# MATHS

# BOOKS - CHHAYA PUBLICATION MATHS (BENGALI ENGLISH)

# COORDINATE GEOMETRY

## Wbhs Archive 2012

**1.** The length of latus rectum of an ellipse is equal to the length of its semi-minor axis . The ratio of lengths of its minor axis and major axis is _

A. $\frac{1}{2}$

B. 2

C. $\frac{1}{4}$

D. 4

**Answer: A**

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**2.** If a circle is concentric with the circle $x^2 + y^2 = 8$ and its diameter is 4 units , which of the following will be the equation of the circle ?

A. $x^2 + y^2 = 1$

B. $x^2 + y^2 = 2$

C. $x^2 + y^2 = 4$

D. $x^2 + y^2 = 16$

**Answer: C**

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**3.** If the distance foa moving point from the point (2,0) is equal to the distance of the moving point from y-axis, then the equation of the locus of the moving point is

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**4.** The equation of the straight line parallel to y - axis and passing through the point (-3 , 4 ) is .

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**5.** The sides of the rectangle ABCD are parallel to the coordinate axes. If the coordinates of the vertices B and D be (7,3) and (2,6) respectively , find the coordinates of the vertices A and C .

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**6.** Find the area of the triangle formed by the straight line $x \sin \alpha + y \cos \alpha = p$ with the axes of coordinates .

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**7.** Find the radius of the circle passing through (6,0), (0,8) and origin .

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**8.** The vertices of a triangle ABC are (2,-5) , (1 ,-2) and (4,7) respectively . Find the coordinates of the point

where the internal bisector of $\angle ABC$ cuts AC .

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**9.** Find the equation of the straight line which passes through the intersection of the straght lines $2x + 3y = 5$ and $3x + 5y = 7$ and makes equal positive intercepts upon the coordinate axes .

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**10.** Show that the circle with the portion of the line $3x + 4y = 12$ intercepted between the axes as

diameter , passes through the origin .

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**11.** A point P is moving in a cartesian plane in such a way that the area of the rectangle formed by the lines through P parallel to the coordinate axes together with ccordinate axes is constant. Find the equation of the locus of P .

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**12.** The parabola $y^2 = -4ax$ passes through the point (-1,2) . Find the coordinates of its focus and length of latus rectum.

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**13.** Let P be a point on the circle $x^2 + y^2 = a^2$ whose ordinate is PN and Q is a point on PN such that PN : QN = 2 : 1 . Find the locus of Q and identify it

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**14.** If athe coordinates of one end of a focal chord of the parabola $y^2 = 4ax$ be $\left(at^2, 2at\right)$ , show that the coordinates of the other end point are $\left(\frac{a}{t^2}, \frac{2a}{t}\right)$ and the length of the chord is $a\left(t + \frac{1}{t}\right)^2$

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**15.** Find the foii of the conic $\frac{x^2}{100} + \frac{y^2}{36} = 1$ . Hence show that , the sum of the distances from any point on the conic to its focii is 20 units .

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Wbhs Archive 2013

**1.** The point (8,4) lies inside the parabola $y^2 = 4ax$ If

-

A. $a < \frac{1}{2}$

B. $a \leq \frac{1}{2}$

C. $a > \frac{1}{2}$

D. $a \geq \frac{1}{2}$

**Answer: C**

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**2.** If t is parameter then the locus of the point $P\left(t, \frac{1}{2t}\right)$ is _

A. circle

B. ellipse

C. hyperbola

D. parabola

**Answer: C**

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**3.** The distance between the straight lines $4x - 3y + 10 = 0$ and $4x - 3y - 10 = 0$ is _

A. 0

B. 20

C. 4

D. 8

**Answer: C**

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**4.** One end of a diameter of the circle $x^2 + y^2 = 2$ is (1,-1) . Then coordinates of its other end is

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**5.** Find the ratio in which the point (-11,16) divides the line segment joining the points (-1,2) and (4,-5) .

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**6.** Show that the line (2 + m) x + (3 + 2m ) y - 2 (2 + 3m ) = 0 passes through a fixed point for all valuse of the parameter m . Find the coordinates of the point .

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**7.** Find the centre of the circle whose parametric equations are $x = -\frac{1}{2}(1 + 5\cos\theta), y = \frac{1}{2}(-2 + 5\sin\theta)$.

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**8.** The extremities of the base of an isosceles triangle have coordinates (2a , 0) and (0,a) . If the equation of one of the equal sides be x = 2a , find the equation of the other equal side and the area of the triangle .

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**9.** The locus represented by $x\cos\alpha + y\sin\alpha = 4$ cuts the coordinate axes at A and B . Find the locus of the midpoint of AB . ($\alpha$ is a parameter)

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**10.** A circle through the common points of the circles $x^2 + y^2 - 2x - 4y + 1 = 0$ and $x^2 + y^2 - 2x - 6y + 1 = 0$ has its centre on the line 4x - 7y - 19 = 0 . Find the centre and radius of the circle .

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**11.** Find the ratio of the eccentricities of the hyperbolas $2x^2 - 3y^2 = 1$ and $3x^2 - 2y^2 = 1$

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**12.** The coordinates of the foci of an ellipse are $(0, \pm 4)$ and the equations of its directrices are $y = \pm 9$. Find the length of the latus rectum of the ellipse

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**13.** Find the equations of the parabola whose focus is (5,3) and vertex is (5,7) . Find also the equation of its directrix .

