# MATHS

## BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

## PARABOLA

**Multiple Choice Question Level I**

**1.** If the focus of a parabola is (0,-3) and its directrix is y =3 then its equation is

A. $x^2 = -12y$

B. $x^2 = 12y$

C. $y^2 = -12x$

D. $y^2 = 12x$

**Answer: A**

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**2.** If the parabola $y^2 - 4ax$ passes through the point (3,2) then the length of its latus rectum is

A. $\dfrac{2}{3}$

B. $\dfrac{4}{3}$

C. $\dfrac{1}{3}$

D. 4

**Answer: B**

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**3.** If the vertex of a parabola is the point (-3, 0) and the directrix is the line x + 5 = 0, then its equation is

A. $y^2 = 8(x + 3)$

B. $x^2 = 8(y + 3)$

C. $y^2 = -8(x + 3)$

D. $y^2 = 8(x + 5)$

**Answer: A**

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**4.** The area of the triangle formed by the linea joining the vertex of th parabola $x^2 = 12y$ to the ends of Latus rectum is

A. 12 sq units

B. 16 sq units

C. 18 sq units

D. 24 sq units

**Answer: C**

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**5.** The equation of the lines joining the vertex of the parabola $y^2 = 6x$ to the points on ti which have abscissa 24 are

A. $y \pm 2x = 0$

B. $2ypxx = 0$

C. $x \pm 2y = 0$

D. $2x \pm y = 0$

**Answer: B**

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**6.** The focus of the parabola $x^2 - 8x + 2y + 7 = 0$ is

A. $\left(0, \dfrac{1}{2}\right)$

B. $\left(4, \dfrac{9}{2}\right)$

C. $(4, 4)$

D. $\left(-4, -\dfrac{9}{2}\right)$

**Answer: C**

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**7.** The co - ordinates of a point on the parabola

$y^2 = 8x$ whose focal distance is 4 are :

A. $\left(1 \pm 2\sqrt{2}\right)$

B. $\left(2 \pm 4\right)$

C. $\left(\dfrac{1}{2}, px2\right)$

D. none of these

**Answer: B**

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**8.** Length of focal of the parabola $y^2 = 4ax$ making an angle $\alpha$ with the axis of the parabola is

A. $4a \sec^2 \alpha$

B. $a \cos ec^2 \alpha$

C. $4a \cos ec^2 \alpha$

D. none of these

**Answer: C**

**9.** The latus rectum of the parabola

$y^2 = 5x + 4y + 1$ is

A. $\dfrac{5}{4}$

B. 10

C. 5

D. $\dfrac{5}{2}$

**Answer: C**

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**10.** Consider the equation of the parabola

$y^2 + 4ax = 0$ where $a > 0$ which of the

following is false

A. vertex of the parabola is at the origin

B. focus of the parabola is (a,0)

C. directrix of the parabola is x=0

D. tangent at the vertex is x=0

**Answer: B**

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**11.** The point of intersection of the tangents at the ends of the laturs rectum of the parabola $y^2 = 4x$ is

A. $(-1, 0)$

B. $(0, -1)$

C. $(1, 1)$

D. $(-1, -1)$

**Answer: A**

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**12.** If x+y=k is a normal to the parabola $y^2 = 12x$ then it touches the parabola

A. $y^2 = -9x$

B. $y^2 = -12x$

C. $y^2 = -16x$

D. $y^2 = -36x$

**Answer: D**

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**13.** The line y=2x+c is a tangent to the parabola

$y^2 = 4x$ if c is equal to

A. $-\dfrac{1}{2}$

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

C. $\dfrac{1}{3}$

D. 4

**Answer: B**

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**14.** If the line 2x-3y+6=0 is a tangent to the parabola $y^2 = 4ax$ then a is

A. $4/3$

B. $-3/4$

C. $-4/3$

D. $3/4$

**Answer: A**

**15.** The st line lx+my+n=0 will be a tangent to the parabola $y^2 = 4bx$ if

A. $mn = bl^2$

B. $\ln = bm^2$

C. $lm = bn^2$

D. $bm = \ln^{\ln^2}$

**Answer: B**

**16.** The parametric equation of the parabola

are

$$x = t^2 + 1, y = 2t + 1$$

The cartesian equation of the directrix is

    A. x=0

    B. y=0

    C. x+1=0

    D. y+1=0

**Answer: A**

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**17.** The curve described parametrically by

