

## **<u>CO-ORDINATE GEOMETRY</u>**

#### (Ref: FM-QAH2022014)

#### I) Basics

(a) What is the equation of the line parallel to the X-axis and passing through (5, 9)?
a) x = 5
b) y = 9

c) x + y = 14 d) x - y = -4

(b) What is the equation of the line parallel to the Yaxis and passing through (5, 9)? a) x = 5 b) y = 9c) x + y = 14 d) x - y = -4

- 2. If the line 2x + 3y + k = 0 passes through the point (3, 2), what is the value of k?
- 3. The distance between points A (2, -3) and B (-1, 1) in units is
  a) 5 b) 6
  c) 7 d) None of these
- 4. The distance from origin to the point. (-5, -12) is
  a) 5
  b) 12
  c) 13
  d) 17
- 5. The slope of the line that makes an angle of 60° with the positive X-axis is a)  $1/\sqrt{3}$  b)  $\sqrt{3}/2$

a) 1/ \J	0) 10/2
c) -√3	d) √3

6. (a) The equation of the line with slope -1 and y-intercept 3 is
a) x - y = 3
b) x - y + 3 = 0
c) x + y = 3
d) x + y + 3 = 0

(b) Find the equation of the line whose slope is 4/3 and x-intercept is 6. a) 3y = 4x - 24 c) 3y = -4x + 24

- b) 3y = 4x + 24 d) 4y = -3x + 18
- 7. The intercepts made by the line 3x 4y 12 = 0 on the X-axis and on the Y-axis respectively are
- 8. The equation of the line making intercepts of 3 and -2 on the X-axis and Y-axis respectively is
  a) 2x + 3y = 6
  b) 2x 3y 6 = 0
  - c) 3x + 2y = -6 d) 3x 2y 6 = 0
- 9. The lines 5x y + 6 = 0 and 4x + 3y + 1 = 0 intersect in the
  - a) 1<sup>st</sup> quadrant
  - b) 2<sup>nd</sup> quadrant
  - c) 3<sup>rd</sup> quadrant
  - d) 4<sup>th</sup> quadrant
- 10. The centroid of the triangle formed by joining the points A (2, 8), B (4, -2) and C (0, 6) is
  a) (6, 6)
  b) (4, 4)
  c) (1, 1)
  d) (2, 4)
- 11. If the lines 3x + y 4 = 0, x 3y + 2 = 0, 2x + 5y 1 = 0 form a right-angled triangle, then the vertex containing the right angle is \_\_\_\_\_. a) (-1, 1) b) (1, 1)

- c) (1, -1) d) (-1, -1)
- 12. If the line 2x + y k = 0 passes through the point of intersection of the lines 4x + y 13 = 0 and x 3y 13 = 0, then k =
- 13. L<sub>1</sub> is 2x + 3y 8 = 0 and L<sub>2</sub> is kx 9y + 24 = 0. L<sub>1</sub> and L<sub>2</sub> do not intersect. Find k.
  - a) 6 b) 1/6 c) -6 d) -1/6
- 14. Find the value of k, if the line (x + y 1) k (3x 7y + 12) = 0 is
  - a) Parallel to the x-axis
  - b) Parallel to the y-axis
  - c) Passes through the origin.

#### II) Distance formula & section formula

- 15. Find the radius of the circle with center (8, -5) and passing through the point (-4, -10).
- 16. Find the center of the circle which has (5, 12) and (3, -8) as the extremities of a diameter.
- 17. A (2, 4) and D (3, -3) are the ends of the median AD of a triangle ABC. Find the centroid of triangle ABC.
- 18. What kind of a triangle is formed by the points (1, 1), (-1, 4) and (4, 6)?
- 19. If (-1, 14), (3, 15) and (1, 12) are the three consecutive vertices of a parallelogram, find the fourth vertex.
- 20. The ratio in which the x-axis divides the line joining the points (4, 7) and (1, 1) is
  - a) 4:1 externally
  - b) 4:1 internally
  - c) 7:1 externally
  - d) 7:1 internally

#### III) Area

- 21. Find the area of the triangle formed by joining the points (5, 3), (3, 8) and (8, 10).
- 22. Find the area of the quadrilateral formed by joinin the points
  - (i) (4, 3), (4, 9), (8, 9) and (8, 3)
  - (ii) (5, 6), (8, 9), (13, 15) and (16, 20).
- 23. In triangle ABC, the midpoints of the sides AB, BC and AC are (-1, 3), (5, -2) and (5, -4) respectively. Find the
  - (i) centroid of triangle ABC.
  - (ii) area of triangle ABC.
  - (iii) vertex opposite to (5, -2).
- 24. Find the area of the pentagon formed by joining the points (1, -1), (2, 5), (3, 2), (-1, 7) and (-4, 1).