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**14.** Prove that the straight line joining the upper end of one latus rectum and lower end of other latus rectum of an ellipse passes through the centre of the ellipse .

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**15.** The four foci of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and its conjugate are joined to form a parallelogram. Find the area of the parallelogram .

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## Wbhs Archive 2014

**1.** The equation of the circle having centre at (3,7) and radius 5 units is _

A. $x^2 + y^2 - 6x - 14y + 33 = 0$

B. $x^2 + y^2 - 6x - 14y = 33$

C. $x^2 + y^2 + 6x + 14y = 33$

D. $x^2 + y^2 + 6x + 14y + 33 = 0$

**Answer: A**

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**2.** The distance between z - axis and (3,4) is _

A. 5 unit

B. 6 unit

C. 7 unit

D. none ot these

**Answer: A**

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**3.** The equation of the parabola with vertex at the origin and directix is $y = 2$ is-

A. $y^2 = 8x$

B. $y^2 = -8x$

C. $x^2 = 8y$

D. $x^2 = -8y$

**Answer: D**

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**4.** The eccentricity of the hyperbola $9x^2 - 4y^2 + 36 = 0$ is

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**5.** Find the area of the triangle formed by the staight line 2x - 3y = 6 with the coordinate axes .

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**6.** Find the coordinates of the point which divides the line segment joining (2,-3,8) and (1,-1,0) internally in the ratio 2 : 1

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**7.** The equations of two sides of a square are 5x + 12 y - 10 = 0 and 5x + 12 y + 29 = 0 and the third side passes through (3,5) , find equations of all other possible sides of the squate.

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**8.** If the straight line $\frac{x}{a}+\frac{y}{b}=1$ is parallel to the line 4x + 3y = 6 and passes through the point of intersection of the lines 2x - y - 1 = 0 and 3x - 4y + 6 = 0 ,find the values of a and b .

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**9.** Find the equations of the circles which pass through the origin and cut off equal chords of length $\sqrt{2}$ units on the straight lines y = x and y = - x .

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**10.** Prove that the least focal chord of a parabola is its latus rectum .

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**11.** Find the equation of the hyperboth whose axes are the axes of coordinates and vertices are ( $\pm$ 4,0) and foci are ( $\pm$ 6,0).

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**12.** Find the equation of an ellipse whose eccentricity is $\frac{1}{2}$ , coordinates of one of its foci is (2,0) and

equation of its corresponding directrix is x - 8 = 0 . Also find out the distance of this focus from its nearest vertex .

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**13.** What is the eccentricity of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ if length of its minor axis is equal to the distance between its foci ?

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**14.** Find the vertex of the parabola $y = -2x^2 + 12x - 17.$

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**15.** The eccentricity of an ellipse is $\frac{1}{\sqrt{3}}$, the coordinates of focus is (-2,1) and the point of intersection of the major axis and the directrix is (-2,3) . Find the coordinates of the centre of the ellipse and also equation of the ellipse .

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**16.** The slope of a chord of the parabola $y^2 = 4x$ is 2 . Show that the locus of the point which divides the chord internally in the ration 1 : 2 is a parabola whose equation is $\left(y - \frac{8}{9}\right)^2 = \frac{4}{9}\left(x - \frac{2}{9}\right)$.

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## Wbhs Archive 2015

**1.** The angle made by the straight line $x\cos\alpha + y\sin\alpha = p$ with the negative direction of x - axis is _

A. $\alpha$

B. $\frac{\pi}{2} + \alpha$

C. $-\alpha$

D. $\frac{\pi}{2} - \alpha$

**Answer: D**

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**2.** The distance of the point (a , b , c ) from xy - plane is _

A. $\sqrt{a^2 + b^2 + c^2}$

B. a

C. b

D. c

**Answer: D**

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**3.** Find the focus of the parabola $y = x^2 + x + 1$ .

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**4.** Determine the equation of the straight line through the point (2,3) which divides the portion of

the line segment between the axes in the ratio $2:1$.

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**5.** A moving straight line always passes through a fixed point $(\alpha, \beta)$. Prove that the locus of the middle point of the portion of the line intercepted between the axes is $\frac{\alpha}{x} + \frac{\beta}{y} = 2$.

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**6.** Find equation of all possible circle that touch the y -axis at the point (0,3) and cut out the chord of

length 8 unit from the x - axis .

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**7.** A ray of light along the line x- 2y + 5 = 0 is reflected from the line 3x - 2y + 7= 0 . Find the equation of the line containing the reflected ray .

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**8.** Find the coordinates of vertices of a unit cube where the three concrrent edges are the coordinte axes .

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**9.** The equation of the axis and directrix of a parabola are $y - 3 = 0$ and $x + 3 = 0$ respectively and the length of the latus rectum is 8 units . Find the equation of the parabola and the coordinate of its vertex .

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**10.** The equation of the directrix of a hyperbola $x - y + 3 = 0$ . One of its focus is at (-1,1) and eccentricity is 3 . Find the equation of the hyperbola .

