



# MATHS

# **BOOKS - MTG WBJEE MATHS (HINGLISH)**

# **CONIC SECTIONS**

Wb Jee Workout Category 1 Single Option Correct Type

**1.** The equation of hyperbola referred to its axes as axes of coordinate whose distance between the foci is 20 and eccentricity equals  $\sqrt{2}$  is

A. 
$$x^2 - y^2 = 25$$
  
B.  $x^2 - y^2 = 50$ 

$$\mathsf{C.}\,x^2-y^2=125$$

D. 
$$x^2 + y^2 = 25$$

### Answer: B



**2.** The equation of the ellipse with its centre at (1, 2), one focus at (6, 2) and passing through the point (4, 6) is-

A. 
$$\frac{(x-1)^2}{45} + \frac{(y-2)^2}{20} = 1$$
  
B.  $\frac{(x+1)^2}{45} + \frac{(y+2)^2}{20} = 1$   
C.  $\frac{(x-1)^2}{20} + \frac{(y-2)^2}{45} = 1$   
D.  $\frac{(x+1)^2}{20} + \frac{(y+2)^2}{45} = 1$ 

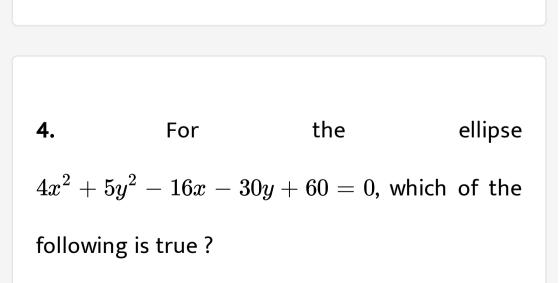
### Answer: A

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**3.** If the eccentric angles of the ends of a focal chord of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1(a > b)$  are  $\theta_1$  and  $\theta_2$ , then value of  $\tan \frac{\theta_1}{2} \tan \frac{\theta_2}{2}$  equals

A. 
$$\frac{e-1}{e+1}$$
  
B. 
$$\frac{e-1}{e^2+1}$$
  
C. 
$$\frac{e+1}{e-1}$$
  
D. 
$$\frac{e^2+1}{e-1}$$

### Answer: A



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A. Centre=(2,3)

B. Length of major axes is1

C. Eccentricity=
$$\frac{1}{\sqrt{5}}$$

D. All of these

### Answer: D



5. The equation of common tangent to the parabola's  $y^2 = 32x$  and  $x^2 = 108y$  is

A. 2x + 3y + 12 = 0

B. 
$$2x + 3y + 36 = 0$$

C. 2x + 3y - 36 = 0

D. 2x + 3y - 12 = 0

#### Answer: B



**6.** If the line x + y - 1 = 0 touches the parabola

 $y^2=kx,\,\,{
m thn}$  the value of k, is

A. 4

 $\mathsf{B.}-4$ 

C. 2

 $\mathsf{D.}-2$ 

### **Answer: B**



## 7. Equation of tangent at the vertex of parabola

$$x^2 + 8x + 4y = 0$$
 is

A. x = 4

B. 
$$x = -4$$

$$C. y = 4$$

D. y = -4

### Answer: C



8. The equation of parabola whose latus rectum

is 2 units, axis of line is x+y-2=0 and tangent at the vertex is x-y+4=0 is given by

A. 
$$(x+y-2)^2 = 4\sqrt{2}(x-y+4)^2$$
  
B.  $(x-y-4)^2 = 4\sqrt{2}(x+y-2)$   
C.  $(x+y-2)^2 = 2\sqrt{2}(x-y+4)$ 

D. none

### Answer: C



9. The co-ordinates of the point on the parabola $y = \left(x^2 + 10x + 3
ight)$  which is nearest to the straight line y = 4x - 7 are

A. (3, 18)B. (18, 3)C. (-3, -18)D. (-18, -3)

### Answer: C

10. The equation of the chord joining two points  $(x_1, y_1)$  and  $(x_2, y_2)$  on the rectangular hyperbola  $xy=c^2$ , is

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A. 
$$rac{x}{x_1-x_2}+rac{y}{y_1-y_2}$$
  
B.  $rac{x}{y_1-y_2}+rac{y}{x_1-x_2}=1$   
C.  $rac{x}{x_1+x_2}+rac{y}{y_1+y_2}=1$   
D.  $rac{x}{y_1+y_2}+rac{y}{x_1+x_2}=1$ 

### Answer: C



**11.** The equation of the circle drawn with the focus of the parabola  $(x-1)^2 - 8y = 0$  as its centre and touching the parabola at its vertex is

