Coordinate Geometry

Straight Line
JEE-MAINS (PREVIOUS YEAR)

MCQ-Single Correct

1. Let k be an integer such that the triangle with vertices (k,-3k), (5,k) and (-k,2) has area 28 sq units. Then the orthocentre of this triangle is at the point :

(1) $\left(2,-\frac{1}{2}\right)$ (2) $\left(1,\frac{3}{4}\right)$

(3) $\left(1,-\frac{3}{4}\right)$ (4) $\left(2,\frac{1}{2}\right)$ **[2017]**

2. Two sides of a rhombus are along the lines, $x-y+1=0$ and $7x-y-5=0$. If its diagonals intersect at (-1,-2), then which one of the following is a vertex of this rhombus?

(1) (-3,-8) (2) $\left(\frac{1}{3},-\frac{8}{3}\right)$

(3) $\left(-\frac{10}{3},-\frac{7}{3}\right)$ (4) (-3,-9) **[2016]**

3. Locus of the image of the point (2,3) in the line $(2x-3y+4)+k(x-2y+3)=0$, $k\in R$, is a :

(1) straight line parallel to y-axis (2) circle of radius $\sqrt{2}$.

(3) circle of radius $\sqrt{3}$ (4) straight line parallel to x-axis. **[2015]**

4. Let a, b, c and d be non-zero numbers. If the point of intersection of the lines $4ax+2ay+c=0$ and $5bx+2by+d=0$ lies in the fourth quadrant and is equidistant from the two axes then

(1) $2bc-3ad=0$ (2) $2bc+3ad=0$

(3) $3bc-2ad=0$ (4) $3bc+2ad=0$ **[2014]**

5. Let PS be the median of the triangle with vertices P(2,2), Q(6,-1) and R(7,3). The equation of the line passing through (1,-1) and parallel to PS is

(1) $4x-7y-11=0$ (2) $2x+9y+7=0$

(3) $4x+7y+3=0$ (4) $2x-9y-11=0$ **[2014]**

6. The x-coordinate of the incentre of the triangle that has the coordinates of mid points of its sides as (0,1) (1,1) and (1,0) is

(1) $2-\sqrt{2}$ (2) $1+\sqrt{2}$
(3) $1-\sqrt{2}$ (4) $2+\sqrt{2}$ **[2013]**

7. A ray of light along $x+\sqrt{3}y=\sqrt{3}$ gets reflected upon reaching x-axis, the equation of the reflected rays is
(1) $\sqrt{3}y=x-\sqrt{3}$ (2) $y=\sqrt{3}x-\sqrt{3}$
(3) $\sqrt{3}y=x-1$ (4) $y=x+\sqrt{3}$ **[2013]**

8. If the line $2x+y=k$ passes through the point which divides the line segment joining the points (1,1) and (2,4) in the ration 3:2, then k equal
(1) 6 (2) 11/5
(3) 29/5 (4) 5 **[2012]**

9. A line is drawn through the point (1,2) to meet the coordinate axes at P and Q such that it forms a triangle OPQ, where O is the origin. If the area of the triangle OPQ is least, then the slope of the line PQ is
(1) -2 (2) -1/2
(3) -1/4 (4) -4 **[2012]**

10. The lines $x+y=|a|$ and $ax-y=1$ intersect each other in the first quadrant. Then the set of all possible values of a is the interval
(1) $(-1,\infty)$ (2) $(-1,1]$
(3) $(0,\infty)$ (4) $[1,\infty)$ **[2011]**

11. If A(2,-3) and B(-2,1) are two vertices of a triangle and third vertex moves on the line $2x+3y=9$, then the locus of the centroid of the triangle is
(1) $2x+3y=3$ (2) $2x-3y=1$
(3) $x-y=1$ (4) $2x+3y=1$ **[2011]**

12. The line L given by $\frac{x}{5}+\frac{y}{b}=1$ passes through the point (13,32). The line K is parallel to L and has the equation $\frac{x}{c}+\frac{y}{3}=1$. Then the distance between L and K is
(1) $\sqrt{17}$ (2) $\frac{17}{\sqrt{15}}$
(3) $\frac{23}{\sqrt{17}}$ (4) $\frac{23}{\sqrt{15}}$ **[2010]**