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## Wbhs Archive 2016

**1.** If $(\lambda, 1+\lambda)$ be lying inside the circle $x^2+y^2=1$, then-

A. $\lambda = -\frac{1}{2}$

B. $\lambda < 0$

C. $-1 < \lambda < 0$

D. $\lambda > 0$

**Answer: C**

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**2.** The distance between the points A (5 , 1 , 2 ) and B (4 , 6 , -1) is

A. $\sqrt{35}$ units

B. $\sqrt{53}$ units

C. $\sqrt{5}$ units

D. $\sqrt{3}$ units

**Answer: A**

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**3.** If the points $A(2, \beta, 3), B(\alpha, -5, 1)$ and C (-1 , 11 , 9 ) are collinear , then

A. $\alpha = 3$

B. $\beta = 3$

C. $\alpha = -1$

D. $\beta = -1$

**Answer: D**

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**4.** Find the locus of the mid - point of the portion of the line $x\cos\alpha + y\sin\alpha = 4$ intercepted between the axes of coordinates .

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**5.** If the coordinates of a point lies on the ellipse $9x^2 + 16y^2 = 144$ be $\left(2, \frac{3\sqrt{3}}{2}\right)$, find the eccentric angle of that point .

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**6.** Two sides of a square have the equations $5x + 12y = 10$ and $5x + 12y + 29 = 0$ and the third side passes through the point $(3,5)$ . Find the equations of the other two sides of the square.

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**7.** Find the equation of the circle passes through the points $(4,3)$ and $(-2, 5)$ and whose centre lies on the line $2x - 3y = 4$

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**8.** Show that the area of the triangle formed by the straight lines $y = m_1x + c_1, y = m_2x + c_2$ and x = 0 is $\frac{1}{2}\frac{(c_1 - c_2)^2}{|m_1 - m_2|}$ sq . Units .

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**9.** Find the vlaue of cos B for the triangle formed by joining the points A (6,11 , 2 ) , B (1 , - 1 , 2) and C (1 , 2 , 6 ) .

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**10.** If the extremities of a focal chord of the parabola $y^2 = 4ax$ be $\left(at_1^2, 2at_1\right)$ and $\left(at_2^2, 2at_2\right)$ , show that $t_1 t_2 = -1$

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**11.** If S and S' are the foci and P be any point on the hyperbola $x^2 - y^2 = a^2$ , prove that $\overline{SP} \cdot \overline{S'P} = CP^2$ , where C is the centre of the hyperbola .

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Wbjee Archive 2012

**1.** If the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of parallel lines, prove that $\frac{a}{h} = \frac{h}{b} = \frac{g}{f}$

A. 1

B. 2

C. 3

D. 4

**Answer: D**

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**2.** If the circles $x^2 + y^2 + 2x + 2ky + 6 = 0$ and $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally , then k is equal to _

A. $2 \text{ or } -\frac{3}{2}$

B. $-2 \text{ or } -\frac{3}{2}$

C. $2 \text{ or } \frac{3}{2}$

D. $-2 \text{ or } \frac{3}{2}$

**Answer: A**

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**3.** The line joining $A(b\cos\alpha b\sin\alpha)$ and $B(a\cos\beta, a\sin\beta)$ , where $a \neq b$ , is produced to the point M(x , y) so that AM : BM = b : a . Then $x\cos\frac{\alpha+\beta}{2} + y\sin\frac{\alpha+\beta}{2}$ is equal to _

A. 0

B. 1

C. $-1$

D. $a^2 + b^2$

**Answer: A**

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**4.** If four distinct points (2k , 3k ) , (2 , 0) ,(0 , 3) and (0 , 0) lie on a circle then _

A. $k < 0$

B. $0 < k < 1$

C. $k = 1$

D. $k > 1$

**Answer: C**

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**5.** Let the foci of the ellipse $\frac{x^2}{9} + y^2 = 1$ subtend a right angle at a point P . Then the locus of P is _

A. $x^2 + y^2 = 1$

B. $x^2 + y^2 = 2$

C. $x^2 + y^2 = 4$

D. $x^2 + y^2 = 8$

**Answer: D**

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**6.** Let P (2 , -3) , Q (-2 , 1) be the vertices of the triangle PQR . If the centroid of $\Delta PQR$ lies on the line 2x + 3y = 1 , then the locus of R is _

A. 2 x + 3y = 9

B. 2x - 3y = 7

C. 3x + 2y = 5

D. 3x - 2y = 5

**Answer: A**

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**7.** Let P be the midpoint of a chord joining the vertex of the parabola $y^2 = 8x$ to another point on it . Then locus of P .

A. $y^2 = 2x$

B. $y^2 = 4x$

C. $\frac{x^2}{4} + y^2 = 1$

D. $x^2 + \frac{y^2}{4} = 1$

**Answer: B**

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**8.** The line x =2 y intersects the ellipse $\frac{x^2}{4} + y^2 = 1$ at the points P and Q . The equation of the circle with pq as diameter is _

A. $x^2 + y^2 = \frac{1}{2}$

B. $x^2 + y^2 = 1$

C. $x^2 + y^2 = 2$

D. $x^2 + y^2 = \frac{5}{2}$

**Answer: D**

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**9.** The eccentric angle in the first quadrant of a point on the ellipse $\frac{x^2}{10} + \frac{y^2}{8} = 1$ at a distance 3 units from the centre of the ellipse is _

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

**Answer: B**

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**10.** The transverse axis of a hyperbola is along the x - axis and its length is 2a . The vertex of the hyperbola bisects the line segment joining the centre and the focus. The equation of the hyperbola is _

A. $6x^2 - y^2 = 3a^2$

B. $x^2 - 3y^2 = 3a^2$

C. $x^2 - 6y^2 = 3a^2$

D. $3x^2 - y^2 = 3a^2$

**Answer: D**

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**11.** A point moves in such a way that the difference of its distances from two points (8,0) and (-8,0) always remains 4 . Then the locus of the point is _

