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## MATHS

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 MATHS (BENGALI ENGLISH)
## PARABOLA

Example

1. Find the axis, coordinates of vertex and
focus, length of latus rectum and the equation
of directrix for the following parabola :
$y^{2}=18 x$

D Watch Video Solution
2. Find the axis, coordinates of vertex and focus, length of latus rectum and the equation of directrix for the following parabola :
$3 x^{2}=-8 y$

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3. Find the axis, coordinates of vertex and focurs, length of latus rectum and the equation of directrix of the following parabola
$y^{2}+4 x+2 y-11=0$

## - Watch Video Solution

4. Find the axis, coordinates of vertex and focus, length of latus rectum and the equation
of directrix for the following parabola :
$y=l x^{2}+m x+n(l \neq 0)$

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5. If $t$ be a variable parameter, find the vartex, axis, focus and length of the latus rectum of the parabola whose parametric equations are,
$x=u \cos \alpha \cdot t, y=u \sin \alpha \cdot t-\frac{1}{2} \mathrm{gt}^{2}$.
6. The parabola $y^{2}=2 a x$ passes through the $\begin{array}{lll}\text { centre of } & \text { the } & \text { circle } \\ 4 x^{2}+4 y^{2}-8 x+12 y-7=0 & \text {. Find the }\end{array}$ focus the length of the latus rectum and the equation of the directrix of this parabola.

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7. Find the point on the parabola $y^{2}=12 x$ at which the ordinate is double than abscissa.
8. If $a+b \neq 0$, find the coordinates of focus and the length of latus rectum of the parabola $y^{2}=2 m x$ which passes through the point of intersection of the straight lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$.

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9. Find the focal distance of a point on the parabola $x^{2}=8 y$ if the ordinate of the point be 11 .
10. Find the equation of the parabola whose coordinates of vertex and focus are ( $-2,3$ ) and $(1,3)$ respectively .

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11. The length of latus rectum of a parabola is

18 unit. Let p be a point on the parabola whose distance from its axis is 15 unit. Find
the distance of $p$ form the focus of the parabola.

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12. The coordinates of one end of a focal chord of the parabola $y^{2}=4 a x$ are $\left(a t^{2}, 2 a t\right)$ .prove that the coordinates of the other end
must be $\left(\frac{a}{t^{2}},-\frac{2 a}{t}\right)$.
13. Find the equation of the parabola whose
focus is $(3,4)$ and whose directrix is $3 x+4 y+$
$25=0$. Also find the length of latus rectum of he parabola .

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14. A double ordinate of the parabola $y^{2}=4 a x$ is of length $8 a$. Prove that the lines joining the vertex to its two ends are at right angles .
15. The focal distance of a point on the parabola $y^{2}=12 x$ is 6 , find the corrdinates of the point.

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16. Find the two points on the parabola $x^{2}=8 y$ each of which is at a distance 4 unit from the focus. Find also the equation of the
circle whose diameter is the line segment joining these two points .

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17. Find the equation of the parabola passing
through the points $(3,0),(-3,0),(2,5)$ and having its axis parallel to the y -axis find the coordinates of its vertex.

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18. The coordinates of the two ends of latus
rectum of a parabola are $(3,4)$ and $(3,0)$,find the equation of the parabola.

## D Watch Video Solution

19. Find the equation of the parabola whose
vertex is $(-1,3)$ and focus is $(3,-1)$.

## D Watch Video Solution

20. Find the equation of the parabola whose coordinates of vertex are $(-2,3)$ and the equation of the directrix is $2 x+3 y+8=0$

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21. A focal chord SE of the parabola $y^{2}=8 x$ passes through the end point, having positive coordinates, of another chord $E F^{\prime}: x=4$.

Find the equation and the length of the chord
22. If a straight line passing through the focus
of the parabola $y^{2}=4 a x$ intersectts the parabola at the points $\left(x_{1}, y_{1}\right)$ and $\left(x_{2}, y_{2}\right)$, then prove that $x_{1} x_{2}=a^{2}$.