A. 
$$(x-1)^2 + (y-2)^2 = 5$$

B. 
$$(x-2)^2 + (y-1)^2 = 5$$

$$\mathsf{C.} \left( x - 1 \right)^2 + \left( y - 2 \right)^2 = 4$$

D. none

### Answer: C



## 12. Find the length of the latus rectum of the

parabola

$$169 \Big\{ (x-1)^2 + (y-3)^2 \Big\} = (5x-12y+17)^2$$

A. 
$$\frac{14}{13}$$
  
B.  $\frac{28}{13}$   
C.  $\frac{12}{13}$ 

•

D. none

Answer: B



13. The number of tangents (real) that can be drawn to the ellipse  $5x^2 + 7y^2 = 40$  passing through (3,5) is

A. 4

B. 3

C. 1

D. 2

### Answer: D



14. The number of values of c such that the straight line y = 4x + c touches the curve $rac{x^2}{4} + y^2 = 1$  is k then,k is

A. 0

B.4

C. 7

D. none

### Answer: D



15. If the curve  $xy = R^2 - 16$  represents a rectangular hyperbola whose branches lies only in the quadrant in which abscissa & ordinate are possite in sign but not equal in magnitude, then

A. 
$$|R| < 4$$

- $\mathsf{B.}\left|R\right|\geq 4$
- $\mathsf{C}.\left|R\right|=4$
- D. none



16. For the second degree equation  $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ which of the following is not true ?

A. represent a pair of straight line if  $\Delta = \begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = 0$ 

B. represent a pair of perpendicular lines if

$$\Delta=0$$
 and  $a+b=0$ 

C. represent a rectangular hyperbola if

$$\Delta 
eq 0, a+b=0 \, ext{ and } \, h^2>ab$$

### D. none

### Answer: D

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17. Find a point on the curve  $x^2 + 2y^2 = 6$ , whose distance from the line x + y = 7, is minimum.

A. (1,2)

B. (-2,-1)

C. (1,-2)

### D. (2,1)

### Answer: D



18. If  $e_1$  is the eccentricity of the conic  $9x^2 + 4y^2 = 36 \text{ and } e_2$  is the eccentricity of the conic  $9x^2 - 4y^2 = 36$  then e12 - e22 = 2 b. e22 - e12 = 2 c. 2 < 322 - 312 < 3 d. e22 - e12 > 3

A. 
$$e_1^2 + e_2^2 = 2$$

B. 
$$3 < e_1^2 + e_2^2 < 4$$

C. 
$$e_1^2 + e_2^2 > 4$$

### D. none

### Answer: B

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19. If e is the eccentricity of 
$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1 \& \theta$$
  
be the angle between the asymptotes, then  $\sec \theta/2$  equals

B.1/e

 $\mathsf{C.}\,2e$ 

D. e

Answer: D

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## 20. Set of values of 'h' for which the number of

distinct common normals of  $(x-2)^2 = 4(y-3)$  and

 $x^2+y^2-2x-hy-c=0(c>0)~~{
m is}~3,{
m is}~$ 

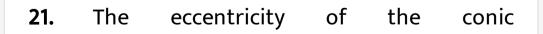
A.  $(2,\infty)$ 

- $\mathsf{B.}\left(4,\infty
  ight)$
- C.(2,4)

D. none

### Answer: B





 $3x^2 + 4y^2 - 6x - 8y + 4 = 0$  is

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

 $\mathsf{B.}\,1/\sqrt{2}$ 

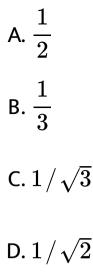
 $\mathsf{C}.\,\sqrt{2}$ 

D. none

Answer: A

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**22.** The eccentricity of an ellipse, the length of whose minor axis is equal to the distance between the foci, is



### Answer: D





 $x=t^2+t+1$ , y =  $t^2-t+1$  represents :

A. a parabola with latus rectum 4

B. an ellipse centre at (1,2)

C. a parabola with latus rectum 2

D. an hyperbola with eccentricity  $\sqrt{2}$ 

### Answer: C

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24. The coordinates of the vertex of the parabola

$$y^2=4(x+y)$$
 is

A. (0,0)

B. (2,1)

C. (-1,2)

D. (1,2)

### Answer: C



25. If ASC is a focal chord of the parabola  $y^2 = 4ax$  and AS = 5, SC = 9, then length of latus rectum of the parabola equals

A. 
$$\frac{90}{7}$$
  
B.  $\frac{7}{90}$   
C.  $\frac{45}{14}$   
D.  $\frac{14}{45}$ 

### Answer: A

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26. The line 
$$x = 2y$$
 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. 
$$x^2+y^2=rac{1}{2}$$
  