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

**Answer: D**

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**12.** The number of integer values of m. for which the x - coordinate of the point of intersection of the lines $3x + 4y = 9$ and $y = mx + 1$ is also an interger is

A. 0

B. 2

C. 4

D. 1

**Answer: B**

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**13.** If a straight line passes through the point $(\alpha, \beta)$ and the portion of the line intercepted between the axes is divided equally at that point , then $\frac{x}{\alpha} + \frac{y}{\beta}$ is _

A. 0

B. 1

C. 2

D. 4

**Answer: C**

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**14.** Let p , q , r be the altiudes of triangles with area s and perimeter 2 t . Then the value of $\frac{1}{p}+\frac{1}{q}+\frac{1}{r}$ is

-

A. $\frac{s}{t}$

B. $\frac{t}{s}$

C. $\frac{s}{2t}$

D. $\frac{2s}{t}$

**Answer: B**

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**15.** Let $C_1$ and $C_2$ denote the centres of the circles $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 1$ respectively and let P and Q be their points of intersection. Then the areas of triangles $C_1PQ$ and $C_2PQ$ are in the ratio _

A. $3:1$

B. $5:1$

C. $7:1$

D. $9:1$

**Answer: C**

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**16.** A straight line through the point of intersection of the lines $x + 2y = 4$ and $2x + y = 4$ meets the coordinate axes at A and B .the locus of the midpoint of AB is _

A. $3(x + y) = 2xy$

B. $2(x + y) = 3xy$

C. $2(x + y) = xy$

D. $x + y = 3xy$

**Answer: B**

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**17.** Let P and Q be the points on the prabola $y^2 = 4x$ so that the line segment PQ subtends right at the vertex . If PQ intersects the axis of the parabola at R , then the distance of the vertex from R is _

A. 1

B. 2

C. 4

D. 6

**Answer: C**

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**18.** The incentre of an equilateral triangle is (1,1) and the equation of one side is 3x + 4y + 3 = 0 . Then the equation of the circumcircle of the triangle is _

A. $x^2 + y^2 = -2x - 2y - 2 = 0$

B. $x^2 + y^2 - 2x - 2y - 14 = 0$

C. $x^2 + y^2 - 2x - 2y + 2 = 0$

D. $x^2 + y^2 - 2x - 2y + 14 = 0$

**Answer: B**

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Wbjee Archive 2013

**1.** A point P lies on the circle $x^2 + y^2 = 169$ . If Q = (5 , 12) and R = (-12 , 5) , then the angle $\angle QPR$ is _

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

**Answer: B**

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**2.** A circle passing through (0,0) , (2 6) , (6 ,2) cuts the x axis at the point $P \neq$ (0,0) . Then the length of OP , where O is origin is _

A. $\frac{5}{2}$

B. $\frac{5}{\sqrt{2}}$

C. 5

D. 10

**Answer: C**

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**3.** The locus of the midpoints of the chords of an ellipse $x^2 + 4y^2 = 4$ that are drawn forms the positive end of the minor axis is

A. a circle with centre $\left(\frac{1}{2}, 0\right)$, and radius 1

B. a parabola with focus $\left(\frac{1}{2}, 0\right)$, and directrix x = - 1

C. an ellipse with centre $\left(0, \frac{1}{2}\right)$ , major axis 1 and minor axis $\frac{1}{2}$

D. a hyperbola with centre $\left(0, \frac{1}{2}\right)$ , transverse axis 1 and conjugate axis $\frac{1}{2}$

**Answer:**

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**4.** A point moves so that the sum of squares of its distances from the points (1,2) and (-2,1) is always 6 . Then its locus is _

A. the straight line $y - \frac{3}{2} = -3\left(x + \frac{1}{2}\right)$

B. a circle with centre $\left(-\frac{1}{2}, \frac{3}{2}\right)$ and radius $\frac{1}{\sqrt{2}}$

C. a parabol with focus (1,2) and directrix passing through (-2 , 1)

D. an ellipse with foci (1,2) and (-2 , 1)

**Answer: B**

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**5.** For the variable t , the locus of the points of intersection of lines x - 2y = t and $x + 2y = \frac{1}{t}$ is _

A. the straight line x = y

B. the circle with centre at the origin and radius 1

C. the ellipse with centre at the origin and one focus $\left(\frac{2}{\sqrt{2}}, 0\right)$

D. the hyperbola with centre at the origin and one focus $\left(\frac{\sqrt{5}}{2}, 0\right)$

**Answer: D**

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**6.** If the distance between the foci of an ellipse is equal to the length of the latus rectum, then its eccentricity is _

A. $\frac{1}{4}(\sqrt{5}-1)$

B. $\frac{1}{2}(\sqrt{5}+1)$

C. $\frac{1}{2}(\sqrt{5}-1)$

D. $\frac{1}{4}(\sqrt{5}+1)$

**Answer: C**

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**7.** For the variable t, the locus of the point of intersection of the lines 3 tx - 2y + 6t = 0 and 3x + 2ty - 6 = 0 is _

A. the ellipse $\frac{x^2}{4}+\frac{y^2}{9}=1$

B. the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$

C. the hyperbola $\frac{x^2}{4} - \frac{y^2}{9} = 1$

D. the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$

**Answer: A**

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**8.** If a , b , c are in A . P ., then the straight line ax + 2 by + c = 0 will always pass through a fixed point whose coordinates are _