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23. Examine with reasons the validity of the following statement : "The point $(4,3)$ lies
outside the parabola $y^{2}=4 x$ but the point
$(-4,-3)$ lies within it "

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24. If $l$ and $l$ 'be the lengths of the segment $\overline{P S}$ and $\overline{P^{\prime} S}$ of a focal chord $\overline{P P^{\prime}}$ of the parabola $y^{2}=4 a x$, then show that $\frac{1}{l}+\frac{1}{l^{\prime}}=\frac{1}{a}$.

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25. Show that the equation of the chord of the
parabola $x^{2}=4 a y$ joining the points $\left(x_{1}, y_{1}\right)$
ann
$\left(x_{2}, y_{2}\right)$
on
it
is
$\left(x-x_{1}\right)\left(x-x_{2}\right)=x^{2}-4 a y$.

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26. Show that the locus of the middle points of chords of the parabola $y^{2}=4 a x$ passing through the vertex is the parabola $y^{2}=2 a x$.
27. Prove that the least focal chord of a parabola is the latus rectum .

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28. Find the latus rectum of the parabola
$3 y^{2}=5 x$

- Watch Video Solution

29. A chord $\overline{P Q}$ of the parabola $y^{2}=4 a x$, subtends a right angle at the vertex, show that the mid point of $\overline{P Q}$ lies on the parabola, $y^{2}=2 a(x-4 a)$.

## D Watch Video Solution

## M C Q

1. The length of latus rectum of the parabola
$3 x^{2}=-8 y$ is
A. $\frac{4}{3}$ unit
B. $\frac{8}{3}$ unit
C. $\frac{2}{3}$ unit
D. 4 unit

## Answer: B

## D Watch Video Solution

2. The coordinates of focus of the parabola $y^{2}=-5 x$ are
A. $\left(-\frac{5}{4}, 0\right)$
B. $\left(\frac{5}{4}, 0\right)$
C. $\left(\frac{4}{5}, 0\right)$
D. $\left(-\frac{4}{5}, 0\right)$

Answer: A

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3. The parametric equations of the parabola
$y^{2}=12 x$ are
A. $x=6 t^{2}, y=3 t$
B. $x=3 t^{2}, y=6 t$
C. $x=t^{2}, y=6 t$
D. $x=3 t^{2}, y=t$

Answer: B

D Watch Video Solution
4. The equation of directrix of the parabola
$4 x^{2}=3 y$ is
A. $16 y+3=0$
B. $16 y-3=0$
C. $8 y+3=0$
D. $8 y-3=0$

Answer: A

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5. The axis of the parabola $(y+1)^{2}=-4(x-3)$ is parallel to_
A. positive $x$-axis
B. positive $y$-axis
C. negative x - axis
D. negative $y$ - axis

## Answer: C

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6. The coordinates of the vertex of the parabola $(x+1)^{2}=-9(y+2)$ are
A. $(1,2)$
B. $(-1,2)$
C. $(1,-2)$
D. $(-1,-2)$

## Answer: D

## - Watch Video Solution

7. The equation of directrix of the parabola
$3 y^{2}=-4 x$ is
A. $3 x+1=0$
B. $3 x+2=0$
C. $3 x-1=0$
D. $3 x-2=0$

Answer: C

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$$
\begin{aligned}
& \text { 8. The axis of the parabola } \\
& (x-1)^{2}=5(y+2) \text { is parallel to _- }
\end{aligned}
$$

A. positive $x$ - axis
B. positive $y$-axis
C. negative x - axis
D. negative $y$ - axis

Answer: B

D Watch Video Solution
9. The coordinate of focus of the parabola
$x^{2}=\frac{a b}{a+b} \cdot y$ are ${ }_{-}$
A. $\left\{\frac{a b}{4(a+b)}, 0\right\}$
B. $\left\{\frac{-a b}{4(a+b)}, 0\right\}$
C. $\left\{0, \frac{a b}{4(a+b)}\right\}$
D. $\left\{0, \frac{-a b}{4(a+b)}\right\}$

