

Bridge Course (B)- COORDINATE GEOMETRY

- 1) If 3 vertices of parallelogram PQRS are P(1,2), Q(4,6), R(5,7) then find the fourth vertex S(a, b) **(IIT 98)**
- 2) If O (0, 0), P (3, 4), Q (6, 0) be the vertices of the triangle OPQ. The point R inside the ΔOPQ is such that the ΔOPR , ΔPQR , ΔOQR are of equal area then find the coordinates of R. **(IIT 2007)**
- 3) Find the point of intersection of the line $4x-3y-10=0$ and the circle $x^2+y^2-2x+4y-20=0$. **(IIT 83)**
- 4) Find the incentre of a triangle whose vertices are $(1, \sqrt{3})$, $(0, 0)$, $(2, 0)$. **(IIT 2000)**
- 5) Find the distance between the following pairs of points: (i) (2, 3, 5) and (4, 3, 1) (ii) $(-3, 7, 2)$ and $(2, 4, -1)$ (iii) $(-1, 3, -4)$ and $(1, -3, 4)$ (iv) $(2, -1, 3)$ and $(-2, 1, 3)$.
- 6) Show that the points $(-2, 3, 5)$, $(1, 2, 3)$ and $(7, 0, -1)$ are collinear.
- 7) Verify the following: (i) $(0, 7, -10)$, $(1, 6, -6)$ and $(4, 9, -6)$ are the vertices of an isosceles triangle. (ii) $(0, 7, 10)$, $(-1, 6, 6)$ and $(-4, 9, 6)$ are the vertices of a right angled triangle. (iii) $(-1, 2, 1)$, $(1, -2, 5)$, $(4, -7, 8)$ and $(2, -3, 4)$ are the vertices of a parallelogram.
- 8) Find the equation of the set of points which are equidistant from the points $(1, 2, 3)$ and $(3, 2, -1)$.
- 9) Find the equation of the set of points P, the sum of whose distances from A $(4, 0, 0)$ and B $(-4, 0, 0)$ is equal to 10.
- 10) Find the coordinates of the point which divides the line segment joining the points $(-2, 3, 5)$ and $(1, -4, 6)$ in the ratio (i) 2 : 3 internally, (ii) 2 : 3 externally.
- 11) Given that P $(3, 2, -4)$, Q $(5, 4, -6)$ and R $(9, 8, -10)$ are collinear. Find the ratio in which Q divides PR.
- 12) Find the ratio in which the YZ-plane divides the line segment formed by joining the points $(-2, 4, 7)$ and $(3, -5, 8)$.
- 13) Find the coordinates of the points which trisect the line segment joining the points P $(4, 2, -6)$ and Q $(10, -16, 6)$.
- 14) Three vertices of a parallelogram ABCD are A $(3, -1, 2)$, B $(1, 2, -4)$, C $(-1, 1, 2)$. Find the coordinates of the fourth vertex.
- 15) Find the lengths of the medians of the triangle with vertices A $(0, 0, 6)$, B $(0, 4, 0)$ and $(6, 0, 0)$.
- 16) If the origin is the centroid of the triangle PQR with vertices P $(2a, 2, 6)$, Q $(-4, 3b, -10)$ and R $(8, 14, 2c)$, then find the values of a, b and c.
- 17) Find the coordinates of a point on y-axis which are at a distance of $5\sqrt{2}$ units from the point P $(3, -2, 5)$.
- 18) A point R with x-coordinate 4 lies on the line segment joining the points P $(2, -3, 4)$ and Q $(8, 0, 10)$. Find the coordinates of the point R.
- 19) If A and B be the points $(3, 4, 5)$ and $(-1, 3, -7)$, respectively, find the equation of the set of points P such that $PA^2 + PB^2 = k^2$, where k is a constant.
- 20) Find the value of x such that $PQ = QR$, where the co-ordinates of P, Q and R are $(6, -1)$, $(1, 3)$ and $(x, 8)$.