B.  $x^2+y^2=1$   
C.  $x^2+y^2=2$   
D.  $x^2+y^2=rac{5}{2}$ 

### Answer: D



**27.** 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



**28.** Let the foci of the ellipse  $rac{x^2}{lpha}+y^2=1$ 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)  $x^2 + y^2 = 8$ 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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29. The locus of the middle points of all chords of the parabola  $y^2 = 4ax$  passing through the vertex is

A. a straight line

B. an ellipse

C. a parabola

D. a circle

Answer: C

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30. The coordinates of the focus of the parabola described parametrically by  $x = 5t^2 + 2$ . y = 10t + 4 are A. (7,4) B. (3,4) C. (3,-4) D. (-7,4) Answer: A



# Wb Jee Workout Category 2 Single Option Correct Type

1. If the equation of a chord of the parabola  $y^2 = 4ax$  is y = mx + c, then its mid point is

$$\begin{array}{l} \mathsf{A.} \left( \frac{2a-mc}{m^2}, \frac{2a}{m} \right) \\ \mathsf{B.} \left( \frac{2a+mc}{m^2}, \frac{2a}{m} \right) \\ \mathsf{C.} \left( \frac{2a-mc}{m^2}, \frac{-2a}{m} \right) \\ \mathsf{D.} \left( \frac{2m-ac}{m^2}, \frac{2a}{m} \right) \end{array}$$



- 2. The ,locus of the point of intersection of two perpendicular tangents to the parabola $y^2 = 4ax$  is
  - A. x+a=0

B. x-a=0

- C. y+a=0
- D. y-a=0



**3.** If the parabola  $y = x^2 + bx + c$ , touches the straight line x=y at the point (1,1) then the value of b+c is

A. 0

B. 2

 $\mathsf{C}.-2$ 

D. 3



4. The mid point of the chord 16x+9y=25 to the

ellipse 
$$\displaystyle rac{x^2}{9} + \displaystyle rac{y^2}{16} = 1$$
 is

A. (1,-1)

- B. (-1,1)
- C. (-1,1)
- D. (1,1)

### Answer: D



**5.** If the normal at an end of a latus rectaum of an ellipse passes through an extremity of the minor axis then the eccentricity of the ellispe satisfies .

A. 
$$e^2 + e + 1 = 0$$
  
B.  $e^4 + e^2 + 1 = 0$   
C.  $e^4 - e^2 - 1 = 0$   
D.  $e^4 + e^2 - 1 = 0$ 

### Answer: D



6. Equation of pair of tangents to the ellipse  $9x^2 + 25y^2 = 225$  from a point (4,2) is

$$9x^2+25y^2-225=\left(rac{36x+50y-225}{\sqrt{19}}
ight)^2$$

A.

$$9x^2+25y^2-225=\left(rac{36x+25y-225}{15\sqrt{19}}
ight)^2$$

$$igg(rac{x^2}{25}+rac{y^2}{9}-1igg)19=igg(rac{36x+25y-225}{15}igg)^2$$

### D. none

### Answer: A



7. If the tangent drawn at a point  $(t^2, 2t)$  on the parabola  $y^2 = 4x$  is same as normal drawn at  $(\sqrt{5}\cos\alpha, 2\sin\alpha)$  on the ellipse  $\frac{x^2}{5} + \frac{y^2}{4} = 1$ , then which of following is not true ?

A. 
$$t=\pmrac{1}{\sqrt{5}}$$
  
B.  $lpha=- an^{-1}2$ 

C. 
$$lpha= an^{-1}2$$

D. none

#### Answer: D



8. If one end of a focal chord of the parabola  $y^2 = 4ax$  be  $(at^2, 2at)$ , then the coordinates of its other end is

A. 
$$\left(\frac{a}{t^2}, \frac{-2a}{t}\right)$$
  
B.  $\left(\frac{-a}{t}, \frac{2a}{t}\right)$ 

$$\mathsf{C}.\left(\frac{-1}{t^2},\frac{a}{t}\right)$$
$$\mathsf{D}.\left(\frac{-a}{t},\frac{1}{t^2}\right)$$

### Answer: A



**9.** if the tangent to the parabola y = x(2 - x)at the point (1,1) intersects the parabola at P. find the co-ordinate of P.