Answer: C

## D Watch Video Solution

10. The length of latus rectum of the parabola $(y-1)^{2}=-6(x+2)$ is_
A. 2 units
B. 3 units
C. 5 units
D. 6 units

## Answer: D

## D Watch Video Solution

11. The equation of the parabola of which the focus is at the point $(-3,0)$ and the directricx is the line $x=3$ is
A. $y^{2}=12 x$
B. $x^{2}=12 y$
C. $y^{2}=-12 x$
D. $x^{2}=-12 y$

Answer: C

D Watch Video Solution
12. The coordinates of one of the end-points of
the latus rectum of the parabola
$(y-1)^{2}=2(x+2)$ are ${ }_{\text {_ }}$
A. $(-2,1)$
B. $\left(\frac{-3}{2}, 1\right)$
C. $\left(\frac{-3}{2}, 3\right)$
D. $\left(\frac{-3}{2}, 0\right)$

Answer: D

## D Watch Video Solution

13. The coordinates of the focus of the parabola $2 x^{2}=-5 y$ are _
A. $\left(-\frac{5}{8}, 0\right)$
B. $\left(-\frac{5}{2}, 0\right)$
C. $\left(0,-\frac{5}{2}\right)$
D. $\left(0,-\frac{5}{8}\right)$

Answer: D

## D Watch Video Solution

14. The equation of directrix of the parabola $3 y^{2}=-4 x$ is _
A. $3 y-1=0$
B. $3 x-1=0$
C. $3 y+1=0$
D. $3 x+1=0$

Answer: B

## D Watch Video Solution

15. The coordinates of the focus of the parabola $3 y^{2}=8 x$ are _
A. $\left(\frac{2}{3}, 0\right)$
B. $\left(\frac{8}{3}, 0\right)$
C. $\left(0, \frac{8}{3}\right)$
D. $\left(0, \frac{2}{3}\right)$

Answer: A

## D Watch Video Solution

16. The equation of the directrix of parabola
$2 x^{2}=3 y$ is
A. $8 x+3=0$
B. $8 x-3=0$
C. $8 y+3=0$
D. $8 y-3=0$

Answer: C

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## Very Short Answer Type Qusetions

1. Find the focus, the length of the latus rectum and the directrix of the parabola $3 x^{2}=8 y$

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2. Find the length of the latus rectum of the parabola $y=-2 x^{2}+12 x-17$.

## - Watch Video Solution

3. Find the eqution of the parabola whose coordinates of vertex and focus are $(0,0)$ and $\left(\frac{3}{2}, 0\right)$ respectively.

## - Watch Video Solution

4. The vertex of a parabola is at the origin and
its focus is $\left(0,-\frac{5}{4}\right)$, find the equation of the parabola.

## - Watch Video Solution

5. The parabola $x^{2}+2 p y=0$ passes through
the point $(4,-2)$, find the coordinates of focus
and the length of latus rectum .

## D Watch Video Solution

6. The parabola $y^{2}=2 a x$ gose through the point of intersection of $\frac{x}{3}+\frac{y}{2}=1$ and $\frac{x}{2}+\frac{y}{3}=1$. Find its focus.

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7. A parabola having vertex at the origin and axis along $x$-axis passes through $(6,-20)$, find the equation of the parabola .

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8. The axis of a parabola is along $y$-axis and vertex is $(0,0)$. If it passes through $(-3,2)$, find the coordinates of its focus .
9. Find the equation of the parabola whose vertex is $(0,0)$ and directrix is the line $x+3=0$.

## D Watch Video Solution

10. Find the equation of the parabola whose vertex is at the origin and directrix is the line $y$
$-4=0$.

D Watch Video Solution
11. If the parabola $y^{2}=4 a x$ passes through
the point of intersection of the straight lines
$3 x+y+5=0$ and $x+3 y-1=0$, find the coordinates of its focus and the length of its latus rectum .

## - Watch Video Solution

12. The parabola $y^{2}=4 a x$ passes through the centre
of
the
circle
$2 x^{2}+2 y^{2}+4 x-12 y-4=0 \quad$,Find the
coordinates of the focus, length of the latus rectum and equation of the derectrix

## D Watch Video Solution

13. If the parabola $y^{2}=4 a x$ passes through
the
centre
of
the
circle
$x^{2}+y^{2}+4 x-12 y-4=0$ what is the
length of the latus rectum of the parabola?

