38.PARABOLA

1. The coordinates of focus of the parabola $5x^2=-12y$ are

[AP EAMCET 18-09-20_Shift-2]

1. $\left(\frac{3}{5},0\right)$
2. $\left(\frac{-3}{5},0\right)$
3. $\left(0,\frac{3}{5}\right)$
4. $\left(0,\frac{-3}{5}\right)$

2. The co-ordinates of the focus of the parabola $(x+3)^2=2(y-5)$ is

[AP EAMCET 18-09-20_Shift-2]

1. $\left(\frac{-5}{2},5\right)$
2. $\left(-3,\frac{11}{2}\right)$
3. $\left(3,-\frac{11}{2}\right)$
4. $\left(0,\frac{1}{2}\right)$

3. If the area bounded by the parabola $y^2=16ax$ and the line y = 4mx is $\frac{a^2}{12}$ sq.uints, then the value of 'm' is **[AP EAMCET 21-09-20_Shift-1]**

1. -1
2. 1
3. 0
4. 2

4. The parabola with directrix x+2y-1=0 and focus (1,0) is___ **[AP EAMCET 21-09-20_Shift-1]**

1. $4x^2-4xy+y^2-8x+4y+4=0$
2. $4x^2+4xy+y^2-8x+4y+4=0$
3. $4x^2+4xy+y^2+8x-4y+4=0$
4. $4x^2-4xy+y^2-8x-4y+4=0$

5. The equation of the tangent to the parabola $y^2=8x$ inclined at 30^0 to the x-axis is

[AP EAMCET 21-09-20_Shift-2]

1. $3x-\sqrt{3y}+14=0$
2. $2x-3y+14=0$
3. $2x-\sqrt{3y}+7=0$
4. $x-\sqrt{3y}+6=0$

6. If the line y=2x+k is normal to the parabola $y^2=4x$, then k=

[AP EAMCET 22-09-20_Shift-1]

1. -10
2. 10
3. 12
4. -12

7. The length of the latusrectum of a parabola whose focal chord PSQ is such that PS=3 and QS=2 is __ **[AP EAMCET 22-09-20_Shift-1]**

1. $\frac{24}{5}$
2. $\frac{12}{5}$
3. $\frac{6}{5}$
4. $\frac{12}{10}$

8. The largest value of k for which the circle $x^2+y^2=k^2$ lies completely in the interior of the parabola $y^2=4x+16$ is **[AP EAMCET 22-09-20_Shift-2]**

1. $4\sqrt{3}$
2. $2\sqrt{3}$
3. $2\sqrt{6}$
4. $4\sqrt{6}$

9. The directrix of the parabola $2y^2+25x=0$ is______ **[AP EAMCET 23-09-20_Shift-1]**

1. $8x-25=0$
2. $8y-25=0$
3. $25x-28=0$
4. $25y-8=0$

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

[AP EAMCET 23-09-20_Shift-1]

1. $\frac{\pi}{6}$
2. $\frac{\pi}{4}$
3. $\frac{\pi}{3}$
4. $\frac{\pi}{2}$

11. The area of the triangle formed by the lines joining the vertex of the parabola $x^2=12y$ to the ends of its latus rectum is equal to____sq. units.

1. 8
2. 12
3. 16
4. 18

12. Let $A(1,2), B(4,-4), C(2,2\sqrt{2})$ be points on the parabola $y^2 = 4x$. If α and β respectively represent the area of ΔABC and the area of the triangle formed by the tangents at A,B,C to the above parabola, then $\alpha\beta =$

[TS EAMCET 09-09-20_Shift-1]

1. 6 2. $3\sqrt{2}$
3. 9 4. $6\sqrt{2}$

13. If $x-2y+k=0$ is a tangent to the parabola $y^2-4x-4y+8=0$ then the slope of the tangent drawn at (1, k) on the given parabola is

[TS EAMCET 09-09-20_Shift-1]

1. $\frac{-5}{2}$ 2. 2
3. -2 4. $\frac{2}{5}$

64. The number of points on the parabola $y^2=x$ at which the slope of the normal drawn at the point is equal to the x-coordinate of that point is

[TS EAMCET 09-09-20_Shift-1]

1. ∞ 2. 2
3. 2 4. 0

15. If $y = mx + c$ is a common tangent to the parabola $y^2 = 4\sqrt{k}x$ and the circle $2x^2+2y^2=k$ then the product of the slopes of such common tangents is **[TS EAMCET 09-09-20_Shift-2]**

1. -2 2. $\frac{k+2}{3}$
3. -1 4. $\frac{k}{2}$

16. If a normal to the parabola $y^2=12x$ at A(3,-6) cuts the parabola again at P, then the equation of the tangent at P is

[TS EAMCET 09-09-20_Shift-2]

1. $x-3y+27=0$ 2. $x+y=45$
3. $y-x+9=0$ 4. $3x+y=99$

17. Consider the parabola $y^2+2x+2y-3=0$ and match the items of list-I with those of the list –II

List – I	*List – II*
$A) 2x-5=0$	$I)$ vertex
$B)\left(\frac{3}{2},-1\right)$	$II)$ focus
$C) y+1=0$	$III)$ equation of the directrix
$D)(2,-1)$	$IV)$ equation of the axis
	$V)$ equation of the latus rectum

[TS EAMCET 10-09-20_Shift-1]

1. A B C D — III II IV I
2. A B C D — V I IV II
3. A B C D — III II V I
4. A B C D — IV I III II

18. The normal at a point on the parabola $y^2=4x$ passes through (5,0), if there are two more normals to this parabola which passes through (5,0), the centroid of the triangle formed by the feet of these three normals is

[TS EAMCET 10-09-20_Shift-1]

1. $\left(\frac{1}{2},\frac{1}{2}\right)$ 2. $(4,0)$
3. $(0,2)$ 4. $(2,0)$

19. For the parabola $y=\frac{h^3}{3}x^2+\frac{h^2}{2}x-h+\frac{3}{4h^3}$, if the equation of directrix is $y=k$ then $k^2:h$

[TS EAMCET 10-09-20_Shift-2]

1. 16:19 2. -19:16
3. 20:27 4. -27:20

20. The equation of the common tangent of the parabola $x^2=108y$ and $y^2=32x$ is

[TS EAMCET 10-09-20_Shift-2]