A. (1,2)

B. (1,1)

C. (3,-2)

D. (-1,-4)

### Answer: B



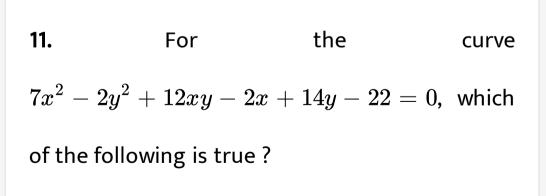
**10.** If a circle cuts a rectangular hyperbola xy=1 in four points P,Q,R,S and the parameters of these four points be  $t_1, t_2, t_3$  and  $t_4$  respectively and  $-20t_1t_2t_3t_4 = k$ , then value of k equals B. -1

C.-4

D. none

Answer: D

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A. an hyperbola with eccentricity  $\sqrt{3}$ 

2x + y - 1 = 0

C. an hyperbola with focus (1, 2)

D. All of these

# Answer: D



**12.** The angle between the tangents drawn from the point (1,4) to the parabola  $y^2=4x$  is

A. 
$$\frac{\pi}{6}$$
  
B.  $\frac{\pi}{4}$   
C.  $\frac{\pi}{3}$   
D.  $\frac{\pi}{2}$ 

## Answer: C



13. The normals at three points P,Q,R of the parabola  $y^2=4ax$  meet in (h,k) The centroid

of triangle PQR lies on (A)x=0(B)y=0(C)x=-a(D)y=a`

A. x=0

B. y=0

C. x=-a

D. y=a

Answer: B



14. The set of a points on the axis of the parabola  $y^2 - 4x - 4y + 12 = 0$  from which all three normals to the parabola are real is

A. (k,2), k>4

 $\mathsf{B.}\,(k,0), k>5$ 

 $\mathsf{C}.\,(k,1), k>4$ 

D. none

**Answer: A** 



**15.** If for a conic section a focus is (-1,1), eccentricity=3 and the equation of the corresponding directrix is x-y+3=0, then the equation of this conic section is

A. 
$$7x^2 - 18xy + 7y^2 + 50x - 50y + 77 = 0$$
  
B.  $7x^2 + 18xy + 7y^2 = 1$   
C.  $7x^2 + 18xy + 7y^2 - 50x + 50y + 77 = 0$ 

D. none

Answer: A



Wb Jee Workout Category 3 One Or More Than One Option Correct Type

**1.** For hyperbola xy=4, which of the following is not true ?

A. Equations of transverse axis is  $y\pm x=0$ 

B. Eccentricity,  $e=\sqrt{2}$ 

C. Co-ordinates of foci are  $\left(2\sqrt{2},2\sqrt{2}
ight)$  and

 $ig(-2\sqrt{2},\ -2\sqrt{2}ig)$  and equation of

directrix is given by  $x+y\pm 2\sqrt{2}=0$ 

## D. none

## Answer: D



**2.** For what value of  $\lambda$ , the line y=2x+ $\lambda$  touches the hyperbola  $9x^2-5y^2=45$  ?

# A. $\sqrt{11}$

B. 11

# C. -11

# $\mathsf{D.}-\sqrt{11}$

Answer: A::D

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**3.** The ratio of the areas of a triangle formed with vertices

 $Aig(at_1^2,2at_1ig),\,Big(at_2^2,2at_2ig),\,Cig(at_3^2,2at_3ig)$  lies on the parabola  $y^2=4ax$  and triangle formed by the tangents at A,B,C is

B. 2:1

C. 2:3

D. 3:2

Answer: B

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**4.** Length of common tangents to the hyperbolas 
$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$
 and  $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$  is

A. 
$$x+y=\sqrt{a^2-b^2}$$

B. 
$$x-y=\sqrt{a^2-b^2}$$

$$\mathsf{C.}\,x+y=\,-\,\sqrt{a^2-b^2}$$

D. 
$$x-y=\,-\sqrt{a^2-b^2}$$

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

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5. Let P be the point on the parabola  $y^2=4x$  which is at the shortest distance from the centre S of the circle  $x^2+y^2-4x-16y+64=0$ . Let

Q be the point on the circle dividing the lie segment SP internally. Then

A. 
$$SP=2\sqrt{5}$$

B. 
$$SQ{:}\,QP=\left(\sqrt{5}+1
ight){:}\,2$$

C. the x-intercept of the normal to the parabola at P is 2

D. the slope of the tangent to the circle at Q

is 
$$\frac{1}{2}$$

Answer: A::D



**6.** The equation  $rac{x^2}{14-a}+rac{y^2}{9-a}=1$  represent

A. an ellipse if a < 9

B. a hyperbola ifi 9 < a < 14

C. a hyperbola if a>14

D. an ellipse a > 9

Answer: A::B



7. The point on the parabola  $y^2 = 4x$  at which it cuts the straight line joining (0,0) and (2,3) is

A. (0,0)

B. (2,3)

C. (16/9,8/3)

D. (1,2)

Answer: A::C

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**8.** If the line ax + by + c = 0 is a tangent to the

curve xy = 4 then

A. 
$$a < 0, b > 0$$

- B.  $a \le 0, b > 0$
- C. a < 0, b < 0
- D.  $a \leq 0, b < 0$

### Answer: C

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9. If parametric representation of a parabola is

