triangle is a line segment that connects a vertex of the triangle to the midpoint of the opposite side.

To find the centroid of triangle ABC, we simply do the sum of all the coordinates of the vertices and divide it by 3.

Therefore coordinates (x,y) of the centroid will be (1 + 3 + 5)/3 and (2+4+2)/3 i.e. 3, 8/3

Q18 Text Solution:

To find the coordinates of the required point, we will be using the section formula for external division:

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

$$y = \frac{my_2 - ny_1}{m-n},$$

where the ratio of external division is m:n.

So,

$$x = \frac{3(7)-2(2)}{3-2} = \frac{21-4}{1} = 17$$

$$y = \frac{3(8)-2(7)}{3-2} = \frac{24-14}{1} = 10$$

Hence, the required coordinate of the point is (17,10).

Q19 Text Solution:

The coordinates of P, which is dividing the given points in 3:2 can be given by:

$$\left(\frac{mx_2 + nx_1}{m+n}\right), \left(\frac{my_2 + ny_1}{m+n}\right)$$

Putting the values, we get:

$$\left(\frac{3*5 + 2*2}{3+2}\right), \left(\frac{3*4 + 2*1}{3+2}\right) = \left(\frac{19}{5}, \frac{14}{5}\right).$$

Q20 Text Solution:

The centroid, orthocenter, circumcenter and incenter lie on the same point only in case of an equilateral triangle.

Distance between the first 2 vertices

$$= \sqrt{\left(-1-(-5)\right)^2 + (4-1)^2}$$

$$= \sqrt{16+9} = 5\ units$$

Distance between the 2 other vertices is:

$= \sqrt{[p-(-1)]^2 + [7-4]^2}$ must be 5

So, $(p+1)^2 + 9 = 25$

or, $(p+1)^2 = 16$

or, p+1 = 4 or -4

Therefore p can have 2 values 3 or -5.

Q21 Text Solution:

The line given to us is:

2y = 3x - 6

⇒ 3x - 2y = 6

⇒ $\frac{3x - 2y}{6} = 1$

⇒ $\frac{x}{2} - \frac{y}{3} = 1$

Therefore, in the intercept form $\frac{x}{a} + \frac{y}{b} = 1$; the x and y intercepts are a and b respectively.

So, for the given line, the X and Y intercepts are 2 and -3.

Q22 Text Solution:

The first line 4y = 3x +8 can be re-written as or,

$y = \frac{3x+8}{4}$

or, $y = \frac{3x}{4} + 2$

Therefore slope of the first line, m1 = $\frac{3}{4}$

For the second line 3y = -4x + 3

or, $y = \frac{-4x}{3} + 1$

Therefore, slope of the second line, m2 = $\frac{-4}{3}$

We see that m1.m2 = -1

Therefore, the two given lines are perpendicular to each other (have 90° between them).

Q23 Text Solution:

First, we will find the slope of the given line.

Slope m of a line in the form ax+by+c =0 is given by -a/b .

For the first line, slope = -2/4 = -1/2

For the line perpendicular to the given line, the slope must be 2 so that the product of slope becomes -1 (when lines are perpendicular, the product of slopes is -1).

Hence, the slope for the required line = 2 and it passes through (4,0).

Therefore, the required line becomes y-0 = m(x-a)

⇒ y = 2(x-4)

⇒ y = 2x - 8.

Q24 Text Solution:

To find the equation of a line parallel to the line passing through (2, 7) and (5, 11) and having an x-intercept at -5, we need to determine the slope of the given line first.

The slope (m) between two points (x1, y1) and (x2, y2) is given by:

m = (y2 - y1) / (x2 - x1)

Using the coordinates (2, 7) and (5, 11), we can calculate the slope of the given line:

m = (11 - 7) / (5 - 2) = 4 / 3

Since the line we want to find is parallel to the given line, it will have the same slope of 4/3.

Now, let's determine the equation of the line using the slope-intercept form, y = mx + b, where m is the slope and b is the y-intercept.

We know that the line has an x-intercept at -5. The x-intercept represents the point where the line intersects the x-axis, so the y-coordinate at the x-intercept is 0.

Substituting the values (-5, 0) into the slope-intercept form equation:

0 = (4/3)(-5) + b

0 = -20/3 + b

b = 20/3

Therefore, the equation of the line parallel to the line passing through (2, 7) and (5, 11) and having an x-intercept at -5 is:

y = (4/3)x + 20/3

or, 3y = 4x+20

Q25 Text Solution:

If the 2 given lines are the same, then the ratio between the x coefficient, y coefficient and the constant must be the same.

Hence

$\frac{1}{3} = \frac{-a}{9} = \frac{4}{b}$

Therefore, a = -3 and b = 12.

Q26 Text Solution:

For two lines to be parallel, their slopes must be equal. The slopes of the two lines given are:

$m_1 = -\frac{2}{k}$

$m_2 = \frac{-8}{-12} = \frac{2}{3}$

The two slopes must be equal.