1. $2x+3y+36=0$ 2. $2x+3y=36$
3. $3x+2y+36=0$ 4. $3x+2y=36$

21. If a circle with its centre at the focus of the parabola $y^2 = 2px$ is such that it touches the directrix of the parabola, then a point of intersection of the circle and the parabola is

[TS EAMCET 11-09-20_Shift-1]

1. $\left(\frac{p}{2}, 2p\right)$
2. $\left(\frac{-9}{2}, p\right)$
3. $\left(\frac{p}{2}, -p\right)$
4. $\left(\frac{-p}{2}, -p\right)$

22. If the tangent drawn at the point P(4,8) to the parabola $y^2=16x$ meets the parabola $y^2=16x+80$ at A and B, then the midpoint of AB is

[TS EAMCET 11-09-20_Shift-1]

1. (9,6)
2. (4,8)
3. (4,1)
4. (2,3)

23. If all the vertices of an equilateral triangle lie on the parabola $y^2=16x$ and one of them coincides with the vertex of that parabola , then the length of the side of that triangle is

[TS EAMCET 11-09-20_Shift-2]

1. $32\sqrt{3}$
2. $16\sqrt{3}$
3. $8\sqrt{3}$
4. 32

24. If mx-y+c=0 is a normal at a point p on the parabola $y^2=16x$ and the focal distance of p is 40 units , then $|c|=$

[TS EAMCET 11-09-20_Shift-2]

1. 108
2. 132
3. 66
4. 60

25. If PQ is a focal chord of the parabola $y^2 = 4x$ with focus S and P=(4,4), then SQ=

[TS EAMCET 14-09-20_Shift-2]

1. 2
2. $\frac{5}{4}$
3. 5
4. $\frac{3}{2}$

26. If the parabola $x^2 = 4ay, (a > 0)$ makes an intercept of length $\sqrt{40}$ units on the line $y = 1 + 2x$ then 4a=

[TS EAMCET 14-09-20_Shift-2]

1. 1
2. $\frac{1}{2}$
3. 2
4. $\frac{4}{3}$

27. If one end of focal chord of the parabola $y^2=8x$ is $\left(\frac{1}{2}, 2\right)$, then the length of the focal chord is______ units

[AP EAMCET 19-08-2021_Shift-1]

1. $\frac{625}{4}$
2. $\frac{5}{\sqrt{2}}$
3. $\frac{25}{2}$
4. 25

28. Find the equation of the parabola which passes through $(6,-2)$ has its vertex at the origin and its axis along the y-axis _____

[AP EAMCET 19-08-2021_Shift-2]

1. $y^2=18x$
2. $x^2=18y$
3. $y^2=-18x$
4. $x^2=-18y$

29. The coordinates of the focus of the parabola described parametrically by $x=5t^2+2, y=10t+4$ (where t is a parameter) are ________

[AP EAMCET 20-08-2021_Shift-1]

1. $(7,4)$
2. $(3,4)$
3. $(3,-4)$
4. $(-7,4)$

30. The point of intersection of the latusrectum and axis of the parabola $y^2 + 4x + 2y - 8 = 0$ is

[AP EAMCET 20-08-2021_Shift-2]

1. $\left(\frac{9}{4}, -1\right)$
2. $\left(\frac{5}{4}, 1\right)$
3. $\left(\frac{7}{2}, \frac{5}{2}\right)$
4. $\left(\frac{-5}{4}, 1\right)$

31. If the line $2bx+3cy+4d=0$ passes through the points of intersection of $y^2=4ax$ and $x^2=4ay$, then **[AP EAMCET 23-08-2021_Shift-1]**

1. $d^2=(2ab+3ac)^2$
2. $d^2=(3b+2c)^2$
3. $d^2=(2b-3c)^2$
4. $d^2=(3b-2c)^2$

32. If the point $(a,2a)$ is an interior point of the region bounded by the parabola $y^2=16x$ and the double ordinate through focus, then ___ **[AP EAMCET 23-08-2021_Shift-2]**

1. $a<4$
2. $0<a<4$
3. $0<a<2$
4. $a>4$

33. If $x-2=t^2, y=2t$ are the parametric equations of the parabola $y^2=a(x-b)$, then the value of $a+b$ equals ______ **[AP EAMCET 24-08-2021_Shift-1]**

1. 4
2. 2
3. 0
4. 6

34. If $(2,0)$ is the vertex and y–axis is the directrix of a parabola, then its focus is _____ **[AP EAMCET 24-08-2021_Shift-2]**

1. $(2,0)$
2. $(-2,0)$
3. $(4,0)$
4. $(0,4)$

35. If the coordinates of the ends of a focal chord of the parabola $x^2=4ay$ are (x_1,y_1) and (x_2,y_2), then __ **[AP EAMCET 25-08-2021_Shift-1]**

1. $y_1y_2=4a^2$
2. $y_1y_2=-4a^2$
3. $y_1y_2=-a^2$
4. $y_1y_2=a^2$

36. The equation of the directrix of parabola $y^2-x+4y+5=0$ is ______ **[AP EAMCET 25-08-2021_Shift-2]**

1. $4y-3=0$
2. $4x-3=0$
3. $3x-4=0$
4. $3y-4=0$

37. Match the items given in List-A with those of the items of List-B

List-A	List-B
A) The vertex of the parabola $y^2+4x-2y+3=0$ is	I) $\left(\frac{5}{4},1\right)$
B) The vertex of the parabola $x^2+8x+12y+4=0$ is	II) $\left(1,\frac{5}{4}\right)$
C) The focus of the parabola $y^2-x-2y+2=0$ is	III) $\left(\frac{-1}{2},1\right)$
D) The focus of the parabola $x^2-2x-8y-23=0$ is	IV) $(1,-1)$
	V) $(-4,1)$

The correct match is **[TS EAMCET 04-08-2021_Shift-2]**

	A	B	C	D
1.	III	V	II	IV
2.	V	II	I	IV
3.	III	II	I	IV
4.	III	V	I	IV

38. For the parabola $y=2+4t, x=-2+2t^2$, the ends of the latus return are at $t=\alpha$ and $t=\beta$ then $\alpha\beta=$ **[TS EAMCET 04-08-2021_Shift-2]**

1. 0
2. 1
3. -1
4. 8

39. A point on the parabola whose focus and vertex are respectively $\left(\frac{5}{4},-2\right)$ and $(1,-2)$ is **[TS EAMCET 04-08-2021_Shift-1]**

1. (4,0)
2. (15,2)
3. (3,-1)
4. (10,1)

