# Assignment-3

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## I. JEE Main / AIEEE

1) Let $\mathbf{P} = (-1, 0)$, $\mathbf{Q} = (0, 0)$ and $\mathbf{R} = \left(3, 3\sqrt{3}\right)$ 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 $p\left(p^2 + 1\right)x - y + q = 0$ and $\left(p^2 + 1\right)^2 x + \left(p^2 + 1\right)y + 2q = 0$ 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 **A**, **B** and **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) $\left(\frac{5}{4}, 0\right)$ b) $\left(\frac{5}{2}, 0\right)$ c) $\left(\frac{5}{3}, 0\right)$ 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 **P** and **Q**, respectively. The bisector of the acute angle between $L_1$ and $L_2$ intersects $L_3$ at **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) $y=x+\sqrt{3}$
b) $\sqrt{3}y=x-\sqrt{3}$
c) $y=\sqrt{3}x-\sqrt{3}$
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) $4x+7y+3=0$
b) $2x-9y-11=0$
c) $4x-7y-11=0$
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) $3bc-2ad=0$
b) $3bc+2ad=0$
c) $2bc-3ad=0$
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) $\left(\frac{1}{3},-\frac{8}{3}\right)$
b) $\left(-\frac{10}{3},-\frac{7}{3}\right)$
c) $(-3,-9)$
d) $(-3,-8)$

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

[JEE M 2018]

a) $2x + 3y = xy$
b) $3x + 2y = xy$
c) $3x + 2y = 6xy$
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 **P**, is:

[JEE M 2019- 9 April(M)]

a) $\frac{1-\sqrt{5}}{1+\sqrt{5}}$
b) $\frac{1-\sqrt{7}}{1+\sqrt{7}}$
c) $\frac{\sqrt{7}-1}{\sqrt{7}+1}$
d) $\frac{\sqrt{5}-1}{\sqrt{5}+1}$