$$x=2+t^2 ext{ and } y=2t+1$$
, then

A. axis of parabola is y=1

B. equation of directrix is x=1

C. focus of parabola is S(3,1)

D. vertex of parabola is V(2,1)

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



10. Let  $x^2 + 3xy + 2y^2 + 2x + 3y = 0$ а hyperbola, then which of the following is true? A. equation of asymptotes is  $x^2 + 3xy + 2y^2 + 2x + 3y + 1 = 0$ B. Equations of asymptotes are x + y + 1 = 0 and x + 2y + 1 = 0C. The equation of conjugate hyperbola is  $x^2 + 3xy + 2y^2 + 2x + 3y + 2 = 0$ D. none

Answer: A::B::C

11. 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  $\Delta OPQ$  is  $3\sqrt{2}$ , then which of the following is (are) the coordinates of P?

A. 
$$(4, 2\sqrt{2})$$
  
B.  $(9, 3\sqrt{3})$   
C.  $\left(\frac{1}{4}, \frac{1}{\sqrt{2}}\right)$ 

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

## Answer: A::D

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12. The locus of mid-points of a focal chord of the ellipse 
$$\displaystyle rac{x^2}{a^2} + \displaystyle rac{y^2}{b^2} = 1$$

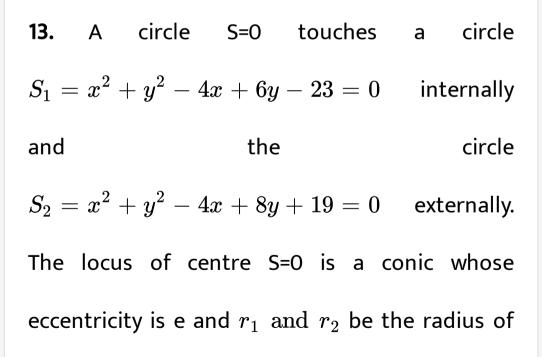
A. director circle with radius  $\sqrt{a^2+b^2}$ 

B. 
$$rac{x^2}{a^2}+rac{y^2}{b^2}-rac{ex}{a}=0$$
  
C.  $rac{x^2}{a^2}+rac{y^2}{b^2}+rac{ex}{a}=0$ 

D. Mutually  $\perp$  tangents to the ellipse

### Answer: B::C





 $S_1$  &  $S_2$  respectively and  $[\ \cdot\ ]$  denotes greatest integer, then

A. 
$$r_1+r_2=7$$

B. 
$$r_1 - r_2 = 5$$

$$\mathsf{C}.\left[\frac{1}{e}\right] = 7$$

D. none

Answer: A::B::C



14. Acute angle between two curve  

$$x^2 + y^2 = a^2\sqrt{2}$$
 and  $x^2 - y^2 = a^2$  is  
A.  $\frac{\pi}{3}$   
B.  $\frac{\pi}{4}$   
C.  $\frac{\pi}{6}$   
D.  $\frac{\pi}{12}$   
Answer: B

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15. The eccentricity of the hypebola whose asymptotes are 5x + 12y - 7 = 0 and 12x - 5y + 5 = 0 is A.  $\sqrt{3}$ B.  $2\sqrt{3}$ C. 2 D. none Answer: D Watch Video Solution

**1.** 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 triangles PQR is

A. 
$$\frac{36}{5}$$
  
B.  $\frac{18}{5}$   
C.  $\frac{9}{5}$   
D.  $\frac{1}{5}$ 

Answer: B



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

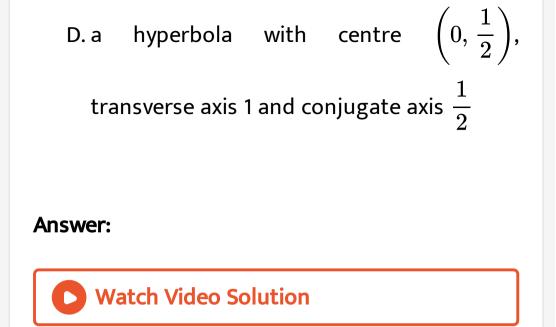
A. the ellipse 
$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$
  
B. the ellipse  $\frac{x^2}{9} + \frac{y^2}{4} = 1$   
C. The hyperbola  $\frac{x^2}{4} - \frac{y^2}{9} = 1$   
D. the hyperbola  $\frac{x^2}{9} - \frac{y^2}{4} = 1$ 

### Answer: A



**3.** The locus of the midpoints of the chords of an ellipse  $x^2 + 4y^2 = 4$  that are drawn from 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  $\frac{1}{2}$ 