40. The parametric equations of the parabola $y^2-4x-8y-12=0$ are

[TS EAMCET 04-08-2021_Shift-1]

1. $x=7+2t, y=-4+t^2$
2. $x=-7+2t, y=4+2t$
3. $x=-7+t^2, y=-4+2t$
4. $x=-7+t^2, y=4+2t$

41. If a parabola having horizontal axis and passes through the points $(-2,1),(1,2)$ and $(-1,3)$ then the y-coordinate of the focus of that parabola is

[TS EAMCET 05-08-2021_Shift-1]

1. $\frac{37}{40}$ 2. $\frac{21}{10}$
3. $\frac{41}{40}$ 4. $-\frac{41}{40}$

42. If $ax^2+2hxy+by^2$ $-82x+98y+144=0$ is the equation of a parabola with focus $(2,-3)$ and directrix $3x-2y+5=0$, then $ax^2+2hxy+by^2=0$ represents**[TS EAMCET 05-08-2021_Shift-1]**

1. two lines making an angle $\frac{\pi}{3}$ at origin
2. a conic with eccentricity $\frac{a}{b}$
3. two perpendicular lines
4. two coincident lines

43. The parametric equations of the parabola $x^2-8x+12y+15=0$ are

[TS EAMCET 05-08-2021_Shift-2]

1. $x=4+6t, y=\frac{1}{12}-3t^2$
2. $x=\frac{1}{12}-3t^2, y=4+6t$
3. $x=3t^2, y=6t$
4. $x=6t, y=3t^2$

44. The equation of the directrix of the parabola $(2x-3y-5)^2=20(3x+2y+1)$ is

[TS EAMCET 05-08-2021_Shift-2]

1. $3x+2y+1+5\sqrt{3}=0$
2. $3x+2y+5=0$
3. $2x-3y+1+5\sqrt{3}=0$
4. $2x-3y+5=0$

45. $A(-2,3)$ is a fixed point outside the parabola $y^2=4ax(a>0)$ and P is a point moving on the parabola. The locus of a point Q which divides AP in the ratio $3:2$ is a conic. Then focus of that conic is

[TS EAMCET 06-08-2021_Shift-2]

1. $(a,0)$ 2. $\left(\frac{-4}{5}+\frac{3a}{5},\frac{a}{5}\right)$
3. $\left(\frac{3a-4}{5},\frac{6}{5}\right)$ 4. $\left(\frac{a}{5},\frac{3a-4}{5}\right)$

46. The length of the latus rectum of the conic $25\left[(x-2)^2+(y-3)^2\right]=(3x-4y+7)^2$ is

[TS EAMCET 06-08-2021_Shift-2]

1. $\frac{1}{5}$ 2. $\frac{2}{5}$
3. $\frac{3}{5}$ 4. $\frac{4}{5}$

47. The area of a triangle (in sq.units) formed by the latus rectum of the parabola $x^2=16y$ and the lines joining the vertex of the parabola to the ends of the latus rectum is

[TS EAMCET 06-08-2021_Shift-1]

1. 24 2. 28
3. 32 4. 64

48 If $(2,k)$ is a point on the parabola passing through the points $(1,-3),(-1,5),(0,2)$ and having its axis parallel to the Y-axis, then k =

[TS EAMCET 06-08-2021_Shift-1]

1. -10
2. 3
3. -7
4. 5

49. The ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(b>a)$ and the parabola $y^2=8ax$ cut at right angles. If e is the eccentricity of the ellipse, then e^4 =

[TS EAMCET 06-08-2021_Shift-1]

1. $\frac{1}{4}$
2. $\frac{1}{16}$
3. $\frac{1}{8}$
4. $\frac{1}{64}$

50. Suppose a parabola with focus at (0, 0) has $x-y+1=0$ as its tangent at the vertex. Then the equation of its directrix is

[AP EAMCET 04-07-2022_Shift-1]

1. $x-y+2=0$
2. $x-y-2=0$
3. $x-y+3=0$
4. $x-y+4=0$

51. If $ax+by=1$ is a normal to the parabola $y^2=4px$ then the condition is

[AP EAMCET 04-07-2022_Shift-1]

1. $4ab=a^2+b^2$
2. $4pab+ab^3=a^2b^2$
3. $pa^3=b^2-2pab^2$
4. $pa^2+4pa=a+b$

52. Suppose a parabola passes through (0,4),(1,9) and (4,5) and has its axis parallel to the y-axis.Then the equation of the parabola is

[AP EAMCET 04-07-2022_Shift-2]

1. $19x^2+12y-79x-48=0$
2. $19x^2+12y-79x+48=0$
3. $19y^2+12x-79y-48=0$
4. $19y^2+12x-79y+48=0$

53. Which of the following represents a parabola?

[AP EAMCET 05-07-2022_Shift-1]

1. $x=4\cos t, y=4\sin t$
2. $x^2-2=-2\cos t, y=\cos^2\left(\frac{t}{2}\right)$
3. $\sqrt{x}=\tan t, \sqrt{y}=\sec t$
4. $x=\sqrt{1-\sin t}, y=\sin\left(\frac{t}{2}\right)+\cos\left(\frac{t}{2}\right)$

54. The distance of the point $\left(6,4\sqrt{3}\right)$ from the focus of $y^2=8x$ is

[AP EAMCET 05-07-2022_Shift-2]

1. 64
2. 4
3. 8
4. 2

55. The parabola with focus at (4, −3) and vertex at (4, −1) is

[AP EAMCET 06-07-2022_Shift-1]

1. $x^2+8x+6y+22=0$
2. $x^2-8x-10y+6=0$
3. $x^2-8x-16y=0$
4. $x^2-8x+8y+24=0$

56. The length of the latus rectum of the parabola $(x-2)^2+(y-3)^2=\frac{1}{25}(3x-4y+7)^2$ is

[AP EAMCET 06-07-2022_Shift-2]

1. $\frac{1}{5}$
2. $\frac{2}{5}$
3. $\frac{3}{5}$
4. $\frac{4}{5}$

57. For the parabola represented in the parametric form by $x=t^2+t+1$ and $y=t^2-t+1$, the length of latus rectum is

[AP EAMCET 07-07-2022_Shift-1]

1. 2
2. 3
3. 1/2
4. 8

58. If the directrix of the parabola $x^2+4y-6x+\lambda=0$ is $y+1=0$, then which of the following is correct? **[AP EAMCET 07-07-2022_Shift-2]**