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14. Find the point on parabola $y^{2}=-20 x$ at which the ordinate is double the abscissa .

- Watch Video Solution

15. Find the point on the parabola $y^{2}=-36 x$ at which the ordinate is three times the abscissa .

## - Watch Video Solution

16. Find the point on the parabola $y^{2}=4 a x(a>0)$ which forms a triangle of area $3 a^{2}$ with the vertex and focus of the parabola.

## - Watch Video Solution

17. What type of conic is the locus of the moving point $\left(a t^{2}, 2 a t\right)$ ? Find the equation of the locus.
18. The focal distance of a point on the parabola $y^{2}=8 x$ is 4 , find the coordinates of the point .

## D Watch Video Solution

19. Find the focal distance of a point on the
parabola $y^{2}=20 x$ if the abscissa of the point be 7 .
20. Determine the positions of the points (a)
$(3,6),(b)(4,3)$ and (c) $(1,-3)$ with respect to the parabola $y^{2}=9 x$.

## D Watch Video Solution

21. For what values of a will the point $(8,4)$ be an inside point of the parabola $y^{2}=4 a x$ ?

## D Watch Video Solution

1. Find the axis, coordinates of vertex and
focus, length of latus rectum, equation of directrix and the coordinates of the ends of latus rectum of the following parabola : $y^{2}=20 x$

## D Watch Video Solution

## Long Answer Type Questions

1. Find the equation of the parabola whose
vertex is $(2,3)$ and the equation of latus rectum
is $x=4$. Find the coordinates of the point of
intersection of this parabola with its latus
rectum .
(D) Watch Video Solution

## Sample Questions For Competitive Exams A M C

1. The focus and directrix of the parabola $9 x^{2}-24 x y+16 y^{2}-20 x-15 y-60=0$ is
A. $\left(-\frac{43}{25},-\frac{129}{100}\right)$
B. $\left(-\frac{43}{25}, \frac{129}{100}\right)$
C. $16 x+12 y+53=0$
D. $16 x+12 y-53=0$

Answer: A::C
2. Let $y^{2}=4 a x$ be a parabola and $x^{2}+y^{2}+2 b x=0$ be a circle. If the parabola and the circle touch each other externally , then
A. $a>0, b>0$
B. $a>0, b>0$
C. $a<0, b>0$
D. $a<0, b<0$

Answer: A::D
3. If the points of intersection of the parabola
$y^{2}=4 a x \quad$ and the circle
$x^{2}+y^{2}+2 g x+2 f y+c=0$ are
$\left(x_{1}, y_{1}\right),\left(x_{2}, y_{2}\right),\left(x_{3}, y_{3}\right)$ and
$\left(x_{4}, y_{4}\right)$
respectively, then
A. $y_{1}+y_{2}+y_{3}+y_{4}=0$
B. $\sqrt{x}_{1}+\sqrt{x}_{2}+\sqrt{x_{3}}+\sqrt{x}_{4}=0$
C. $y_{1}-y_{2}+y_{3}-y_{4}=0$
D. $y_{1}-y_{2}-y_{3}+y_{4}=0$

## Answer: A::B

## D Watch Video Solution

4. $A y^{2}+B y+C x+D=0$ be the equation of a parabola , then
A. the length of the latus rectum is $\left|\frac{C}{A}\right|$
B. the axis of the parabola is vertical
C. the y - coordinate of the vertex is $-\frac{B}{2 A}$
D. the $x$ - coordinate of the verte is

$$
\frac{D}{A}+\frac{B^{2}}{4 A C}
$$

## Answer: A::C

## D Watch Video Solution

5. If equation of directrix of the parabola $x^{2}+4 y-6 x+k=0$ is $\mathrm{y}+1=0$, then

Sample Questions For Competitive Exams B Integer Answer Type

1. S is focus of parabola $y^{2}=8 x$ and AB is
common chord of $y^{2}=4 a x$ and circle $x^{2}+y^{2}-2 x-4 y=0$ the area of $\triangle P Q S$ is