4. For the variable t, the locus of the points of

intersection of lines  $x-2y=t ext{ and } x+2y=rac{1}{t} ext{ is }$ 

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 
$$\left(rac{2}{\sqrt{5}},0
ight)$$

D. the hyperbola with centre at the origin

and one focus 
$$\left( \frac{\sqrt{5}}{2}, 0 \right)$$

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## Answer: D

5. 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 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)  $\frac{3}{\sqrt{2}}$ A.  $\frac{\sqrt{5}}{3}$ 

B. 
$$\frac{5}{\sqrt{3}}$$
  
C.  $\frac{5}{9}$   
D.  $\frac{25}{9}$ 



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

A. 
$$rac{1}{4} \left( \sqrt{5} - 1 
ight)$$
  
B.  $rac{1}{2} \left( \sqrt{5} + 1 
ight)$   
C.  $rac{1}{2} \left( \sqrt{5} - 1 
ight)$   
D.  $rac{1}{4} \left( \sqrt{5} + 1 
ight)$ 

#### Answer: C



7. If 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. 1/2

C. 2

D. 1/4

#### **Answer: A**

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8. if y = 4x + 3 is parallel to a tangent to the parabola  $y^2 = 12x$ , then its distance from the normal parallel to the given line is

A. 
$$\frac{213}{\sqrt{17}}$$
  
B.  $\frac{219}{\sqrt{17}}$   
C.  $\frac{211}{\sqrt{17}}$ 

D.  $\frac{210}{\sqrt{17}}$ 

#### Answer: B

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**9.** The point on the parabola  $y^2 = 64x$  which is nearest to the line 4x + 3y + 35 = 0 has coordinates

A. (9,-24)

B. (1,81)

C. (4,-16)

#### D. (-9,-24)

#### Answer: A

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

$$A. \pm \frac{6}{5}$$
$$B. \pm \frac{7}{5}$$
$$C. \pm \frac{1}{5}$$

#### Answer: B

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11. The equation of the common tangent with positive slope to the parabola  $y^2=8\sqrt{3}x$  and hyperbola  $4x^2-y^2=4$  is

A. 
$$y=\sqrt{6}x+\sqrt{2}$$

B. 
$$y=\sqrt{6}x-\sqrt{2}$$

C. 
$$y=\sqrt{3}x+\sqrt{2}$$

D. 
$$y=\sqrt{3}x-\sqrt{2}$$

#### Answer: A



12. The the vertex of the conic  $y^2 - 4y = 4x - 4a$  always lies between the straight lines x + y = 3 and 2x + 2y - 1 = 0then

A. 
$$2 < a < 4$$
  
B.  $-rac{1}{2} < a < 2$ 

C. 
$$0 < a < 2$$
  
D.  $-rac{1}{2} < a < rac{3}{2}$ 

#### **Answer: B**



#### 13. Number of intersecting points of the coincs

$$4x^2 + 9y^2 = 1 \, ext{ and } \, 4x^2 + y^2 = 4 \, ext{is}$$

A. 1

B. 2

C. 3

D. 0

#### Answer: D

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# 14. Then 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)  
 $(x+1)^2 + (y-2)^2 = 225$ 

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: A



**15.** If PQ is a double ordinate of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  such that OPQ is an equilateral triangle, O being the center of the hyperbola,

then find the range of the eccentricity e of the

hyperbola.

A. 
$$1 < e < rac{2}{\sqrt{3}}$$
  
B.  $e = rac{2}{\sqrt{2}}$   
C.  $e = rac{\sqrt{3}}{2}$   
D.  $e > rac{2}{\sqrt{3}}$ 

#### Answer: D



16. The line  $y = x + \lambda$  is a tangent to an ellipse

 $2x^2+3y^2=1$  then

A.-2

B. 1

C. 
$$\sqrt{\frac{5}{6}}$$
  
D.  $\sqrt{\frac{2}{3}}$ 

#### Answer: C

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**17.** 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 line

B. an ellipse

C. a parabola

D. a hyperbola

Answer: D

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**18.** Let P be the foot of the perpendicular from focus S of hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  on the line bx - ay = 0 and let C he the centre of the hyperbola. Then the area of the rectangle whose sides are equal to that of SP and CP is