1. $\lambda=-17$
2. $\lambda=-19$
3. focus is $(3,-3)$
4. vertex is $(3,-3)$

59. The equation of directrix of parabola $x^2+8x+12y+4=0$ is

[AP EAMCET 08-07-2022_Shift-1]

1. $y+4=0$
2. $y-1=0$
3. $y-4=0$
4. $y-2=0$

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

[AP EAMCET 08-07-2022_Shift-2]

1. $x^2=12y$
2. $y^2=-12x$
3. $y^2=12x$
4. $x^2=-12y$

61. If $y^2=16x$ is the given parabola, then the point of intersection of the focal chord through the point (2, 2) and the double ordinate of length 24 is **[TS EAMCET 18-07-2022_Shift-1]**

1. (3, 1)
2. (9, –5)
3. (9, 3)
4. (8, –4)

62. Let PQ and RT be two focal chords of the parabola $y^2=16x$. If P = (4, 8) and R = (16, 16) then QT =

[TS EAMCET 18-07-2022_Shift-1]

1. 5
2. $4\sqrt{5}$
3. $4\sqrt{13}$
4. 13

63. The vertex and the focus of the parabola $2x^2+5y-6x+1=0$ respectively, are

[TS EAMCET 18-07-2022_Shift-2]

1. $\left(\frac{-3}{2},\frac{7}{10}\right),\left(\frac{-3}{2},\frac{53}{40}\right)$
2. $\left(\frac{-3}{2},\frac{7}{10}\right),\left(\frac{-3}{2},\frac{3}{40}\right)$
3. $\left(\frac{3}{2},\frac{7}{10}\right),\left(\frac{3}{2},\frac{53}{40}\right)$
4. $\left(\frac{3}{2},\frac{7}{10}\right),\left(\frac{3}{2},\frac{3}{40}\right)$

64. The axis of a parabola is along the line y = x and the distance of its vertex A from $(0,0)$ is $\sqrt{2}$ and that of its focus S from $(0,0)$ is $2\sqrt{2}$. If A and S lie in first quadrant, then the equation of the parabola in parametric form is

[TS EAMCET 18-07-2022_Shift-2]

1. $x=(t+1)^2, y=(t-1)^2$
2. $x=t^2, y=2t$
3. $x=\left(t-\sqrt{2}\right)^2, y=\left(t+\sqrt{2}\right)^2$
4. $x=t^2+5, y=t^2-5$

65. **Statement–I:** $4x^2+y^2-4xy-30x-50y+40=0$ is the equation of parabola having (2, 3) as its focus and $x+2y+5=0$ as its directrix.

Statement–II: The equation of the directrix of the parabola $x^2-4x+16y+52=0$ is $y+1=0$.

Which of the above statements is (are) true?

[TS EAMCET 19-07-2022_Shift-I]

1. Statement I is true, but statement II is false
2. Statement II is true, but Statement I is false
3. Both statement I and Statement II are true
4. Both statement I and Statement II are false

66. The cartesian equation of the parabola $x=-2+2t^2, y=2+4t$ is

[TS EAMCET 19-07-2022_Shift-I]

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

67. Let LL' be the latus rectum and PQ be the focal chord of the parabola $y^2=16x$. If P=(1,4) and P, L lie in the same quadrant the LQ =

[TS EAMCET 19-07-2022_Shift-2]

1. 5
2. 20
3. $24\sqrt{5}$
4. $12\sqrt{5}$

68. If $P\left(\frac{1}{2},4\right)$ and Q are the ends of a focal chord of the parabola $y^2=32x$ and S is the focus of the parabola then SQ=

[TS EAMCET 19-07-2022_Shift-2]

1. $\frac{17}{2}$
2. $\frac{\sqrt{65}}{2}$
3. 136
4. $\frac{289}{2}$

69. If the focal chord drawn through the point (1,2) to the parabola $y^2=8x$ meets this parabola in (x_1,y_1) and (x_2,y_2) then $x_1+x_2=$

[TS EAMCET 20-07-2022_Shift-1]

1. 4
2. 5
3. 6
4. 8

70. If $(2t^2,4t)$ is a point on the parabola $y^2=8x$ such that its focal distance is 3, then t=

[TS EAMCET 20-07-2022_Shift-1]

1. ± 1
2. $\pm\frac{1}{2}$
3. $\pm\frac{1}{\sqrt{3}}$
4. $\pm\frac{1}{\sqrt{2}}$

71. The equation of the given curve is

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

Match the following.

List - I		List – II	
A)	Focus	I)	(4, 2)
B)	Vertex	II)	(3, 2)
C)	One end of the latus rectum	III)	(2, 3)
D)	Point of intersection of the axis and directrix	IV)	(2, 4)
		V)	(2, 2)

The correct match is

[TS EAMCET 20-07-2022_Shift-2]

	A	B	C	D
1.	II	III	I	IV
2.	IV	III	I	V
3.	V	III	IV	I
4.	V	III	I	IV

72. If one end of a focal chord of the parabola $y^2=\frac{8}{a}x\,(a>0)$ is at (1, 4), then the length of this focal chord is

[TS EAMCET 20-07-2022_Shift-2]

1. $\frac{25}{8}$
2. $\frac{25}{2}$
3. $\frac{25}{4}$
4. 25

73 The perpendicular distance from the origin to the focal chord drawn through the point $(4,5)$ to the parabola $y^2-4y-3x+7=0$ is

[15th May 2023 Shift 2]

1. 2/5
2. $1/\sqrt{2}$
3. 1/5
4. 1

74 If a parabola having its axis parallel to X-axis passes through the points (0,-1), (6,1) and (-2,-3), then the point at which this parabola cuts the X-axis is **[16th May 2023 Shift 1]**

1. $\left(\frac{5}{2},0\right)$
2. $(-1,0)$
3. $(6,0)$
4. $\left(\frac{8}{5},0\right)$

75. Let Z be the point of intersection of the axis and the directrix of the parabola $4x^2-12x+4y+5=0$. If S is its focus, then the point which divides SZ in the ratio 2:1 is **[16th May 2023 Shift 2]**

1. $\left(\frac{3}{2},\frac{13}{12}\right)$
2. $\left(1,\frac{13}{12}\right)$
3. $\left(\frac{3}{4},\frac{13}{14}\right)$
4. $\left(\frac{3}{2},\frac{13}{14}\right)$