- 25. If the lines 4x y 1 = 0 and 12x 3y + 3 = 0 represent a pair of opposite sides of a square, then the area of the square is \_\_\_\_\_. a) 2/5 sq. unit b)  $36/\sqrt{153}$  sq. unit
  - c) 18/153 sq. unit d) 4/17 sq. unit

#### **IV)** Collinear

- 26. If (-4, 7), (k, -1) and (10, -9) are collinear, find the value of k.
- 27. If A(10,14), B(15, 19) and C(17, 21) are three collinear points.
  - (i) In what ratio does B divide the line segment AC?
  - (ii) In what ratio does the x-axis divide the line segment BC?
  - (iii) In what ratio does the line 6x + 7y 25 = 0 divide the line segment AB?
- 28. If the points (1. 7), (3, 3), and (7, k) are collinear, then k =
- 29. Which of the following points is collinear with the points (1, 3) and (3,7)?
  a) (0, 0)
  b) (-1, 1)
  c) (-2, -6)
  d) (2, 5)

#### V) Slope

30. (i) Find the value of a, if the slope of the line joining the points (-1, 4) and (a, -1) is -5/4.

(ii) If the lines 7x + 9y + 15 = 0 and kx + 3y + 10 = 0 are parallel, then find the value of k.

(iii) If the lines 4x + 7y + 18 = 0 and 21x + ky + 13 = 0 are perpendicular to each other, then find the value of k.

31. The slope of the line joining the points (a - b, a + b) and (-b, a) is \_\_\_\_\_\_

a) b/a	b) a/b
c) –b/a	d) –a/b

#### VI) Equation of line & angle between lines

- 32. Find the equation of the line passing through (3, -3) and
  - (i) Parallel to 3x + y + 1 = 0.
  - (ii) Perpendicular to 2x + 5y 2 = 0.
- 33. If A(8, 9), B(12, 14) and C(10, 16) are the vertices of triangle ABC, then find the equation of the median passing through A.
- 34. A(6, 7), B(10, 12), and C(8, 13) are the vertices of triangle ABC. Find the equation of the altitude passing through B.
- 35. A(3, 7), B(5, 7), and C(6, 9) are the vertices of triangle ABC, then find the equation of the perpendicular bisector of AB.

- 36. Find the equation of the line which passes through (1, -1) and makes an angle of 60° with x axis in the positive direction.
- 37. Find the equation of the line which passes through (7, 9) and whose intercepts on the axes are in the ratio 7 : 9.
- 38. Find the angle between the lines 3x + 5y 9 = 0 and x-4y+7=0.

#### VII) Circle & Quadrilateral

- 39. Find the equation of the circle with center (-3, 5) and radius 7 units.
- 40. A square is inscribed in the circle  $x^2 + y^2 8x + 10y 23 = 0$ . Find the area of the square.
- 41. If the center of a circle is (2, 2) and 4x + 3y 4 = 0 is a tangent to the circle, find the radius of the circle.
- 42. If the lines 3x + 4y 10 = 0 and 9x + 12y + 20 = 0 are tangents to a circle, then find the radius of the circle.
- 43. Find the shortest distance from the point (7, 24) to any point on the circle  $x^2 + y^2 = 289$ .
- 44. Find the number of points at which the line 3x 4y + 15 = 0 intersect the circle  $x^2 + y^2 = 36$ .
- 45. The lines x + y 2 = 0, x + y + 6 = 0 and x y 4 = 0 form three sides of a square. Find the equation of the fourth side.
- 46. If the line 4x 3y + k = 0 touches the circle  $x^2 + y^2 + 2x + 6y 39 = 0$  at exactly one point, find the value of k.
- 47. Find the shortest distance between the circles  $x^2 + y^2 + 6x lay + 9 = 0$  and  $x^2 + y^2 + 22x + 20y + 140 = 0$ .