## (D) Watch Video Solution

2. $x-1=0$ is the equation of directrix of the
parabola $y^{2}-k x+8=0$. Then the value of
k is
A. $\frac{1}{8}$
B. 8
C. 4
D. $\frac{1}{4}$

Answer: C

## - Watch Video Solution

3. If $x=\frac{3}{k}$ be the equation of directrix of the parabola $y^{2}+4 y+4 x+2=0$ then , k is .

## - Watch Video Solution

4. If $\lambda x^{2}+4 x y+y^{2}+\lambda x+3 y+2=0$ represents the equation of the parabola , then the vlaue of $\lambda$ is

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5. Find the latus rectum of the parabola $2 x^{2}+3 y=0$
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Sample Questions For Competitive Exams C Matrix Match Type

1. Find the latus rectum of the parabola
$(y-3)^{2}=6(x-2)$

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2. Find the focus of the parabola
$(y-3)^{2}=6(x-2)$

- Watch Video Solution

Sample Questions For Competitive Exams D Comprehension Type

1. Find the focus of the parabola
$x^{2}-4 x-5 y-1=0$

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2. Find the latus rectum of the parabola $y^{2}+4 x+2 y=11$

D Watch Video Solution
3. Find the focus of the parabola

$$
(x-3)^{2}+8(y+1)=0
$$

( Watch Video Solution
4. If the locus of the circumcentre of variable triangle having sides $x=0, y=2$ and $l x+m y=1$ where $(\mathrm{I}, \mathrm{m})$ lies on the Parabola $y^{2}=4 a x$ is a curve ' C ' then

Coorrdinates of the vertex of this curve ' C ' is _

$$
\begin{aligned}
& \text { A. }\left(-2, \frac{3}{2}\right) \\
& \text { B. }\left(-2,-\frac{3}{2}\right) \\
& \text { C. }\left(2, \frac{3}{2}\right) \\
& \text { D. } \left.2,-\frac{3}{2}\right)
\end{aligned}
$$

5. If the locus of the circumcentre of variable triangle having sides $\mathrm{x}=0, \mathrm{y}=2$ and $\mathrm{lx}+\mathrm{my}=1$ where $(1, \mathrm{~m})$ lies on the Parabola $y^{2}=4 a x$ is a curve ' C ' then

The length of smallest focal chord of this curve 'C' is _
A. $\frac{1}{4}$
B. $\frac{1}{12}$
C. $\frac{1}{8}$

## D. $\frac{1}{16}$

## Answer: C

## D Watch Video Solution

6. If the locus of the circumcentre of variable
triangle having sides $x=0, y=2$ and $l x+m y=1$
where $(1, \mathrm{~m})$ lies on the Parabola $y^{2}=4 a x$ is a
curve ' C ' then

The curve ' C ' is symmetric about the line

$$
\text { A. } x=\frac{3}{2}
$$

> В. $y=-\frac{3}{2}$
> C. $x=-\frac{3}{2}$
> D. $y=\frac{3}{2}$

## Answer: D

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## Sample Questions For Competitive Exams E Assertion Reason Type

1. Find the latus rectum of the parabola $x=2 y^{2}-4 y+5$

## D Watch Video Solution

2. Statemet - I : Number of focal chords of length 6 units that can be drawn on the parabola $y^{2}-2 y-8 x+17=0$ is zero

Statement - II : Latus rectum is the shortest focal chord of the parabola
A. Statement - I is true Statement - II is true
and

Statement - II is a correct explantion for

Statement - I .

B. Statement - I is true, Statement - II is

true but

Statement - II is not a correct
explanation of Statement - I.
C. Statement - I is true , Statement - II is
false .