A. $(1, -1)$

B. $(-1, 1)$

C. $(1, -2)$

D. $(-2, 1)$

**Answer: A**

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**9.** If one end of a diameter of the circle $3x^2 + 3y^2 - 9x + 6y + 5 = 0$ is (1 ,2) then the other end is _

A. $(2, 1)$

B. $(2, 4)$

C. $(2, -4)$

D. $(-4, 2)$

**Answer: C**

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**10.** the equation $2x^2 + 5xy - 12y^2 = 0$ represents a _

A. circle

B. pair of non-perpendicular intersecting straight lines

C. pair of perpendicular straight lines

D. hyperbola

**Answer: B**

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**11.** The line y = x intersects the hyperbola $\frac{x^2}{9} - \frac{y^2}{25} = 1$ at the points P and Q . The eccentricity of ellipse with PQ as major axis and minor axis of length $\frac{5}{\sqrt{2}}$ is _

A. $\frac{\sqrt{5}}{3}$

B. $\frac{5}{\sqrt{3}}$

C. $\frac{2\sqrt{2}}{3}$

D. $\frac{25}{9}$

**Answer:**

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**12.** The equation of the circle passing through the point (1 , 1) and the points of intersection of $x^2 + y^2 - 6x - 8 = 0$ and $x^2 + y^2 - 6 = 0$ is _

A. $x^2 + y^2 + 3x - 5 = 0$

B. $x^2 + y^2 - 4x + 2 = 0$

C. $x^2 + y^2 + 6x - 4 = 0$

D. $x^2 + y^2 - 4y - 2 = 0$

**Answer: A**

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**13.** The number of lines which pass through the point (2 , -3) and are at distance 8 from the point (-1 , 2) is _

A. infinite

B. 4

C. 2

D. 0

**Answer: D**

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**14.** Let P be a point on the parabola $y^2 = 4ax$ with focus F . Let Q denote the foot of the perpendicular from P onto the directrix . Then $\frac{\tan\angle PQF}{\tan\angle PFQ}$ is_

A. 1

B. $\frac{1}{2}$

C. 2

D. $\frac{1}{4}$

**Answer: A**

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**15.** The equations of the circles which touch both the axes and the line 4 x + 3y = 12 and have centres in the first quadrant are _

A. $x^2 + y^2 - x - y + 1 = 0$

B. $x^2 + y^2 - 2x - 2y + 1 = 0$

C. $x^2 + y^2 - 12x - 12y + 36 = 0$

D. $x^2 + y^2 - 6x - 6y + 36 = 0$

**Answer: A::B::C::D**

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**16.** Lines x + y = 1 and 3y = x + 3 intersect the ellipse $x^2 + 9y^2 = 9$ at the points P , Q , R . The area of the triangle PQR is _

A. $\frac{36}{5}$

B. $\frac{18}{5}$

C. $\frac{9}{5}$

D. $\frac{1}{5}$

**Answer: B**

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**17.** A line passing through the point of intersection of x + y = 4 and x - y = 2 makes and angle $\tan^{-1}\frac{3}{4}$ with the x - axis . It intersects the parabola $y^2 = 4(x-3)$ at points $(x_1, y_1)$ and $(x_2, y_2)$ respectively . then $|x_1 - x_2|$ is equal to _

A. $\frac{16}{9}$

B. $\frac{32}{9}$

C. $\frac{40}{9}$

D. $\frac{80}{9}$

**Answer: B**

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## Wbjee Archive 2014

**1.** Let the equation of an ellipse be $\frac{x^2}{144} + \frac{y^2}{25} = 1$ .

Then the radius of the circle with centre $\left(0, \sqrt{2}\right)$

and passing through the foci of the ellipse is _

A. 9

B. 7

C. 11

D. 5

**Answer: C**

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**2.** The values of $\lambda$ for which the curve $(7x+5)^2+(7y+3)^2=\lambda^2(4x+3y-24)^2$ represents a parabola is _

A. $\pm\frac{6}{5}$

B. $\pm\frac{7}{5}$

C. $\pm\frac{1}{5}$

D. $\pm\frac{2}{5}$

**Answer: B**

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**3.** The straight lines x + y = 0 , 5 x + y = 4 and x + 5y = 4 form _

A. an isosceles triangle

B. an equilateral triangle

C. a scalene triangle

D. a right angled triangle

**Answer: A**

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**4.** The equation of hyperbola whose coordinates of the foci are $(\pm 8, 0)$ and the length of latus rectum is 24 units is _

A. $3x^2 - y^2 = 48$

B. $4x^2 - y^2 = 48$

C. $x^2 - 3y^2 = 48$

D. $x^2 - 4y^2 = 48$

**Answer: A**

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**5.** If the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ , cuts the three circles $x^2 + y^2 - 5 = 0, x^2 + y^2 - 8x - 6y + 10 = 0$ and $x^2 + y^2 - 4x + 2y - 2 = 0$ at the extremities of their diameters , then _