#### VIII) Mixed

- 48. Find the transformed equation of 2x 3y + 7 = 0, when the origin is translated to (1, -1).
  - a) 2x 3y + 12 = 0
  - b) 2x 3y 12 = 0
  - c) 2x 3y 12 = 0
  - d) 2x + 3y − 12 =0
- 49. The transformed equation of x 2y + 5 = 0, when the axes are rotated by an angle of  $45^{\circ}$  in the anticlockwise direction is
  - a) 3X + Y 5 = 0
  - b)  $3X + Y + 5\sqrt{2} = 0$ .
  - c) x 3Y +  $5\sqrt{2} = 0$
  - d) X + 3Y 5 $\sqrt{2}$  =0
- 50. The maximum distance between any point on  $(x + 8)^2 + y^2 = 36$  and any point on  $x^2 + (y + 15)^2 = 64$  is



- 51. The number of points lying strictly inside the circle  $x^2$ +  $y^2$  = 9, which have integer coordinates is a) 30 b) 25 c) 13 d) 15
- 52. The point of intersection of 4x + 5y = 26 and y = kx + 2 has integral coordinates. What is the number of integral values that k can take?
- 53. At how many points does the line 8x 15y + 140 = 0meet the curve  $x^2 + y^2 = 64$ ?
- 54. The roots of the equation  $p^2 p 12 = 0$  represent the slope and the x-intercept of a line. Find the equation of the line.
  - a) y = 4x + 12
  - b) y = -3x + 12
  - c) Either a) or (B)
  - d) y = -4x + 12
- 55. Find the value of k for which the lines 3x + 4y = 14, 2x + 3y = 10 and 5x + ky = 16 are concurrent.
- 56. If the lines 2x + 3y + 4 = 0, 5x 7y 19 = 0 and 4x + ky + 6 = 0 arer2nirlent, then k = a) 5 b) 4 c) 3 d) -2
- 57. If the lines 2x + 3y 12 = 0, 3x + 4y 17 = 0 and 4x + ay 22 = 0 are concurrent, then find a.
- 58. A line makes an angle of 150° with the X axis. The sum of its intercepts on the coordinate axes is 3. Find its x intercept.

a) 
$$\frac{3\sqrt{3}(\sqrt{3}-1)}{2}$$
 b)  $\frac{3\sqrt{3}(\sqrt{3}-1)}{4}$   
c)  $\frac{3\sqrt{3}(\sqrt{3}+1)}{2}$  d)  $\frac{3\sqrt{3}(\sqrt{3}+1)}{4}$ 

- 59. The line 2x + 6y + k = 0 passes through the point of intersection of the lines 2x + 3y 13 = 0 and 3x + 2y 12 = 0. Find k.
  a) -20 b) -18
  - c) -16 d) -22
- 60. The minimum possible distance between the curves  $x^2 + y^2 8y + 12 = 0$  and  $x^2 + y^2 + 6y = 0$  is
- 61. Find the acute angle between the lines 3x + 4y + 8 = 0 and 12x 5y + 9 = 0

a) $\cos^{-1}\left(\frac{12}{65}\right)$	b) $\cos^{-1}\left(\frac{18}{65}\right)$
C) $\cos^{-1}\left(\frac{14}{65}\right)$	d) $\cos^{-1}\left(\frac{16}{65}\right)$

- 62. The lines 4x 3ky + 4 = 0 and 2x 5y + 1 = 0 intersect in the first quadrant. The x - coordinate of the point of intersection is twice the y -coordinate. Find the value of k.
- 63. The transformed equation, when the axes are rotated through an angle  $60^{\circ}$  is  $X^2 + Y^2 = 2$ , then the original equation is
  - a)  $x^2 y^2 = 2$ b)  $x^2 + y^2 = 2$
  - b)  $x^2 + y^2 = 2$ c)  $x^2 + y^2 = 1$
  - d)  $x^2 + y^2 = 1$

- 64. If the lines 3x + 4y = 10 and my x + 4 = 0 intersect, then for how many integer values of m, does the point of intersection have integer coordinates?
- 65. The number of points lying strictly inside the curve whose equation is  $x^2 + 2y^2 = 24$ , which have integer coordinates is

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