## D. Statement - I false, Statement - II is true .

## Answer: A

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## Others

1. Find the axis, coordinates of vertex and focus, length of latus rectum, equation of directrix and the coordinates of the ends of
latus rectum of the following parabola :
$x^{2}=-12 y$

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2. Find the axis, coordinates of vertex and focus, length of latus rectum, equation of directrix and the coordinates of the ends of latus rectum of the following parabola :
$5 x^{2}=16 y$

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3. Find the axis, coordinates of vertex and focus, length of latus rectum, equation of directrix and the coordinates of the ends of latus rectum of the following parabola:
$3 y^{2}=-4 x$

## D Watch Video Solution

4. Find the axis, coordinates of vertex and focus, length of latus rectum, equation of directrix and the coordinates of the ends of
latus rectum of the following parabola :
$(y+3)^{2}=2(x+2)$

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5. Find the axis, coordinates of vertex and focus, length of latus rectum, equation of directrix and the coordinates of the ends of latus rectum of the following parabola :
$4(x-2)^{2}=-5(y+3)$
6. Find the axis, coordinates of vertex and
focus, length of latus rectum, equation of directrix and the coordinates of the ends of latus rectum of the following parabola :

$$
y^{2}=6(x+y)
$$

## D Watch Video Solution

7. Find the axis, coordinates of vertex and
focus, length of latus rectum, equation of directrix and the coordinates of the ends of
latus rectum of the following parabola :
$y^{2}-4 x-2 y-7=0$

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8. Find the equation of the parabola whose
vertex is at $(2,-3)$, axis is parallel to $x$-axis and
length of latus rectum is 12 .

- Watch Video Solution

9. The coordinates of the vertex and focus of a
parabola are ( 1,2 ) and ( $-1,2$ ) respectively : find
its equation.

## D Watch Video Solution

10. Show that the equation of the parabola whose vertex is $(2,3)$ and focus is $(2,-1)$ is
$x^{2}-4 x+16 y=44$.

## D Watch Video Solution

11. show that the equation of the parabola whose vertex and focus are on the $x$-axis at distances a and a' from the origin respectively is $y^{2}=4\left(a^{\prime}-a\right)(x-a)$

## D Watch Video Solution

12. Find the equation of the parabola whose
vertex is the point $(-2,3)$ and directrix is the line $x+7=0$
13. Find the equation of the parabola whose
vertexi is the point $(1,-2)$ and the eqation of directrix is $y+5=0$.

## D Watch Video Solution

14. Find the equatio of the parabola whose
focus is at the origin and the equation of directrix is $x+y=1$.
15. Find the equation of the parabola whose focus is (2,1) and whose directrix is $3 x-y+1=0$

## D Watch Video Solution

16. The equation of the directrix of a parabola
is $x=y$ and the coordinates of its focus ar $(4,0)$
. Find the equation of the parabola.
17. Find the coordinates of vartex and the length of latus rectum of the parabola whose focus is $(0,0)$ and the directrix is the line $2 x+$ $y=1$

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18. A point moves in such a way that its ditance from the point $(2,5)$ is equal to its distace from the line $2 x+4 y=3$. Find the equation of its path. What is the name of the curve ?

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19. The coordinates of a moving point $P$ are
$\left(2 t^{2}+4,4 t+6\right)$, show that the locus of P is a parabola.

## - Watch Video Solution

20. If $\theta$ is a variable parameter, show that the equations
$x=\frac{1}{4}\left(3-\operatorname{cosec}{ }^{2} \theta\right), y=2+\cot \theta$
represent the equation of a parabola. Find the
coordinates of vertex, focus and the length of
latus rectum of the parabola.

## D Watch Video Solution

21. Find the equation of the circle, one of whose diameters is the latus rectum of $y^{2}=4 a x$. Show that this circle goes through the common point of the axis and the directrix of the parabola.

## D Watch Video Solution

22. Show that the locus of the middle points of chords of the parabola $y^{2}=4 a x$ passing through the vertex is the parabola $y^{2}=2 a x$

## - Watch Video Solution

23. Find the locus of middle points of a family of focal chords of the parabola $y^{2}=4 a x$
24. PN is any ordinate of the parabola $y^{2}=4 a x$, the point M divides PN in the ratio $m: n$. Find the locus of $M$.

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25. Prove that the lines joining the ends of
latus rectum of the parabola $y^{2}=4 a x$ with
the point of intersection of its axis and directrix are at right angles.
26. PQ is a chord of the parabola $y^{2}=4 a x$.