A. $c = -5$

B. $fg = \frac{147}{25}$

C. $g + 2f = c + 2$

D. $4f = 3g$

**Answer: A::B::C::D**

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## Wbjee Archive 2015

**1.** If the vertex of the conic $y^2 - 4y = 4x - 4a$ always lies between the straight lines x + y = 3 and 2

x + 2y - 1 = 0 then

A. $2 < a < 4$

B. $-\frac{1}{2} < a < 2$

C. $0 < a < 2$

D. $-\frac{1}{2} < a < \frac{3}{2}$

**Answer: B**

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**2.** Number of points having distance $\sqrt{5}$ from the straight line x - 2y + 1 = 0 and a distance $\sqrt{13}$ from the line 2 x + 3y - 1 = 0 is _

A. 1

B. 2

C. 4

D. 5

**Answer: C**

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**3.** Number of intersecting points of the conic $4x^2 + 9y^2 = 1$ and $4x^2 + y^2 = 4$ is _

A. 1

B. 2

C. 3

D. 0 (zero)

**Answer: D**

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**4.** Let $16x^2 - 3y^2 - 32x + 12y = 44$ represents a hyperbola . Then _

A. length of the transverse axis is $2\sqrt{3}$

B. length of each latus rectum is $\frac{32}{\sqrt{3}}$

C. eccentricity is $\sqrt{\frac{19}{3}}$

D. equation of a directrix is $x = \frac{\sqrt{19}}{3}$

**Answer: A::B::C::D**

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**5.** The least positive value of t so that the lines $x = t + \alpha, y + 16 = 0$ and $y = \alpha x$ are concurrent is _

A. 2

B. 4

C. 16

D. 8

**Answer: D**

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## Wbjee Archive 2016

**1.** The points $(-a, -b), (a^2, ab), (a, b), (0, 0), a \neq 0, b \neq 0$ are always

A. collinear

B. vertices of a parallelogram

C. vertices of a rectangle

D. lie on a circle

**Answer: A**

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**2.** The line AB cuts of equal intercepts 2a from the axes . From any point P on the line AB perpendicular PR and PS are drawn on the axes . Locus of midpoint of RS is

A. $x - y = \frac{a}{2}$

B. $x + y = a$

C. $x^2 + y^2 = 4a^2$

D. $x^2 - y^2 = 2a^2$

**Answer: B**

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**3.**

$x + 8y - 22 = 0, 5x + 2y - 34 = 0, 2x - 3y + 13 = 0$

are three sides of a triangle. The area of the triangle

is

A. 36 square unit

B. 19 square unit

C. 42 square unit

D. 72 square unit

**Answer: B**

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**4.** The line through the points (a , b) and (-a , -b) passes through the point

A. $(1, 1)$

B. $(3a, -2b)$

C. $\left(a^2, ab\right)$

D. $(a, b)$

**Answer: C**

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**5.** The locus of the point of intersection of the straight lines $\frac{x}{a} + \frac{y}{b} = k$ and $\frac{x}{a} - \frac{y}{b} = \frac{1}{k}$ where k is a non-zero real variable is given by

A. a straight by

B. an ellipse

C. a parabola

D. a hyperbola

**Answer: D**

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**6.** The equations of a line parallel to the line 3 x + 4y = 0 and touching the circle $x^2 + y^2 = 9$ in the 1st quardrant is

A. $3x + 4y = 15$

B. $3x + 4y = 45$

C. $3x + 4y = 0$

D. $3x + 4y = 27$

**Answer: A**

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**7.** A line passing through the point of intersection of x + y = 4 and x - y = 2 makes an angle $\tan^{-1}\left(\frac{3}{4}\right)$ with the x-axis . It intersects the parabola $y^2 = 4(x - 3)$ at points $(x_1, y_1)$ and $(x_2, y_2)$ respectively . Then $|x_1 - x_2|$ is equal to

A. $\frac{16}{9}$

B. $\frac{32}{9}$

C. $\frac{40}{9}$

D. $\frac{80}{9}$

**Answer: B**

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**8.** The equation of auxiliary circle of the ellipse $16x^2 + 25y^2 + 32x - 100y = 284$ is

A. $x^2 + y^2 + 2x - 4y - 20 = 0$

B. $x^2 + y^2 + 2x - 4y = 0$

C. $(x+1)^2+(y-2)^2=400$

D. $(x_1)^2+(y-2)^2=225$

**Answer:**

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**9.** If PQ is a double ordinate of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ such that $\Delta OPQ$ is equilateral, O being the centre. Then the eccentricity e satisfies

A. $1<e<\frac{2}{\sqrt{3}}$

B. $e=\frac{2}{\sqrt{2}}$

C. $e = \frac{\sqrt{3}}{2}$

D. $e > \frac{2}{\sqrt{3}}$

**Answer: D**

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**10.** If the vertex of the conic $y^2 - 4y = 4x - 4a$ always lies between the straight lines x + y = 3 and 2 x + 2y - 1 = 0 . Then

A. $2 < a < 4$

B. $-\frac{1}{2} < a < 2$

C. $0 < a < 2$

D. $-\frac{1}{2} < a < \frac{3}{2}$

**Answer: B**

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**11.** Let S be the set of points whose abscissas and ordinates are natural numbers . Let $P \in S$ such that the sum of the distance of P from (8,0) and (0,12) is minimum among all elements in S . Then the number of such points P in S is

A. 1

B. 3

C. 5

D. 11

**Answer: B**

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**12.** The locus of the midpoints of chords of the circle $x^2 + y^2 = 1$ which subtends a right angle at the origin is

A. $x^2 + y^2 = \frac{1}{4}$

B. $x^2 + y^2 = \frac{1}{2}$

C. $xy = 0$

D. $x^2 - u^2 = 0$

**Answer: B**

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**13.** The locus of the midpoints of all chords of the parabola $y^2 = 4ax$ through its vertex is another parabola with directrix is