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

A. a pair of st lines

B. a parabola

C. an ellipse

D. a hyperbola

**Answer: B**

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**18.** The two parabolas $y^2 = 4x$ and $x^2 = 4y$ intersect at a point p whose abscissa is not zero such that

A. the tangents to each curve at p make complementary angles with x axis

B. they cut at right angle at p

C. they both touch each other at p

D. none of these

**Answer: A**

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**19.** If the chord which is normal to the parabola $y^2 = 4ax$ at one end subteneds a right angle at the vertex then its slope is

A. 2

B. $\sqrt{2}$

C. $\sqrt{3}$

D. 6

**Answer: B**

**20.** If t is a parameter of one end of a focal chord of the parabola $y^2 = 4ax$ then its length is

A. $a\left(t - \dfrac{1}{t}\right)$

B. $a\left(t + \dfrac{1}{t}\right)$

C. $a\left(t - \dfrac{1}{t}\right)^2$

D. $a\left(t + \dfrac{1}{t}\right)^2$

**Answer: D**

**21.** An equilateral triangle is inscribed in the parbola $y^2 = 4x$ one of whose verted is at the vertex of the parabola the length of each side of the triangle is

A. $8\sqrt{3}$

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

C. $\dfrac{4\sqrt{3}}{2}$

D. $\dfrac{8\sqrt{3}}{2}$

**Answer: A**

**22.** A set of parallel chords of the parabola $y^2 = 4ax$ have their mid point on any st line

    A. through vertices

    B. through axis

    C. parallel to axis

    D. none of these

**Answer: C**

**23.** The length of the latus rectum of the

parabola $169[(x-1)^2 + (y-3)^2] = (5x-12y+17)^2$

A. $\dfrac{12}{13}$

B. $\dfrac{14}{13}$

C. $\dfrac{28}{13}$

D. $\dfrac{25}{13}$

**Answer: C**

**24.** If the line x -1=0 is the directrix of the parabola $y^2 - kx + 8 = 0$ then one of the values of k is

A. $\dfrac{1}{8}$

B. 4

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

D. 8

**Answer: B**

**25.** If x+y=k is normal to $y^2 = 12x$ then k is

A. 3

B. 9

C. $-9$

D. $-3$

**Answer: B**

**26.** The slopes of the normal to the parabola $y^2 = 4ax$ intersecting at a point on the axis of the parabola at a distance 4a from its vertex are in

A. H.P

B. G.P

C. A.P

D. none of these

**Answer: C**

27. The equation of the directix of the parabola $y^2 + 4y + 4x + 2 = 0$ is

    A. x=-1

    B. x=1

    C. $x = -\dfrac{3}{2}$

    D. $x = \dfrac{3}{2}$

**Answer: D**

**28.** The normal at the point on a parabola meets the parabola again in the point $by_2^2$, $2by_2$ then

A. $t_2 = -t_1 + \dfrac{2}{t_1}$

B. $t_2 = t_1 - \dfrac{2}{t_1}$

C. $t_2 = t_1 + \dfrac{2}{t_1}$

D. $t_2 = -t_1 - \dfrac{2}{t_1}$

**Answer: D**

**29.** The focal chord of $y^2 = 16x$ is tangent to $(x - 6)^2 + y^2 = 2$ then the possible values of the slope of this chord are

A. $1, -1$

B. $-\dfrac{1}{2}, 2$

C. $-2, \dfrac{1}{2}$

D. $\dfrac{1}{2}, 1$

**Answer: A**

**30.** If $a \neq 0$ and the line 2bx+3cy+4d=0 passes through the points of intersection of the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ then

A. $d^2 + (2b + 3c)^2 = 0$

B. $d^2 + (3b + 2c)^2 = 0$

C. $d^2 + (2b - 3c)^2 = 0$

D. $d^2 + (3b - 2c)^2 = 0$

**Answer:**

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

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

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

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

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

**Answer: C**

**32.** Let p be the point (1,0) and Q a point on the locurs $y^2 = 8x$ the locus of mid point of PQ is

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

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

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

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

**Answer: B**

33. Alngle between the tangents to the curve $y = x^2 - 5x + 6$ at the point (2,0) and (3,0) is

A. $\pi/2$

B. $\pi/3$

C. $\pi/6$

D. $\pi/4$

**34.** The equation of a tangent to the parabola $y^2 = 8x$ is y=x+2 the point on this line for which the other tangent to the parabola is perpendicular to the given tangent is