The ordinate of $P$ is twice that of $Q$. Prove that the locus of the mid - point of $P Q$ is $5 y^{2}=18 a x$

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27. The coordinates of the two ends of latus rectum of a parabola are ( 8,1 ) and ( $-4,1$ ), find the equation of the parabola.
28. Find the equation of the parabola whose vertex is ( $-2,2$ ) and focus is ( $-6,-6$ ).

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29. The directrix of a parabola is $x+y+4=0$ and vertix is the point $(-1,-1)$. Find (i) the position of focus and (ii) the equation of the parabola.
30. The axis of a parabola is parallel to $x$-axis and it passes through the points $(2,0),(1,-1)$ and ( $6,-2$ ) , find its equation .

## D Watch Video Solution

31. A parabola passes through the points (0.0)
,(2,2) and (-2,-6) and its asix ia parallel to $y$-axis .

Find its equation.
32. If the extremities of a focal chord of the parabola $y^{2}=4 a x$ be $\left(a t_{1}^{2}, 2 a t^{1}\right) \quad$ and $\left(a t_{2}^{2}, 2 a t_{2}\right)$, prove that $t_{1} t_{2}=-1$

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33. If $\left(a t^{2}, 2 a t\right)$ be the coordinates of an extremity of a focal chord of the parabola $y^{2}=4 a x$, then show that the length of the chord is $a\left(t+\frac{1}{t}\right)^{2}$.
34. Show that the equation of the chord of the parabola $y^{2}=4 a x$ through the points $\left(x_{1}, y_{1}\right) \quad$ and $\quad\left(x_{2}, y_{2}\right) \quad$ on $\quad$ it is $\left(y-y_{1}\right)\left(y-y_{2}\right)=y^{2}-4 a x$

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35. Show that the product of the ordinates of
the ends of a focal chord of the parabola $y^{2}=4 a x$ is constant.
36. If a straight line pasing through the focus
of the parabola $y^{2}=4 a x$ intersects the parabola at the points $\left(x_{1}, y_{1}\right)$ and $\left(x_{2}, y_{2}\right)$ then prove that $y_{1} y_{2}+4 x_{1} x_{2}=0$.

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37. Find the equation of the circle, passing through the origin and the foci of the parabolas $y^{2}=8 x$ and $x^{2}=24 y$.

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38. Find the equation of the circle on SC as diameter, where S is the focus of $y^{2}=12 x$ and $C$ is the centre of
$x^{2}+y^{2}-18 x-16 y+45=0$. Also find the
length of the chord of the circle lying along the x -axis

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39. Q is any point on the parabola $y^{2}=4 a x$
, QN is the ordinate of Q and P is the mid-point of $Q N$,. Prove that the locus of $p$ is a parabola whose latus rectum is one -fourth that of the given parabola.

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40. Find the equation of the circle drawn on
the line-segment joining the foci of the two
parabolas $x^{2}=4 a y$ and $y^{2}=4 a(x-a)$ as diameter .

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41. $\overline{P Q}$ is a double ordinate of the parabola $y^{2}=4 a x$,find the equation to the locus of its point of trisection.

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42. Show that the circle described on a focal chord of a parabola as diameter touches its directrix .

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43. Prove that the sum of the reciprocals of
the segments of any focal chord of a parabola is constant .
44. The length of latus rectum of a parabola is

16 unit . The distance of a point $P$ on the parabola from its axis is 12 unit. Find the distance of $P$ from the focus of the parabola .

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45. Prove that the length of any chord of the parabola $y^{2}=4 a x$ passing through the vertex and making an angle $\theta$ with the positive direction of the x -axic is $4 a \cos e c \theta \cot \theta$
46. If $a \neq 0$ and the line $2 \mathrm{bx}+2 \mathrm{cy}+4 \mathrm{~d}=0$ is passing through the points of intersection of parabolas $y^{2}=4 a x$ and $x^{2}=4 a y$, then prove that $d^{2}=a^{2}(2 b+3 c)^{2}$.

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47. Find the equation of the parabola which has its axis along the x -axis and passes through the points $(3,2)$ and $(-2,-1)$.

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48. A chord is drawn through the vertex of the parabola $y^{2}=4 a x$ making an angle $\theta$ with its axis. Find the length of the chord.

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