76 Let a focal chord $12x+5y-27=0$ of the parabola $y^2=kx$ intersect the parabola at the points P and P^1. If S is the focus of this parabola, then $9(SP+SP^1)=$

[17th May 2023 Shift 1]

1. 27
2. 108
3. 16 $SP.SP^1$
4. 4 $SP.SP^1$

77. Let l be the directrix of the parabola $9y^2+12y+9x-14=0$ and l_1 be the line passing through the vertex of this parabola and the origin. If (h, k) is the point of intersection of l and l_1 then h+k=**[17th May 2023 Shift 2]**

1. 2/3
2. 3/2
3. −3/4
4. 9/4

78 If (2, 3) is the vertex and (3, 2) is the focus of a parabola, then its equation is

1. $x^2+2xy+y^2-18x-2y+35=0$
2. $2x^2+4xy+2y^2-9x-y+17=0$
3. $x^2+2xy+y^2-18x-2y+17=0$
4. $x^2+4xy+4y^2-18x+2y+9=0$

[18th May2023 shift -1]

79 A parabola having its axis parallel to Y-axis, passes through the points $\left(0,\frac{2}{5}\right)$, $(4,-2)$ and $\left(1,\frac{8}{5}\right)$. Then a point that lies on this parabola is **[18th May 2023 Shift 2]**

1. (3,5/2)
2. (-1,2)
3. (-2, 28/5)
4. (2,8/5)

80 If the focal chord drawn through the point P (5,5) to the parabola $y^2=5x$ meets the parabola again at the point Q, then the tangent drawn to this parabola at Q meets the axis of the parabola at the point.

[19th May 2023 Shift 1]

1. $\left(\frac{-5}{4},0\right)$
2. $\left(\frac{5}{16},0\right)$
3. $\left(\frac{-5}{16},0\right)$
4. $\left(\frac{5}{4},0\right)$

81. If two circles $x^2+y^2-6x-6y+13=0$ and $x^2+y^2-8y+9=0$ intersect at A and B, then the focus of the parabola whose directrix is the line AB and vertex is the point $O(0,0)$ is

[12TH MAY 2023 SHIFT-1]

1. $\left(\frac{3}{5},\frac{1}{5}\right)$
2. $\left(-\frac{3}{5},\frac{1}{5}\right)$
3. $\left(-\frac{3}{5},-\frac{1}{5}\right)$
4. $\left(\frac{3}{5},-\frac{1}{5}\right)$

82. The equation of the parabola with $x+2y=1$ as directrix and $(1,0)$ as focus is

[12TH MAY 2023 SHIFT-1]

1. $4x^2-4xy+y^2-8x+4y+4=0$
2. $4x^2-4xy+y^2-4x+4y+4=0$
3. $4x^2-4xy+y^2+8x+4y+4=0$
4. $x^2-4xy+y^2-8x+4y+4=0$

83 The tangents are drawn from the point $(-1,-2)$ to the parabola $y^2=4x$. If θ is the angle between these tangents, then $\tan\theta=$

[12TH MAY 2023 SHIFT-1]

1. $\frac{\pi}{4}$
2. $\frac{\pi}{2}$
3. $\frac{\pi}{3}$
4. $\frac{\pi}{6}$

84 The normal at a point on the parabola $y^2=4x$ passes through (5,0). If there are two more normals to this parabola passing through (5,0) then the equation of one of these normals is

[12TH MAY 2023 SHIFT -2]

1. $2x-y-10=0$
2. $x+y-5=0$
3. $\sqrt{3}x+2y+5\sqrt{3}=0$
4. $\sqrt{3}x-y-5\sqrt{3}=0$

85 The equations of common tangents to the parabola $y^2=16x$ and the circle $x^2+y^2=8$ are **[12TH MAY 2023 SHIFT -2]**

1. $y=x+2, y=x-2$
2. $y=x+1, y=x-2$
3. $y=2x+4, y=-2x+4$
4. $y=x+4, y=-x-4$

86 If the focal distance of a point $P(2,y_1)$ on the parabola $y^2=kx$ is 3,then the equation of the tangent drawn at P to the given parabola is

[13TH MAY 2023 SHIFT-1]

1. $x\pm2\sqrt{2}y+4=0$
2. $x\pm2\sqrt{2}y+2=0$
3. $x\pm\sqrt{2}y+4=0$
4. $x\pm\sqrt{2}y+2=0$

87 Normals are drawn from the point P(8,0) to the parabola $y^2 = 12x$. If θ is the acute angle between two non-horizontal normals among them, Then $\tan\theta =$

[13TH MAY 2023 SHIFT-1]

1. $\frac{2\sqrt{6}}{5}$
2. $2\sqrt{6}$
3. $\frac{\pi}{2}$
4. $\frac{\pi}{4}$

88 If $x-2y+k=0$ is a tangent to the parabola $y^2-4x-4y+8=0$, then the value of k is

[EAPCET 14-05-23 SHIFT-1]

1. 2
2. $\frac{2}{5}$
3. 7
4. -7

89 If the points of intersection of the parabolas $y^2=5x$ and $x^2=5y$ lie on the line L, then the area of the triangle formed by the directrix of one parabola, latus rectum of another parabola and the line L is

[EAPCET 14-05-23 SHIFT-1]

1. $\frac{15}{32}$
2. $\frac{12}{25}$
3. $\frac{25}{8}$
4. $\frac{25}{32}$

90 If the line $2x+3y+n=0$ is a tangent to the parabola $y^2=8x$, then the equation of the normal drawn at the point (2n, $4\sqrt{n}$) to the parabola $y^2=8x$ is

[EAPCET 13-05-23 SHIFT-2]

1. $x-3y+18=0$
2. $3x+2y-30=0$
3. $3x+y-66=0$
4. $2x-3y+6=0$

91 $ax-y+c=0$ is the equation of the common tangent to the parabola $y^2=8\sqrt{5}x$ and the circle $x^2+y^2=1$. If this tangent makes an acute angle with the positive X-axis in the positive direction, then $a^2c^2 =$

[EAPCET 13-05-23 SHIFT-2]

1. 40
2. 80
3. 160
4. 20

92 Let the equation of the tangent at a point P on the parabola $x^2-4x-4y+16=0$ be $2x-y-5=0$. If the equation of the normal drawn at P to this parabola is $ax+y+c=0$, then ac =

[15th May 2023 Shift 1]