A. (0,2)

B. (2,4)

C. (-2,0)

D. (-1,1)

**Answer: C**

**35.** A parabola has the origin as its focus and the line x=2 as the directix then the vertex of the parabola is at

A. (0,2)

B. (0,2)

C. (1,0)

D. (0,1)

**Answer: C**

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**Multiple Choice Question Level Ii**

1. Length of sub normal to the parabola $y^2 = 4ax$ at any point is equal to

A. 2a

B. $\dfrac{a}{\sqrt{2}}$

C. $a\sqrt{2}$

D. $2\sqrt{2a}$

**Answer: A**

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**2.** The vertex of a parabola is (a,0) and the directrix is x+y=3a the equation of the parabola is

A.

$$x^2 - 2xy + y^2 - 6ax + 10ay - 7a^2 = 0$$

B.

$$x^2 - 2xy + y^2 + 6ax + 10ay - 7a^2 = 0$$

C.

$$x^2 - 2xy + y^2 + 6ax + 10ay - 7a^2 = 0$$

D.

$$x^2 + 2xy + y^2 + 6ax + 10ay - 7a^2 = 0$$

**Answer: B**

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**3.** The normal at a point on $y^2 = 4x$ passes through (5,0) there are three such normals one of which is the axis the feet of three normals form a triangle whose centroid is

A. (0,2)

B. (2,2)

C. (2,0)

D. none of these

**Answer: C**

4. The arithmetic mean of the ordinates of the feet of the normals from (3,5) to the parabola $y^2 = 8x$ is

A. 0

B. 3

C. 4

D. 8

**Answer: A**

**5.** Let $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ be three points on the parabola $y^2 = 4ax$ if the normals meet in a point then

A. $x_1 + x_2 + x_3 = 0$

B. $y_1 + y_2 + y_3 = 0$

C. $y_1 + y_2 + y_3 = 2a$

D. none of these

**Answer: B**

**6.** We are given with two ends of the latus rectum of a parabola then the maximum number of parabolas which can be draw is

A. 0

B. 1

C. 2

D. infinite

**Answer: C**

**7.** A double ordinate of the parabola $y^2 = 8ax$ of length 16a the angle subtended by it at the vertex of the parabola is

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

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

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

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

**Answer: D**

**8.** The equation of the common tangent to equal parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is

A. x-y=a

B. x+y=a

C. x+y+a=0

D. x+y-a=0

**Answer: C**

**9.** The circle $x^2 + y^2 + 2kx = 0 k \in R$ touches the parabola $y^2 = 4x$ externally then

A. $k < 0$

B. $k > 0$

C. $k < 1$

D. $k > 1$

**Answer: B**

**10.** If the polar of the circle $x^2 + y^2 = 9$ is always touching the parabola $y^2 = 8x$ then the locus of the pole is

A. $4y = 3x^2$

B. $y^2 = 9x$

C. $2y^2 = 9x$

D. $2y^2 = -9x$

**Answer: D**

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**11.** Angle substended by the latus rectum at the origin is

A. $\dfrac{\tan^{-1}4}{3}$

B. $\pi - \dfrac{\tan^{-1}4}{3}$

C. $\pi - \dfrac{\tan^{-1}3}{4}$

D. none of these

**Answer: A**

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**12.** A ray of light moving parallel to x axis gets reflected from a parabolic mirror whose equation is $(y - 2)^2 = 4(x + 1)$ after reflection the ray must pass through the point

A. (2,0)

B. (0,-2)

C. (0,2)

D. (-1,-2)

**Answer: C**

13. Range of values of k for which the point (k-1) is exteriro to both the parabolas $y^2 = |x|$ is

A. (-1,0)

B. (-1,1)

C. (0,1)

D. (0,-1)

Answer: B

**14.** If PQ is a focal chord of the parbola $y^2 = 4ax$ with focus at s then $\dfrac{2SP, SQ}{SP + SQ}$ is equal to

A. a

B. 2a

C. 3a

D. 4a

Answer: B

15. The point (a,2a) is an interior point of the region bounded by the parabola $y^2 = 16x$ and the double ordinate through the focus the range of 'a' is

