

# Assignment-3

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## I. JEE MAIN / AIEEE

- 1) Let  $\mathbf{P} = (-1, 0)$ ,  $\mathbf{Q} = (0, 0)$  and  $\mathbf{R} = (3, 3\sqrt{3})$  be three points. The equation of the bisector of the angle  $PQR$  is [2007]
  - a)  $\frac{\sqrt{3}}{2}x + y = 0$
  - b)  $x + \sqrt{3}y = 0$
  - c)  $\sqrt{3}x + y = 0$
  - d)  $x + \frac{\sqrt{3}}{2}y = 0$
- 2) If one of the lines of  $my^2 + (1 - m^2)xy - mx^2 = 80$  is a bisector of the angle between the lines  $xy = 0$ , then  $m$  is [2007]
  - a) 1
  - b) 2
  - c)  $-\frac{1}{2}$
  - d) -2
- 3) The perpendicular bisector of the line segment joining  $\mathbf{P}(1, 4)$  and  $\mathbf{Q}(k, 3)$  has y-intercept -4. Then a possible value of  $k$  is [2008]
  - a) 1
  - b) 2
  - c) -2
  - d) -4
- 4) The shortest distance between the line  $y - x = 1$  and the curve  $x = y^2$  is [2009]
  - a)  $\frac{2\sqrt{3}}{8}$
  - b)  $\frac{3\sqrt{2}}{5}$
  - c)  $\frac{\sqrt{3}}{4}$
  - d)  $\frac{3\sqrt{2}}{8}$
- 5) The lines  $p(p^2 + 1)x - y + q = 0$  and  $(p^2 + 1)^2x + (p^2 + 1)y + 2q = 0$  are perpendicular to a common line for : [2009]
  - a) exactly one values of  $p$
  - b) exactly two values of  $p$
  - c) more than two values of  $p$
  - d) no value of  $p$
- 6) Three distinct points  $\mathbf{A}$ ,  $\mathbf{B}$  and  $\mathbf{C}$  are given in the 2-dimensional coordinates 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: [2009]
  - a)  $(\frac{5}{4}, 0)$
  - b)  $(\frac{5}{2}, 0)$
  - c)  $(\frac{5}{3}, 0)$
  - d)  $(0, 0)$
- 7) The line  $L$  given by  $\frac{x}{5} + \frac{y}{b} = 1$  passes through the point  $(13, 32)$ . The line  $K$  is parallel to the line  $L$  and has the equation  $\frac{x}{c} + \frac{y}{3} = 1$ . Then the distance between  $L$  and  $K$  is [2010]
  - a)  $\sqrt{17}$
  - b)  $\frac{17}{\sqrt{15}}$
  - c)  $\frac{23}{\sqrt{17}}$
  - d)  $\frac{23}{\sqrt{15}}$
- 8) Lines  $L_1 : y - x = 0$  and  $L_2 : 2x + y = 0$  intersect the line  $L_3 : y + 2 = 0$  at  $\mathbf{P}$  and  $\mathbf{Q}$ , respectively. The bisector of the acute angle between  $L_1$  and  $L_2$  intersects  $L_3$  at  $\mathbf{R}$ .  
**STATEMENT-1** : The ratio  $PR : RQ$  equals  $2\sqrt{2} : \sqrt{5}$ .  
**STATEMENT-2** : In any triangle, bisector of an angle divides the triangle into two similar triangles.

[2011]

- a) Statement-1 is True, Statement-2 is True Statement-2 is not a correct explanation for Statement-1  
 b) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1  
 c) Statement-I is True, Statement-2 is False  
 d) Statement-1 is False, Statement-2 is True.

- 9) 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  $k$  equals: [2012]

- a)  $\frac{29}{5}$                                       b) 5                                      c) 6                                      d)  $\frac{11}{5}$

- 10) A ray of light along  $x + \sqrt{3}y = \sqrt{3}$  gets reflected upon reaching the x-axis, the equation of the reflected ray is [JEE M 2013]

- a)  $y = x + \sqrt{3}$                                       c)  $y = \sqrt{3}x - \sqrt{3}$   
 b)  $\sqrt{3}y = x - \sqrt{3}$                                       d)  $\sqrt{3}y = x - 1$

- 11) 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:

[JEE M 2013]

- a)  $2 + \sqrt{2}$                                       b)  $2 - \sqrt{2}$                                       c)  $1 + \sqrt{2}$                                       d)  $1 - \sqrt{2}$

- 12) Let  $PS$  be the median of the triangle with vertices  $\mathbf{P}(2, 2)$ ,  $\mathbf{Q}(6, -1)$  and  $\mathbf{R}(7, 3)$ . The equation of the line passing through (1, -1) and parallel to  $PS$  is: [JEE M 2014]

- a)  $4x + 7y + 3 = 0$                                       c)  $4x - 7y - 11 = 0$   
 b)  $2x - 9y - 11 = 0$                                       d)  $2x + 9y + 7 = 0$

- 13) 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 [JEE M 2014]

- a)  $3bc - 2ad = 0$                                       c)  $2bc - 3ad = 0$   
 b)  $3bc + 2ad = 0$                                       d)  $2bc + 3ad = 0$

- 14) The number of points, having both co-ordinates as integers, that lie in the interior of the triangle with vertices (0, 0), (0, 41) and (41, 0) is:

[JEE M 2015]

- a) 820                                      b) 780                                      c) 901                                      d) 861

- 15) 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?

[JEE M 2016]

- a)  $\left(\frac{1}{3}, -\frac{8}{3}\right)$                                       c)  $(-3, -9)$   
 b)  $\left(-\frac{10}{3}, -\frac{7}{3}\right)$                                       d)  $(-3, -8)$

- 16) A straight the through a fixed point (2, 3) intersects the coordinate axes at distinct points  $\mathbf{P}$  and  $\mathbf{Q}$ . If  $\mathbf{O}$  is the origin and the rectangle  $OPRQ$  is completed, then the locus of  $R$  is:

[JEE M 2018]

a)  $2x + 3y = xy$

c)  $3x + 2y = 6xy$

b)  $3x + 2y = xy$

d)  $3x + 2y = 6$

- 17) Consider the set of all lines  $px + qy + r = 0$  such that  $3p + 2q + 4r = 0$ . Which one of the following statements is true?

[JEE M 2019- 9 Jan (M)]

a) The lines are concurrent at the point  $\left(\frac{3}{4}, \frac{1}{2}\right)$

b) Each line passes through the origin.

c) The lines are all parallel.

d) The lines are not concurrent.

- 18) Slope of a line passing through  $\mathbf{P}(2, 3)$  and intersecting the line  $x + y = 7$  at a distance of 4 units from  $\mathbf{P}$ , is:

[JEE M 2019- 9 April(M)]

a)  $\frac{1-\sqrt{5}}{1+\sqrt{5}}$

c)  $\frac{\sqrt{7}-1}{\sqrt{7}+1}$

b)  $\frac{1-\sqrt{7}}{1+\sqrt{7}}$

d)  $\frac{\sqrt{5}-1}{\sqrt{5}+1}$