- 21) Find the distance between the following points:
 (a) $A(3, 5)$ and $B(8, -7)$ (b) $P(a + b, a - b)$ and $Q(a - b, -a - b)$
- 22) Find the value of x for which the distance between points $A(x, 7)$ and $B(-2, 3)$ is $4\sqrt{5}$ units.
- 23) If the points $(3, 2)$ and $(2, -3)$ are equidistant from points (x, y) show that $x + 5y = 0$.
- 24) Show that the following points are collinear:
 (a) $(-5, 6)$, $(-1, 2)$ and $(2, -1)$ (b) $(4, 3)$, $(5, 1)$ and $(1, 9)$ (c) $(1, -1)$, $(5, 2)$ and $(9, 5)$
- 25) Show that following points are vertices of right triangle. Also, name the right angle.
 (a) $(4, 4)$, $(3, 5)$, $(-1, 1)$ (b) $(-2, 3)$, $(8, 3)$, $(6, 7)$ (c) $(-2, 3)$, $(8, 3)$ and $(6, 7)$
- 26) Show that following points are vertices of a rectangle:
 (a) $(2, -2)$, $(8, 4)$, $(5, 7)$, $(-1, 1)$ (b) $(-4, -1)$, $(-2, 4)$, $(4, 0)$, $(2, 3)$
- 27) Show that following points are vertices of a square:
 (a) $(0, -1)$, $(2, 1)$, $(0, 3)$, $(-2, 1)$ (b) $(0, 1)$, $(1, 4)$, $(4, 3)$, $(3, 0)$
- 28) Show that following points are vertices of rhombus:
 (a) $(0, 5)$, $(-2, -2)$, $(5, 0)$, $(7, 7)$ (b) $(2, -1)$, $(3, 4)$, $(-2, 3)$, $(-3, -2)$
- 29) Find the co-ordinates of circumcenter of a ΔABC where $A(1, 2)$, $B(3, -4)$ and $C(5, -6)$.
- 30) Find radius of the circle, the co-ordinates of the ends of whose diameter are $(-1, 2)$ and $(3, -4)$.
- 31) Find the point on x-axis, which is equidistant from points $(7, 6)$ and $(9, 4)$.
- 32) Find the point on y-axis, which is equidistant from points $(5, 2)$ and $(-4, 3)$.
- 33) A line of length 10 units has $(-2, 3)$ as one of its end points. If the ordinate of the other end be 9, Show that its abscissa is 6 or -10 .
- 34) The opposite angular points of a square be $(3, 4)$ and $(1, -1)$. Find the co-ordinates of the remaining angular points.
- 35) Show that the following points are the vertices of isosceles right triangle :
 (a) $(6, 4)$, $(3, 0)$ and $(-1, 3)$ (b) $(0, 0)$, $(5, 5)$ and $(-5, 5)$ (c) $(-5, 6)$, $(3, 0)$ and $(9, 8)$
- 36) Show that the following points are the vertices of a parallelogram :
 (a) $A(-2, -1)$, $B(1, 0)$, $C(4, 3)$ and $D(1, 2)$
 (b) $P(1, -2)$, $Q(3, 6)$, $R(5, 10)$ and $S(3, 2)$
- 37) Show that the points $A(2, -1)$, $B(3, 4)$, $C(-2, 3)$ and $D(-3, -2)$ form a rhombus but not a square. Find the area of the rhombus also.
- 38) If the point (x, y) is equidistant from the points $(a + b, b - a)$ and $(a - b, a + b)$, prove that $bx = ay$.
- 39) The center of a circle is $(3k + 1, 2k - 1)$. If the circle passes through the point $(-1, -3)$ and the length of its diameter be 20 units, find the value of k .
- 40) Find the co-ordinates of a point which divide the segment AB in the ration 3:5 internally, where $A(4, -1)$ and $B(-2, 4)$.