A. $a < 4$

B. $a > 4$

C. $0 < a < 2$

D. $0 < a < 4$

**Answer: A**

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**16.** Locus of the middle points of parallel chords of a parabola $x^2 = 4ay$ is a

   A. st line parallel to x axis

   B. st line parallel to y axis

   C. st line parallel to the bisector of the angles between the axes

D. circle

**Answer: B**

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**17.** The tangent to a parabola at the vertex A and any point P meet at Q if S is the focus then SP ,SQ SA are in

A. A.P

B. G.P

C. H.P

D. none of these

Answer: B

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**18.** The tangents at three points A,B,C on the parabola $y^2 = 4x$ taken in pairs intersect at the points P,Q,R if $\triangle_1$ , $\triangle_2$ be the areas of triangle ABC and PQR respectively then

A. $\triangle_1 = \triangle_2$

B. $\triangle_2 = 2\triangle$

C. $\triangle_1 = 2\triangle_2$

D. none of these

**Answer: C**

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**19.** AB is a chord of a parabola $y^2 = 4ax$ with the end A at the vertex of the given parabola BC is drawn perpendicular to AB meeting the

axis of the parabola at C then the projection of BC on this axis is

A. a

B. 2a

C. 4a

D. 6a

**Answer: C**

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**20.** The point of intersection of the tangents to the parabla $y^2 = 4x$ at the points where the circle $(x - 3)^2 + y^2 = 9$ meets the parabola other than origin is

   A. (0,0)

   B. (-2,0)

   C. (-1,-1)

   D. (1,0)

**Answer: B**

**21.** If the tangents at $(x_1, y_1)$ and $(x_2, y_2)$ to the parabola $y^2 = 4ax$ meet at $(x_3, y_3)$ then

A. $x_1, x_2, x_3$ are A.P

B. $x_1, x_3, x_2$ are A.P

C. $y_1, y_2, y_3$ are A.P

D. $x_1, x_2, x_3$ are A.P

**Answer: B**

**22.** If b and c are the length of the segments of any focal chord of a parabola $y^2 = 4ax$ then the length of the semi latus rectum is

A. $\dfrac{b + c}{2}$

B. $\dfrac{bc}{b + c}$

C. $\dfrac{2bc}{b + c}$

D. $\sqrt{bc}$

**Answer: C**

**23.** If the focus of a parabola divides a focal chord of the parabola in segment of length 3 and 2 the length of the latus rectum of the parbola is

A. $\dfrac{3}{2}$

B. $\dfrac{24}{5}$

C. $\dfrac{12}{5}$

D. $\dfrac{6}{5}$

**Answer: D**

**24.** Equation of the common tangent touching the circle $(x - 3)^2 + y^2 = 9$ and the parabola $y^2 = 4x$ above the x axis is

A. $\sqrt{3}y = 3x + 1$

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

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

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

**Answer: C**

**25.** The locus of the mid point of the line segment joining the focus to a moving point on the parbola $y^2 = 4ax$ is another parabola with directix

A. $x = -a$

B. $x = -\dfrac{a}{2}$

C. x=0

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

**Answer: C**

**26.** A tangent is drawn to the parabola $y = x^2 + 6$ at the point (1,7) which also touches the circle $x^2 + ty^2 + 16x + 12y + c = 0$ at

A. $( - 8, \; - 6)$

B. $( - 7, \; - 6)$

C. $( - 6, \; - 7)$

D. $(6, 7)$

**Answer: C**

**27.** The locus of the vertices of the family of parabolas $y = \dfrac{a^3 x^2}{3} + \dfrac{a^2 x}{2} - 2a$ is

A. $xy = \dfrac{105}{64}$

B. $xy = \dfrac{3}{4}$

C. $xy = \dfrac{35}{16}$

D. $xy = \dfrac{64}{105}$

**Answer: A**

**28.** The axis of a parabola is along the line y=x and the distance of its vertex from origin is $\sqrt{2}$ and that from its focus is $2\sqrt{2}$ if vertex and focus both lie in the first quadrant then the equatio of the parbola is