13. Three distinct points A, B and C are given in the 2-dimensional coordinate plane such that the ratio of the distance of any one of them from the point (1,0) to the distance from the point (-1,0) is equal to $\frac{1}{3}$. Then the circumcentre of the triangle ABC is at the point

(1) (0,0) (2) $\left(\frac{5}{4},0\right)$

(3) $\left(\frac{5}{2},0\right)$ (4) $\left(\frac{5}{3},0\right)$ **[2009]**

14. The lines $p\left(p^2+1\right)x-y+q=0$ and $\left(p^2+1\right)^2x+\left(p^2+1\right)y+2q=0$ are perpendicular to a common line for

(1) no value of p (2) exactly one value of p

(3) exactly two values of p (4) more than two values of p **[2009]**

15. The perpendicular bisector of the line segment joining P(1,4) and Q(k,3) has y-intercept -4. Then a possible value of k is

(1) 1 (2) 2

(3) -2 (4) -4 **[2008]**

16. A straight line through the point A(3,4) is such that its intercept between the axes is bisected at A. Its equation is

(1) $x+y=7$ (2) $3x-4y+7=0$

(3) $4x+3y=24$ (4) $3x+4y=25$ **[2006]**

17. The two lines $x=ay+b$, $z=cy+d$; and $x=a'y+b'$, $z=c'y+d'$ are perpendicular to each other if

(1) $aa'+cc'=-1$ (2) $aa'+cc'=1$

(3) $\frac{a}{a'}+\frac{c}{c'}=-1$ (4) $\frac{a}{a'}+\frac{c}{c'}=1$ **[2006]**

18. If $\left(a,a^2\right)$ falls inside the angle made by the lines $y=\frac{x}{2}$, $x>0$ and $y=3x$, x>0, then a belongs to

(1) $\left(0,\frac{1}{2}\right)$ (2) $\left(3,\infty\right)$

(3) $\left(\frac{1}{2},3\right)$ (4) $\left(-3,-\frac{1}{2}\right)$ **[2006]**

19. The line parallel to the x-axis and passing through the intersection of the lines $ax+2by+3b=0$ and $bx-2ay-3a=0$, where $\left(a,b\right)\neq\left(0,0\right)$ is

(1) below the x-axis at a distance of $\frac{3}{2}$ from it

(2) below the x-axis at a distance of $\frac{2}{3}$ from it

(3) above the x-axis at a distance of $\frac{3}{2}$ from it

(4) above the x-axis at a distance of $\frac{2}{3}$ from it **[2005]**

20. If non-zero numbers a, b , c are in H.P. , then the straight line $\frac{x}{a}+\frac{y}{b}+\frac{1}{c}=0$ always passes through a fixed point. The point is

(1) (-1,2) (2) (-1,-2)

(3) $(1,-2)$ (4) $\left(1,-\frac{1}{2}\right)$ **[2005]**

21. If a vertex of a triangle is (1,1) and the mid-points of two sides through this vertex are (-1,2) and (3,2), then the centroid of the triangle is

(1) $\left(-1,\frac{7}{3}\right)$ (2) $\left(-\frac{1}{3},\frac{7}{3}\right)$

(1) $\left(1,\frac{7}{3}\right)$ (2) $\left(\frac{1}{3},\frac{7}{3}\right)$ **[2005]**

22. If the pair of lines $ax^2+2(a+b)xy+by^2=0$ lie along diameters of a circle and divide the circle into four sectors such that the area of one of the sectors is thrice the areas of another sector then

(1) $3a^2-10ab+3b^2=0$ (2) $3a^2-2ab+3b^2=0$

(3) $3a^2+10ab+3b^2=0$ (4) $3a^2+2ab+3b^2=0$ **[2005]**

23. Let A(2,-3) and B(-2,1) be vertices of a triangle ABC. If the centroid of this triangle moves on the line $2x+3y=1$, then the locus of the vertex C is the line

(1) $2x+3y=9$ (2) $2x-3y=7$

(3) $3x+2y=5$ (4) $3x-2y=3$ **[2004]**

24. The equation of the straight line passing through the point (4,3) and making intercepts on the co-ordinate axes whose sum is -1 is