So, $\frac{-2}{k} = \frac{2}{3}$

or, k = -3

Q27 Text Solution:

To find the equation of a line intersecting the x-axis at a distance of 5 units to the left of the origin (-5, 0) with a slope of -3, we can use the point-slope form of a linear equation.

The point-slope form of a line is given by:

$y - y_1 = m(x - x_1)$

where (x_1, y_1) is a point on the line and "m" is the slope.

In this case, we have:

Point: (-5, 0)

Slope: -3

Substituting these values into the point-slope form, we get:

y - 0 = -3(x - (-5))

Simplifying the equation:

y = -3(x + 5)

Expanding the equation:

y = -3x - 15

Therefore, the equation of the line intersecting the x-axis at a distance of 5 units to the left of the origin (-5, 0) with a slope of -3 is y = -3x - 15.

Q28 Text Solution:

To find the coordinates (a, b) where the lines 2x + 3y + 8 = 0 and 2y - 3x + 1 = 0 intersect, we can solve the system of equations simultaneously.

Starting with the given equations:

$2x + 3y + 8 = 0$ ...(1)

$2y - 3x + 1 = 0$ ...(2)

We can solve this system of equations by using any method, such as substitution or elimination.

Let's solve it using the elimination method:

Multiply equation (1) by 3 and equation (2) by 2 to eliminate the x term:

$6x + 9y + 24 = 0$ ...(3) [3 times equation (1)]

$4y - 6x + 2 = 0$ ...(4) [2 times equation (2)]

Now, add equations (3) and (4) together:

$6x + (-6x) + 9y + 4y + 24 + 2 = 0$

Combining like terms:

$13y + 26 = 0$

Simplifying:

$13y = -26$

Dividing by 13:

$y = -2$

Now, substitute this value of y back into equation (1) or (2) to find the value of x:

$2y - 3x + 1 = 0$

Substituting $y = -2$:

$2(-2) - 3x + 1 = 0$

Simplifying:

$-4 - 3x + 1 = 0$

$-3x - 3 = 0$

$-3x = 3$

Dividing by -3:

$x = -1$

Therefore, the lines $2x + 3y + 8 = 0$ and $2y - 3x + 1 = 0$ intersect at the point (-1, -2).

The sum of the coordinates (a, b) is:

$a + b = -1 + (-2) = -3$

So, a + b is equal to -3.

Q29 Text Solution:

For the 3 lines to intersect at one point, and of the 2 lines must also be passing through the same point of intersection.

So, $2x + 3y = 13$ (1) and $x + 2y = 8$ (2) must have the same point of intersection through which the line $mx-y =1$ passes through.

So, $x + 2y =8$

$\Rightarrow 2x + 4y = 16$ (3)

Subtracting eqn 1 from eqn 3, we get,

$2x + 4y - 2x - 3y = 16 - 13$

$\Rightarrow y = 3$.

Putting y = 3 in eqn 2, we get,

$x + 6 = 8$

$\Rightarrow x = 2$

Therefore the point of intersection is (2,3).

Now, $mx - y = 1$ also passes through (2,3).

So, $m(2) - 3 = 1$

$\Rightarrow 2m = 4$

And m = 2

Q30 Text Solution:

To find the slope of the line joining the midpoint of the line joining points (6, 5) and (-2, 1) and the point of intersection of lines $x + y = 8$ and $2x - y = 1$, we need to follow these steps:

1. Find the midpoint of the line segment joining the points (6, 5) and (-2, 1).
2. Find the point of intersection of the lines $x + y = 8$ and $2x - y = 1$.
3. Calculate the slope of the line passing through the midpoint and the point of intersection.

Step 1: Finding the midpoint

The midpoint formula is given by:

midpoint = $((x_1 + x_2) / 2, (y_1 + y_2) / 2)$

Using the coordinates (6, 5) and (-2, 1), we can calculate the midpoint:

midpoint = $((6 + (-2)) / 2, (5 + 1) / 2)$

midpoint = $(4 / 2, 6 / 2)$

midpoint = (2, 3)

So, the midpoint of the line segment is (2, 3).

Step 2: Finding the point of intersection

To find the point of intersection, we can solve the system of equations formed by $x + y = 8$ and $2x - y = 1$.

Adding the two equations, we get:

$3x = 9$

$x = 3$

Substituting $x = 3$ into the first equation, we have:

$3 + y = 8$

$y = 5$

Therefore, the point of intersection is (3, 5).

Step 3: Calculating the slope

The slope of a line passing through two points (x1, y1) and (x2, y2) is given by:

slope = $(y_2 - y_1) / (x_2 - x_1)$

Using the coordinates of the midpoint (2, 3) and the point of intersection (3, 5), we can calculate the slope:

slope = $(5 - 3) / (3 - 2)$

slope = $2 / 1$

slope = 2

Therefore, the slope of the line joining the midpoint of the line joining points (6, 5) and (-2, 1) and the point of intersection of lines $x + y = 8$ and $2x - y = 1$ is 2.