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

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

C. $(x - y)^2 = 4(x + y - 2)$

D. $(x - y)^2 = 8(x + y - 2)$

**Answer: D**

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**29.** Three normals are dran to a parabola $y^2 = 4ax$ from a given point $(x_1, y_1)$ the algebraic sum of the ordinates of their feet is

A. O

B. 1

C. $-a$

D. none of these

Answer: A

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**30.** Consider the two curves

$C_1 : y^2 = 4x, C_2 : x^2 + y^2 - 6x + 1 = 0$ then

A. $C_1$ and $C_2$ touch each other only at one point

B. $C_1$ and $C_2$ touch each other only at two point

C. $C_1$ and $C_2$ intersect at exactly two points

D. $C_1$ and $C_2$ neither intersect nor touch each other

**Answer: B**

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1. If two tangents drawn from a point p to the parabola $y^2 = 4x$ are at right angles then the locus of p is

   A. x=1

   B. 2x+1=0

   C. x=-1

   D. 2x-1=0

**Answer: C**

**2.** Let a and b two distinct points on the parabola $y^2 = 4x$ if the axis fo the parabola touches a circle of raidus r haiving then the slope of the line joining a and b can be

A. $-\dfrac{1}{r}$

B. $\dfrac{1}{r}$

C. $\dfrac{2}{r}$

D. $-\dfrac{2}{r}$

**Answer: C::D**

**3.** Let (x,y) be any point on the parabla $y^2 = 4x$ let P be the point that divides the line segment from (0,0) to (x,y) in the ratio 1:3 then the locus of p is

A. $x^2 = y$

B. $y^2 = 2x$

C. $y^2 = x$

D. $x^2 = 2y$

**Answer: C**

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**4.** The slope of theline touching both the parabolas $y^2 = 4x$ and $x^2 = 32y$ is

A. $\dfrac{3}{2}$

B. $\dfrac{1}{8}$

C. $\dfrac{2}{3}$

D. $\dfrac{1}{2}$

**Answer: D**

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

A. $x^2 = y$

B. $y^2 = x$

C. $y^2 = 2x$

D. $x^2 = 2y$

**Answer: D**

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**1.** The locus of the mid points of the line joining the focus and any point on the parabola $y^2 = 4ax$ is a parabola with equation of directrix as

A. $x = \dfrac{a}{2}$

B. x=0

C. 2x+a=0

D. x+a=0

Answer: B

**2.** The tangents drawn at the extremities of a focal chord of the parabola $y^2 = 16x$

    A. intersect at an anlge of $45°$

    B. intersect at an angle of $60°$

    C. intersect on the line x+4=0

    D. intersect on x=0

**Answer: C**

**3.** The locus of the point of intersection of tangents drawn at the ends of a focal chord of the parabola $x^2 = -8y$ is

A. y=-2

B. y=2

C. x=-2

D. x=2

**Answer: B**

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**4.** The condition for the line y =mx+c to be normal to the parabola $y^2 = 4ax$ is

A. $c = 2a + am^3$

B. $c = \dfrac{a}{m}$

C. $c = -\dfrac{a}{m}$

D. $c = -2am - am^3$

**Answer: D**

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**5.** The length of the latus rectum of the parabola $bx^2 - 4ay + dx + e = 0$

A. $\dfrac{a}{b}$

B. 4a

C. $\dfrac{4d}{b}$

D. $\dfrac{4a}{b}$

**Answer: D**

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**6.** The length of the latus rectum of

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

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

B. $\dfrac{4}{3}$

C. 2

D. 3

**Answer: A**

**7.** The sum of the reciprocals of focal distances of a focal chord PQ of $y^2 = 4ax$ is

A. $\dfrac{1}{a}$

B. $a$

C. $2a$

D. $\dfrac{1}{2a}$

**Answer: A**

**8.** The area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of latus rectum is

A. 18 sq units

B. 19 sq units

C. 20 sq units

D. 17 sq units

**Answer: A**

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**9.** The ends of the latus rectum of the parabola $x^2 + 10x - 16y + 25 = 0$ are

A. (3x,4),(-13,4)

B. (5,-8),(-5,8)

C. (3,-4),(13,4)

D. (-3,-4),(13,-4)

Answer: A