(1) $\frac{x}{2}+\frac{y}{3}=-1$ and $\frac{x}{-2}+\frac{y}{1}=-1$

(2) $\frac{x}{2}-\frac{y}{3}=-1$ and $\frac{x}{-2}+\frac{y}{1}=-1$

(3) $\frac{x}{2}+\frac{y}{3}=1$ and $\frac{x}{2}+\frac{y}{1}=1$

(3) $\frac{x}{2}-\frac{y}{3}=1$ and $\frac{x}{-2}+\frac{y}{1}=1$ **[2004]**

25. If the sum of the slopes of the lines given by $x^2-2cxy-7y^2=0$ is four times their product, then c has the value

(1) 1

(2) -1

(3) 2

(4) -2 **[2004]**

26. If one of the lines given by $6x^2-xy+4cy^2=0$ is $3x+4y=0$, then c equals

(1) 1

(2) -1

(3) 3

(4) -3 **[2004]**

27. If the equation of the locus of a point equidistant from the points (a_1,b_1) and (a_2,b_2) is $(a_1-a_2)x+(b_1-b_2)y+c=0$, then the value of 'c' is

(1) $\frac{1}{2}(a_2^2+b_2^2-a_1^2-b_1^2)$

(2) $a_1^2+a_2^2+b_1^2-b_2^2$

(3) $\frac{1}{2}(a_1^2+a_2^2-b_1^2-b_2^2)$

(4) $\sqrt{a_1^2+b_1^2-a_2^2-b_2^2}$ **[2003]**

28. Locus of centroid of the triangle whose vertices are $(a\cos t, a\sin t)$, $(b\sin t, -b\cos t)$ and (1,0), where t is a parameter , is

(1) $(3x-1)^2+(3y)^2=a^2-b^2$

(2) $(3x-1)^2+(3y)^2=a^2+b^2$

(3) $(3x+1)^2+(3y)^2=a^2+b^2$

(4) $(3x+1)^2+(3y)^2=a^2-b^2$ **[2003]**

29. If the pair of straight lines $x^2 - 2pxy - y^2 = 0$ and $x^2 - 2qxy - y^2 = 0$ be such that each pair bisects the angle between the other pair, then

(1) p = q (2) p = -q

(3) pq = 1 (4) pq = -1 **[2003]**

30. A square of side a lies above the x-axis and has one vertex at the origin. The side passing through the origin makes an angle $\alpha\left(0<\alpha<\frac{\pi}{4}\right)$ with the positive direction of x-axis. The equation of its diagonal not passing through the origin is

(1) $y(\cos\alpha-\sin\alpha)-x(\sin\alpha-\cos\alpha)=a$

(2) $y(\cos\alpha+\sin\alpha)+x(\sin\alpha-\cos\alpha)=a$

(3) $y(\cos\alpha+\sin\alpha)+x(\sin\alpha+\cos\alpha)=a$

(4) $y(\cos\alpha+\sin\alpha)+x(\cos\alpha-\sin\alpha)=a$ **[2003]**

31. If the pair of lines $ax^2+2hxy+by^2+2gx+2fy+c=0$ intersect on the y-axis then

(1) $2fgh=bg^2+ch^2$ (2) $bg^2 \neq ch^2$

(3) abc = 2fgh (4) none of these **[2002]**

32. Lines represented by $3ax^2+5xy+(a^2-2)y^2=0$ are ⊥ to each other for

(1) two values of a (2) ∀ a

(3) for one value of a (4) for no values of a **[2002]**

33. Locus of mid-point of the portion between the axes of $x\cos\alpha + y\sin\alpha = p$, where p is constant, is

(1) $x^2+y^2=\frac{4}{p^2}$ (2) $x^2+y^2=4p^2$

(3) $\frac{1}{x^2}+\frac{1}{y^2}=\frac{2}{p^2}$ (4) $\frac{1}{x^2}+\frac{1}{y^2}=\frac{4}{p^2}$ **[2002]**

34. A triangle with vertices (4,0) , (-1,-1), (3,5) is

(1) isosceles and right angled (2) isosceles but not right angled

(3) right angled but not isosceles (4) neither right angled nor isosceles **[2002]**