A. 2ab

B.ab

C. 
$$rac{\left(a^2+b^2
ight)}{2}$$

D. 
$$\frac{a}{b}$$

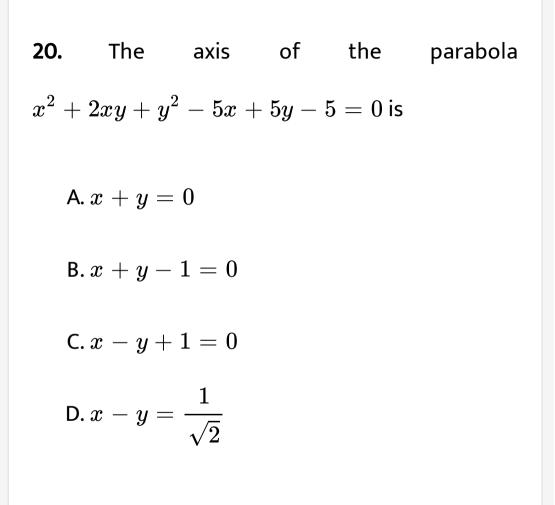
#### **Answer: B**



**19.** B is extermity of the minor axis of an elipse whose foci are S and S'. If  $\angle SBS'$  is a right angle, then the eccfentricity of the ellipse is

A. 
$$\frac{1}{2}$$
  
B.  $\frac{1}{\sqrt{2}}$   
C.  $\frac{2}{3}$   
D.  $\frac{1}{3}$ 

#### Answer: B



#### Answer: A

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**21.** The line segment joining the foci of the hyperbola  $x^2 - y^2 + 1 = 0$  is one of the diameters of a circle. The equation of the circle is

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

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

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

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

#### Answer: C

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**22.** The focus of the conic  $x^2 - 6x + 4y + 1 = 0$ 

is

A. (2,3)

B. (3,2)

C. (3,1)

D. (1,4)

#### Answer: C



23. Equation of common tangent of  $y = x^2, y = -x^2 + 4x - 4$  is A. 1 **B**. 2 C. 3 D. 4 **Answer: B** Watch Video Solution

24. Let the eccentricity of the hyperbola  $rac{x^2}{a^2}-rac{y^3}{b^2}=1$  be reciprocal to that of the ellipse  $x^2+9y^2=9,$  then the ratio  $a^2:b^2$  equals

A. 8:1

B.1:8

**C**. 9:1

D.1:9

#### Answer: A



25. Let a, r, s, t be non-zero real numbers. Let  $P(at^2, 2at), Q(ar^2, 2ar) \text{ and } S(as^2, 2as)$ be distinct points on the parabola  $y^2 = 4ax$ . Suppose that PQ is the focal chord and lines QR and PK are parallel, where K the point (2a,0). If st=1, then the tangent at P and the normal at S to the parabola meet at a point whose ordinate is

A. 
$$rac{t}{1-t^2}$$
  
B.  $rac{1-t^2}{t}$ 

C. 
$$\frac{t^2+1}{t}$$
  
D.  $\frac{t^2-1}{t}$ 

#### Answer: D



**26.** Let P be a point on the ellipse  $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and the line through P parallel to the y-axis meets the circle  $x^2 + y^2 = 9$  at Q where P,Q are on the same side of the x-axis. If R is a point on PQ such that  $\frac{PR}{RQ} = \frac{1}{2}$ , then locus of R is

A. 
$$rac{x^2}{9} + rac{9y^2}{49} = 1$$
  
B.  $rac{x^2}{49} + rac{y^2}{9} = 1$   
C.  $rac{x^2}{9} + rac{y^2}{49} = 1$   
D.  $rac{9x^2}{49} + rac{y^2}{49} = 1$ 

#### Answer: A



27. Let P(4,3) be a point on the hyperbola  $rac{x^2}{a^2} - rac{y^2}{b^2} = 1.$  If the normal at P intersects the

x-axis at (16,0), then the eccentricity of the

hyperbola is

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

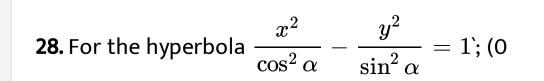
 $\mathsf{B.}\,2$ 

$$\mathsf{C}.\sqrt{2}$$

D.  $\sqrt{3}$ 

#### **Answer: B**

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A. directrix

B. vertices

C. foci

D. eccentricity

#### Answer: C



**29.** S and T are foci of an ellipse and B is an end of the minor axis , if STB is an equilateral triangle , the eccentricity of the ellipse , is

A. 
$$\frac{1}{4}$$
  
B.  $\frac{1}{3}$   
C.  $\frac{1}{2}$   
D.  $\frac{2}{3}$ 

#### Answer: C



**30.** The equation of th directrices of the hyperbola  $3x^2 - 3y^2 - 18x + 12y + 2 = 0$  is

A. 
$$x=3\pm\sqrt{rac{13}{6}}$$
  
B.  $x=3\pm\sqrt{rac{6}{13}}$   
C.  $x=6\pm\sqrt{rac{13}{3}}$   
D.  $x=6\pm\sqrt{rac{3}{13}}$ 

#### Answer: A



**31.** P is the extremity of the latuscrectum of ellipse  $3x^2 + 4y^2 = 48$  in the first quadrant. The eccentric angle of P is