1. -20
2. 20
3. 5
4. -5

KEY

1)	4	2)	2	3)	4	4)	1	5)	4
6)	4	7)	1	8)	2	9)	1	10)	3
11)	4	12)	3	13)	4	14)	3	15)	3
16)	1	17)	1	18)	4	19)	2	20)	1
21)	3	22)	2	23)	1	24)	2	25)	2
26)	1	27)	3	28)	4	29)	1	30)	2
31)	1	32)	2	33)	4	34)	3	35)	4
36)	2	37)	4	38)	3	39)	4	40)	4
41)	2	42)	4	43)	2	44)	1	45)	3
46)	2	47)	3	48)	1	49)	1	50)	1
51)	3	52)	1	53)	2	54)	3	55)	4
56)	2	57)	1	58)	3	59)	3	60)	4
61)	2	62)	1	63)	4	64)	1	65)	1
66)	2	67)	4	68)	3	69)	3	70)	4
71)	4	72)	4	73)	3	74)	1	75)	1
76)	4	77)	2	78)	3	79)	4	80)	3
81)	2	82)	1	83)	2	84)	4	85)	4
86)	4	87)	2	88)	3	89)	3	90)	3
91)	4	92)	4						

SOLUTIONS

1. $x^2 = -\frac{12}{5}y \Rightarrow a = \frac{3}{5}$

Focus$= (0,-a) = \left(0, \frac{-3}{5}\right)$

2. a=1/2S(h,a+k)=(-3,11/2)

3. $y^2 = 16ax.....(1)\ y_1 = y = 4\sqrt{a}\sqrt{x}$

$y_2 = y = 4mx....(2)$

By solving (1) and (2)

$x = 0, \frac{a}{m^2}\ A = \int_0^{\frac{a}{m^2}} |y_1 - y_2| dx$

$= \left| 4\sqrt{a}\frac{x^{\frac{3}{2}}}{3/2} - 4m\frac{x^2}{2} \right|_0^{\frac{a}{m^2}} = 2$

4. Let S (1,0)P(x,y)SP== $\sqrt{(x-1)^2 + y^2}$

$PM = \frac{|x+2y-1|}{\sqrt{5}}$

$SP^2 = PM^2$

$4x^2 - 4xy + y^2 - 8x + 4y + 4 = 0$

5. Given parabola eq. $y^2 = 8x \,\&\, \theta = 30^0$

w.k.t slope of tangent eq. is $y = mx + \frac{a}{m}$

$\Rightarrow y = \frac{1}{\sqrt{3}}x + \frac{2}{\frac{1}{\sqrt{3}}}$

$\Rightarrow \sqrt{3}y = x + 6$

$x - \sqrt{3}y + 6 = 0$

6. If $lx + my + n = 0$ is a normal to the $y^2 = 4ax$ then

$al^3 + 2alm^2 + m^2 n = 0$

$1(2)^3 + 2(1)(2)(-1)^2 + (-1)^2 k = 0 \Rightarrow k = -12$

7. Conceptual

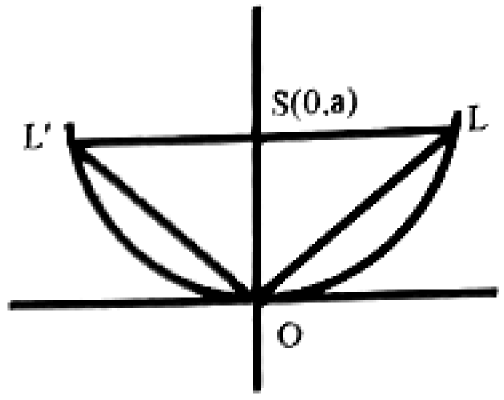
8. Conceptual

9. $y^2 = -\frac{25}{2}x \Rightarrow a = \frac{25}{8}$

Directrix is $x = \frac{25}{8} \Rightarrow 8x - 25 = 0$

10. $\text{Tan}\,\theta = \frac{\sqrt{S_{11}}}{|x_1 + a|} = \sqrt{3}\ \theta = 60^0$

11. Given parabola $x^2 = 12y$



$\because LL' = 4a\ \Delta = \frac{1}{2}(LL')(a) = 18$

12. $A(1,2), B(4,-4), c(2, 2\sqrt{2})$

$\alpha = Area\ of\ \Delta ABC = 3\sqrt{2}$

$\beta = \frac{1}{16a}|(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)| = \frac{3\sqrt{2}}{2}$

$\alpha\beta = 3\sqrt{2}.\frac{3\sqrt{2}}{2} = 9$

13. x=2y-k y^2-4x-4y+8=0y^2-4(2y-k)-4y+8=0

y^2-12y+4(k+2)=0144=16(k+2)K=7

the equation of tangent to y^2-4x-4y+8=0 is at (1,k)=(1,7) is 2x-5y+8=0slope=2/5

14. $y^2 = x \Rightarrow \frac{dy}{dx} = \frac{1}{2y}$

Given that $-2y = x\ y^2 = x \Rightarrow \frac{x^2}{4} - x = 0$

$x = 0, 4; y = 0, \pm 2$ At (0,0) not possible

Therefore no. of points is 2

15. $y^2 = 4\sqrt{k}x$

Equation of tangent $y = mx + \frac{\sqrt{k}}{m}$

It is also tangent to $2x^2 + 2y^2 = k$

$r^2 = d^2$

$\frac{k}{2} = \left(\frac{\frac{\sqrt{k}}{m}}{\sqrt{1+m^2}} \right)^2 \Rightarrow (m^2 + 2)(m^2 - 1) = 0$

$m_1 m_2 = -1$

16. $y^2=12x, a=4\left(at^2,2at_1\right)=(3,-6)$

$2at_1=-6 \Rightarrow t_1=-1$ $t_2=-t_1-\frac{2}{t_1}=3$

$p(at_2^2,2at_2)=(27,18)$

Equation of tangent at P is $x-3y+27=0$

17. $y^2+2y=-2x+3$

$\left(y-(-1)\right)^2=-2(x-2)$

Here $k=-1, h=2, a=\frac{1}{2}$

Vertex $=(h,k)=(2,-1)$

focus $=(h-a,k)=(\frac{3}{2},-1)$

equation of the directrix:

$x=h+a \Rightarrow 2x-5=0$

equation of the axis: $y=k \Rightarrow y+1=0$

18 Here a=1 $P=\left(at^2,2at\right)=\left(t^2,2t\right)$........(1)

Equation of normal at P is

$y+xt=2at+at^3$ $y+xt=2t+t^3$

$(5,0)\rightarrow 0+5t=2t+t^3$

$t\left(t^2-3\right)=0$

$t=0,\pm\sqrt{3}$

$(1)\Rightarrow put\ \ t=0\ then\ A=(0,0)$

$(1)\Rightarrow\ put\ \ t=\sqrt{3}\ then\ B=\left(3,2\sqrt{3}\right)$

$(1)\Rightarrow\ put\ \ t=-\sqrt{3}\ then\ C=\left(3,-2\sqrt{3}\right)$

Centroid $=\left(\frac{0+3+3}{3},\frac{0+2\sqrt{3}-2\sqrt{3}}{3}\right)=(2,0)$

19. $\left(x+\frac{3}{4h}\right)^2=\frac{3}{h^3}\left(y-\frac{3}{4h^3}+\frac{19h}{16}\right)$

Here $a=\frac{3}{4h^3}$

Equation of directrix is

$y-\frac{3}{4h^3}+\frac{19h}{16}+\frac{3}{4h^3}=0$

$\Rightarrow y=\frac{-19}{16}h \Rightarrow k^2=\frac{-19}{16}h$

$\therefore k^2:h=-19:16$

20. Equation of tangent to $y^2=32x$ is

$y=mx+\frac{8}{m}$.......(1)

It is also a tangent to $x^2=108y$

$bm^2+c=0 \Rightarrow 27m^2+\frac{8}{m}=0$

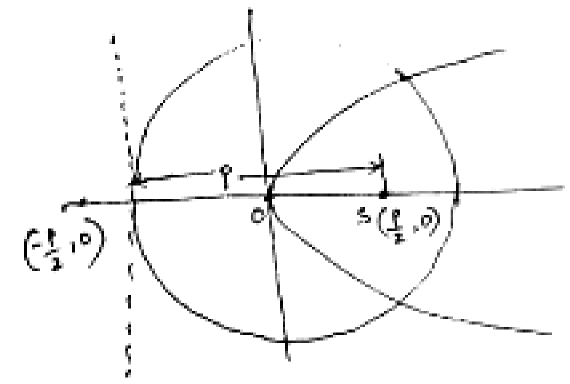
$m=-\frac{2}{3}$ (1)$\Rightarrow$required equation is

$2x+3y+36=0$

21.

Equation of the circle with centre $C\left(\frac{p}{2},0\right)$

Radius $r=p$ is



22. Given $P(4,8)$ and parabola is $y^2=16x$

Equation of tangent at $P(4,8)$ to the parabola is,

$x-y+4=0..(1)$

Equation (1) intersects the parabola

$y^2=16x+80.....(2)$

Solving (1) *and* (2)

In terms of x , $x^2-8x-64=0$

Sum of roots $x_1+x_2=8$

In terms of y, $y^2-16y-16=0$

Sum of roots $y_1+y_2=16$

Now mid-point of $A(x_1,y_1)$ *and* $B(x_2,y_2)$ is

$\left[\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right]=\left[\frac{8}{2},\frac{16}{2}\right]=(4,8)$

23. $\underline{|BAC}=60^0$, $\underline{|BAM}=30^0$

$\tan 30^0=\frac{2at}{at^2}=\frac{2}{t}=\frac{1}{\sqrt{3}}$

$t=2\sqrt{3}$

Length of the side of triangle =

$BC=4at=32\sqrt{3}$

24. $x_1+4=40 \Rightarrow x_1=36$

$y_1^2=16.36 \Rightarrow y_1=24$

$y_1^2=16x \Rightarrow 2y.\frac{dy}{dx}=\frac{8}{y_1}=\frac{8}{24}=\frac{1}{3}$

Equation of normal=

$y-24=-3(x-36)$

$y-24=-3x+108$

$3x+y-132=0$

$|c|=132$

25. $P=(at^2,2at)=(4,4)$

$\Rightarrow t=2$

$Q=\left(\frac{a}{t^2},\frac{-2a}{t}\right)=\left(\frac{1}{4},-1\right)$

$S=(1,0)$

$SQ=\frac{5}{4}$

26. $x^2=4ay...(1)$

$y^2=1+2x....(2)$

Solving (1) and (2) we get

$x=4a\pm\sqrt{16a^2+4a}$

$y=1+84a\pm\sqrt{16a^2+4a}$

$P(x_1,y_1)=\left(4a+\sqrt{16a^2+4a},1+84a+\sqrt{16a^2+4a}\right)$

$Q(x_2,y_2)=\left(4a-\sqrt{16a^2+4a},1+84a-\sqrt{16a^2+4a}\right)$

27. $y^2=8x \Rightarrow a=2,(at^2,2at)=\left(\frac{1}{2},2\right)$

$\Rightarrow t=\frac{1}{2}$

Length of focal chord

$=a\left(t+\frac{1}{t}\right)^2=2\left(\frac{1}{2}+2\right)^2=\frac{25}{2}$

28. Let equation of parabola be: $x^2=4by$

Passes through point $(6,-2)$

$\Rightarrow 36=-8b \Rightarrow 4b=-18$

$\therefore$ Equation of parabola is $x^2=-18y$

29. $x=5t^2+2, y=10t+4 \Rightarrow t=\frac{y-4}{10}$

$\therefore x=5.\frac{(y-4)^2}{100}+2$

$\Rightarrow 20x=(y-4)^2+40$

$\Rightarrow (y-4)^2=20(x-2)$

Compare with $(y-k)^2=4a(x-h)$

Focus $=(h+a,k)=(7,4)$

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

$\Rightarrow y^2+2y+1=-4x+9$

$\Rightarrow (y+1)^2=-4\left(x-\frac{9}{4}\right)$

Compare with $(y-k)^2=-4a(x-h)$

End point of latus rectum $=(h-a,k\pm 2a)$

$=\left(\frac{5}{4},1\right)$ (or) $\left(\frac{5}{4},-3\right)$

31. $y^2=4ax....(1)$, $x^2=4ay......(2)$

P.O.I of (1) & (2) $=(4a,4a)$

$2bx+3cy+4d=0$ passes through $(4a,4a)$

$\Rightarrow 2b(4a)+3c(4a)+4d=0$

$\Rightarrow d=-(2ab+3ac)$

$\Rightarrow d^2=(2ab+3ac)^2$

32. $y^2-16x=0$

Focus $=(a,0)=(4,0)$

Equation of latus rectum : $x-4=0\equiv L$

$(a,2a)$ is interior to parabola

$\Rightarrow (y^2-16x)_{(a,2a)}<0$

$\Rightarrow 4a^2-16a<0$
$\Rightarrow a(a-4)<0$
$\Rightarrow a\in(0,4)$......(1)