A. $x = -a$

B. $x = a$

C. $x = 0$

D. $x = -\frac{a}{2}$

**Answer: D**

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**14.** The equation $x^3 - yx^2 + x - y = 0$ represents

A. a hyperbola and two straight lines

B. a straight line

C. a parabola and two straight lines

D. a straight line and a circle

**Answer: B**

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**15.** The coordinates of a point on the line x + y + 1 = 0 which is at a distance $\sqrt{2}$ units from the line 3x + 4y - 2 = 0 ` are

A. $(2, -3)$

B. $(-3, 2)$

C. $(0, -1)$

D. $-1, 0)$

**Answer: A::B::D**

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**16.** If the parabola $x^2 = ay$ makes an intercept of length $\sqrt{40}$ unit on the line y - 2 x = 1 , then a is equal to

A. 1

B. $-2$

C. $-1$

D. 2

**Answer: A::B::D**

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## Jee Main Aieee Archive 2012

**1.** 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 ratio 3 : 2 , then k equals _

A. 6

B. $\frac{11}{5}$

C. $\frac{29}{5}$

D. 5

**Answer: A**

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**2.** The length of the diameter of the circle which touches the x - axis at the point (1,0) and passes through the point (2,3) is _

A. $\frac{6}{5}$

B. $\frac{5}{3}$

C. $\frac{10}{3}$

D. $\frac{3}{5}$

**Answer: A::B::D**

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**3.** An ellipse is drawn by taking a diameter of the circle $(x-1)^2+y^2=1$ as its semi-minor axis and a diameter of the the circle $x^2+(y-2)^2=4$ as its sem-major axis . If the centre of the ellipse is at the origin and its axes are the coordinate axes , then the equation of the ellipse is _

A. $4x^2 + y^2 = 8$

B. $x^2 + 4y^2 = 16$

C. $4x^2 + y^2 = 4$

D. $x^2 + 4y^2 = 8$

**Answer: B**

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## Jee Main Aieee Archive 2013

**1.** A ray of light along $x + \sqrt{3}y = \sqrt{3}$ gets reflected upon reaching g x- axis , the equation of reflected

ray is _

A. $y = x + \sqrt{3}$

B. $\sqrt{3}y = x - \sqrt{3}$

C. $y = \sqrt{3}x - \sqrt{3}$

D. $\sqrt{3}y = x - 1$

**Answer: B**

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**2.** The circle passing through (1 , -2) and touching the axis of x at (3 , 0) also passes through the point _

A. $(-5, 2)$

B. $(2, -5)$

C. $(5, -2)$

D. $(-2, 5)$

**Answer: C**

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**3.** The x - coordinate of the incentre of the triangle that has the coordinates of midpoints of its sides as (0 ,1) , (1 , 1) and (1 , 0) is _

A. $2+\sqrt{2}$

B. $2-\sqrt{2}$

C. $1+\sqrt{2}$

D. $1-\sqrt{2}$

**Answer: B**

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**4.** The equation of the circle passing through the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$ and having centre at (0 , 3) is _

A. $x^2 + y^2 - 6y - 7 = 0$

B. $x^2 + y^2 - 6y + 7 = 0$

C. $x^2 + y^2 - 6y - 5 = 0$

D. $x^2 + y^2 - 6y + 5 = 0$

**Answer: A**

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## Jee Main Aieee Archive 2014

**1.** Let be the circle with centre at (1 , 1) and radius is 1 unit . It T is the circle centred at (0 , y) , passing

through origin and touching the circle c externally ,

then the radius of T is equal to _

A. $\frac{\sqrt{3}}{\sqrt{2}}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$

**Answer: D**

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**2.** Let a, b , c and d be nonzero number . If the point

of intersection of the lines 4ax + 2ay + c = 0 and 5 b

x + 2 by + d = 0 lies in the fouth quadrant and is eqaidistant from the two axes , then _

A. $2bc - 3ad = 0$

B. $2bc + 3ad = 0$

C. $3bc - 2ad = 0$

D. $3bc + 2ad = 0$

**Answer: C**

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**3.** Let PS be the median of the triangle with vertices P (2 ,2) , Q (6 , -1) and R (7 , 3) . The equationf o the

line passing through (1 , -1) and parallel to Ps is _

A. $4x - 7y - 11$

B. $2x + 9y + 7 = 0$

C. $4x + 7y + 3 = 0$

D. $2x - 9y - 11 = 0$

**Answer: B**

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Jee Main Aieee Archive 2015

**1.** Let O be the vertex and Q be any point on the parabola $x^2 = 8y$ . If the point P divides the line segments OQ internally in the ratio $1 : 3$ , then the locus of P is _

A. $y^2 = 2x$

B. $x^2 = 2y$

C. $x^2 = y$

D. $y^2 = x$

**Answer: B**

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**2.** The number of points, having both coordinates are integers, that lie in the interior of the triangle with vertices (0,0), (0,41) and (41, 0) is

A. 820

B. 780

C. 901

D. 861

**Answer: B**

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

A. Circle of radius $\sqrt{2}$

B. circle of radius $\sqrt{3}$

C. straight line parallel to x-axis

D. straight line parallel to y - axis

**Answer: A**

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Jee Main Aieee Archive 2016

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

A. $(-3, -9)$

B. $(-3, -8)$

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

D. $\left(\frac{10}{3}, -\frac{7}{3}\right)$

**Answer: C**

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**2.** The centres of those circles which touch the circle $x^2 + y^2 - 8x - 8y - 4 = 0$ externally and also touch the x - axis, lie on