A. 
$$\frac{\pi}{8}$$
  
B.  $\frac{3\pi}{4}$   
C.  $\frac{\pi}{3}$   
D.  $\frac{2\pi}{3}$ 

#### Answer: C



**32.** The length of conjugate axis of a hyperbola is greater than the length of transverse axis. Then the eccentricity e is

$$\begin{array}{ll} \mathsf{A.} &= \sqrt{2} \\ \mathsf{B.} &> \sqrt{2} \\ \mathsf{C.} &< \sqrt{2} \\ \mathsf{D.} &< \frac{1}{\sqrt{2}} \end{array}$$

#### Answer: B



# Wb Jee Previous Years Questions Category 2 Single Option Correct Type

1. 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 intersect 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



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

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

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

$$\mathsf{C.}\,x^2-3y^2=48$$

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

#### Answer: A



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

A. x=-a

B. x=a

C. x=0

D. 
$$x=~-~rac{a}{2}$$

#### Answer: D



4. Tangents are drawn to the ellipse  $rac{x^2}{9}+rac{y^2}{5}=1$  at the end of latus rectum. Find

the area of quadrilateral so formed

A. 27 sq. units

B. 
$$rac{13}{2}$$
 sq. units

C. 
$$rac{15}{4}$$
 sq. units

D. 45 sq. units

#### Answer: A



5. Consider the parabola  $y^2 = 4x$ , let P and Q be two points (4, -4) and (9, 6) on the parabola. Let R be a moving point on the arc of the parabola whose x-coordinate is between P and Q. If the maximum area of triangle PQR is K, then  $(4K)^{1/3}$  is equal to

A.  $\angle PQR = 90^{\circ}$ 

B. R(4, 4)

C. 
$$R\left(\frac{1}{4}, 1\right)$$
  
D.  $R\left(1, \frac{1}{4}\right)$ 

#### Answer: C



## Wb Jee Previous Years Questions Category 3 One Or More Than One Option Correct Type

1. The equation 
$$16x^2 - 3y^2 - 3y^2 - 32x + 12y - 44 = 0$$
 represents a hyperbola. the length of whose

transvers axis is  $4\sqrt{3}$  the length of whose transvers axis is 4 whose center is (-1,2)whose eccentricity is  $\sqrt{\frac{19}{3}}$ 

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

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

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

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

#### Answer: A::B::C

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

A. 1

 $\mathsf{B.}-2$ 

 $\mathsf{C}.-1$ 

 $\mathsf{D}.2$ 

Answer: A::B

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**3.** On the ellipse  $4x^2 + 9y^2 = 1$ , the points at which the tangents are parallel to the line 8x=9y are  $\left(rac{2}{5},rac{1}{5}
ight)$  (b)  $\left(-rac{2}{5},rac{1}{5}
ight)$  $\left(-rac{2}{5},\ -rac{1}{5}
ight)$  (d)  $\left(rac{2}{5},\ -rac{1}{5}
ight)$ A.  $\left(\frac{2}{5}, \frac{1}{5}\right)$ B.  $\left(-\frac{2}{5},\frac{1}{5}\right)$  $C.\left(-\frac{2}{5}, -\frac{1}{5}\right)$ D.  $\left(\frac{2}{5}, -\frac{1}{5}\right)$ 

#### Answer: B::D

4. A hyperbola, having the transverse axis of length  $2\sin\theta$ , is confocal with the ellipse  $3x^2 + 4y^2 = 12$ . Then its equation is

A. 
$$x^2 \sin^2 heta - y^2 \cos^2 heta = 1$$

B. 
$$x^2 \mathrm{cosec}^2 heta - y^2 \mathrm{sec}^2 \, heta = 1$$

C. 
$$ig(x^2+y^2ig) \sin^2 heta = 1+y^2$$

D. 
$$x^2 \mathrm{cosec}^2 heta = x^2 + y^2 + \sin^2 heta$$

#### **Answer: B**

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5. Let A and B be two distinct points on the parabola  $y^2 = 4x$ . If the axis of the parabola touches a circle of radius r having AB as its diameter, then the slope of the line joining A and B can be

A. 
$$-\frac{1}{r}$$
  
B.  $\frac{1}{r}$   
C.  $\frac{2}{r}$   
D.  $-\frac{2}{r}$ 

Answer: C::D



## 6. Equation of a tangent passing through (2, 8) to

the hyperbola  $5x^2-y^2=5$  is

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

B. 
$$3x + y - 14 = 0$$

C. 
$$23x - 3y - 22 = 0$$

D. 
$$3x - 23y + 178 = 0$$

#### Answer: A::C