A. a circle

B. an ellipse which in not a circle

C. a hyperbola

D. a parabola

**Answer: D**

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**3.** In one of the diameters of the circle, given by the equation $x^2 + y^2 - 4x + 6y - 12 = 0$ , is a chord of a circle S , whose center is at (-3 , 2) , then the radius of S is

A. $5\sqrt{2}$

B. $5\sqrt{3}$

C. 5

D. 10

**Answer: B**

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**4.** Let , P be the point on the parabola $y^2 = 8x$ which is at a minimum distance from the centre C of the circle $x^2 + (y+6)^2 = 1$ . Then the equation of the circle, passing through C and having its centre at P is

A. $x^2 + y^2 - 4x + 8y + 12 = 0$

B. $x^2 + y^2 - x + 4y - 12 = 0$

C. $x^2 + y^2 - \frac{x}{4} + 2y - 24 = 0$

D. $x^2 + y^2 - 4x + 9y + 18 = 0$

**Answer: A**

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**5.** The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci , is

A. $\frac{4}{3}$

B. $\frac{4}{\sqrt{3}}$

C. $\frac{2}{\sqrt{3}}$

D. $\sqrt{3}$

**Answer: C**

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## Jee Advanced Archive 2013

**1.** Circle (s) touching x - axis at a distance 3 from the origin and having an intercept of length $2\sqrt{7}$ on y - axis is (are)

A. $x^2 + y^2 - 6x + 8y + 9 = 0$

B. $x^2 + y^2 - 6x + 7y + 9 = 0$

C. $x^2 + y^2 - 6x - 8y + 9 = 0$

D. $x^2 + y^2 - 6x - 7y + 9 = 0$

**Answer:**

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## Jee Advanced Archive 2014

**1.** A circle s passes through the point ( 0,1) and is orthogonal to the circles $(x-1)^2+y^2=16$ and $x^2+y^2=1$. Then

A. radius of S is 8

B. radius of S is 7

C. center of S is ( -7 , 1)

D. center of s is ( - 8 , 1)

**Answer: A::B::C::D**

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## Jee Advanced Archive 2015

**1.** Let the curve C be the mirror image of the parabola $y^2 = 4x$ with respect to the line x + y + 4 = 0 If A and B are the points of intersection of C with the line y = - 5 , then the distance between A and B is

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**2.** Let P and Q be distinct points on the parabola $y^2 = 2x$ such that a circle with PQ as diameter passes through the vertex O of the parabola . If P lies in the first quadrant and the area of the triangle OPQ is $3\sqrt{2}$, then which of the following is (are) the coordinates of P ?

A. $\left(4, 2\sqrt{2}\right)$

B. $\left(9, 3\sqrt{2}\right)$

C. $\left(\frac{1}{4}, \frac{1}{\sqrt{2}}\right)$

D. $\left(1, \sqrt{2}\right)$

**Answer: A::D**

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## Jee Advanced Archive 2016

**1.** The circle $C_1 : x^2 + y^2 = 3$ , with centre at O , intersects the parabola $x^2 = 2y$ at the point P in the first quadrant . Let the tangent to the circle $C - (1)$ at P touches other two circles $C_2$ and $C_3 at R_2$ and $R_3$ , respectively. suppose $C_2$ and $C_3$ have equal radii $2\sqrt{3}$ and centres $Q_2$ and $Q_3$ , respectively . if $Q_2$ and $Q_3$ lie on the y-axis , then

A. $Q_2 Q_3 = 12$

B. $R_2R_3 = 4\sqrt{6}$

C. area of the triangle $OR_2R_3 is 6\sqrt{2}$

D. area of the triangle $PQ_2Q_3 is 4\sqrt{2}$

**Answer: A::B::C**

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**2.** Let , RS be the diameter of the circle $x^2 + y^2 = 1$ , where S is the point ( 1,0) . Let P be a variable point (other then R and S ) on the circle and tangents to the circle at s and P meet at the point Q . The normal to the circle at P intersects a line drawn through Q

parallel to RS at point E . The locus of E passes through the point (s)

A. $\left(\frac{1}{3}, \frac{1}{\sqrt{3}}\right)$

B. $\left(\frac{1}{4}, \frac{1}{2}\right)$

C. $\left(\frac{1}{3}, -\frac{1}{\sqrt{3}}\right)$

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

**Answer: A::C::D**

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**3.** Let $a, b \in \mathbb{R}$ and $a^2 + b^2 \neq 0$ . Suppose $s = \left\{ z \in \mathbb{C} : z = \frac{1}{a + ibt}, t \in \mathbb{R}, t \neq 0 \right\}$ where I = $\sqrt{-1}$ . If z = x + iy and $z \in S$ then ( x , y) lies on

A. The circle with radius $\frac{1}{2a}$ and center $\left( \frac{1}{2a}, 0 \right)$ for $a > 0, b \neq 0$

B. The circle with radius $-\frac{1}{2a}$ and center $\left( -\frac{1}{2a}, 0 \right)$ for $a < 0 b \neq 0$

C. the x - axis for $a \neq 0, b = 0$

D. the y - axis for $a = 0, b \neq 0$

**Answer: A::C::D**

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