For latus rectum, $L(0,0).L(a,2a)>0$

$\Rightarrow(-4).(a-4)>0$
$\Rightarrow a-4<0$
$\Rightarrow a<4$........(2)

From (1) & (2), $a\in(0,4)$

---

33. $x-2=t^2, y=2t$
$\Rightarrow y^2=4(x-2)$
Compare with $y^2=a(x-b)$
$a+b=4+2=6$

---

34. Vertex $=(h,k)=(2,0)$

Given: $VZ=2$

We know that, $VZ=VS=2$

$\therefore$Focus $=S(4,0)$

---

35. $x^2=4ay$

End points of focal chord:

$(x_1,y_1)=(2a,a),(x_2,y_2)=(-2a,a)$

$\Rightarrow x_1.x_2=-4a^2,\ \ y_1y_2=a^2$

---

36. $y^2-x+4y+5=0$

$\Rightarrow (y+2)^2=1(x-1)$

Equation of directrix: $x=h-a=1-\frac{1}{4}=\frac{3}{4}$

$\Rightarrow 4x-3=0$

---

37. A) $(y-1)^2=-4[x-(-1/2)]$

Vertex $=\left(\frac{-1}{2},1\right)$

B) $(x+4)^2=-12(y-1)$

Vertex $=(-4,1)$

C) $(y-1)^2=1(x-1)$

Focus $=(h+a,k)=\left(\frac{5}{4},1\right)$

D) $(x-1)^2=8[y-(-3)]$

Focus $=(1,-1)$

---

38. Parabola is $(y-2)^2=8(x+2)$

Latus rectum is one of the focal chords

$\alpha\beta=-1$

---

39. $a=SA=\sqrt{\frac{1}{16}+0}=\frac{1}{4}$

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

$(y+2)^2=(x-1)$

$(10,1)$

---

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

$y^2-8y=4x+12$

$(y-4)^2=4(x+7)$

$A(-7,4)$

41. Let $x=ay^2+by+c..(1)$ be the equation of parabola.

(1) passes through $(-2,1)$

$-2=a+b+c...(2)$

(1)passé through $(1,2)$

$1=4a+2b+c......(3)$

(1)passé through $(-1,3)$

$-1=9a+3b+c......(4)$

Solving (2) ,(3) and (4)

$$a=\frac{-5}{2},b=\frac{21}{2},c=-6$$

$$\therefore x=\frac{-5}{2}y^2+\frac{21}{2}y-6$$

$$-5\left[y^2-\frac{21}{5}y+\frac{441}{100}-\frac{441}{100}\right]=2(x+6)$$

$$-5\left[\left(y-\frac{21}{10}\right)^2-\frac{441}{100}\right]=2x+12$$

$$-5\left(y-\frac{21}{10}\right)^2+\frac{441}{20}=2x+12$$

$$-5\left(y-\frac{21}{10}\right)^2=2x+12-\frac{441}{100}$$

$$=2x+\frac{120-441}{10}$$

$$=2x-\frac{321}{10}$$

$$=2\left(x-\frac{321}{20}\right)$$

$$\left(y-\frac{21}{10}\right)^2=\frac{-2}{5}\left(x-\frac{321}{20}\right)$$

$$4a=\frac{2}{5}$$

Vertex $(h,k)=\left(\frac{321}{10},\frac{21}{10}\right)$

Focus $=(h-a,k)=\left(\frac{321}{10}-\frac{2}{5},\frac{21}{10}\right)$

y – coordinate of focus $=\frac{21}{10}$.

42. Let $P(x,y)$ be a point

$S(2,-3)$

Directrix is $3x-2y+5=0$

Equation of parabola $SP=PM$

$$\sqrt{(x-2)^2+(y+3)^2}=\frac{|3x-2y+5|}{\sqrt{13}}$$

S.O.B.S and simplification

$$4x^2+12xy+9y^2-82x+98y+144=0$$

Comparing with

$$ax^2+2hxy+by^2-82x+98y+144=0$$

$$ax^2+2hxy+by^2=4x^2+12xy+9y^2$$

$$4x^2+12xy+9y^2=0$$

$$k^2=ab$$

$\therefore ax^2+2hxy+by^2=0$ represents two coincident lines.

43. Given parabola $x^2-8x+12y+15=0$

$$\Rightarrow(x-4)^2-12y-1=0$$

$$\Rightarrow(x-4)^2=-12\left(y-\frac{1}{12}\right)$$

$$(h,k)=(4,1/2);4a=-12\Rightarrow a=-3$$

Parametric equation are :

$x=h+2at$; $y=k-at^2$

$=4+6t$; $=\frac{1}{12}-3t^2$

44. Conceptual

45. $A(-2,3)$

Let $P(at^2,2at)$ be moving point on the parabola

$m:n=3:2$

$$(x,y)=\left(\frac{3at^2-4}{5},\frac{6at+6}{5}\right)$$

$$5x=3at^2-4,\frac{5y-6}{6a}=t$$

$$5x=3a\times\frac{(5y-6)^2}{36a^2}-4$$

$$(5y-6)^2=12a(5x+4)$$

$$\left(y-\frac{6}{5}\right)^2=\frac{12}{5}a\left[x-\left(\frac{-4}{5}\right)\right]$$

Focus $=(h+a,k)=\left(\frac{3a-4}{5},\frac{6}{5}\right)$

46. $(x-2)^2+(y-3)^2=\frac{1}{25}(3x-4y+7)^2$

$(x-2)^2+(y-3)^2=\left[\frac{13x-4y+7}{\sqrt{25}}\right]^2$

This is a parabola

L. of latusrectum $=2\times$[The $\perp'$ distance from

$(2,3)$ to $3x-4y+7=0] = 2\times\frac{1}{5}=\frac{2}{5}$.

47. $x^2=16y \Rightarrow 4a=16, a=4$

Ends of latus rectum are $L=(2a,a)=(8,4)$, $L'=(-2a,a)=(-8,4)$

Required Area of $\Delta OLL'=2\left(\frac{1}{2}\times4\times8\right)=32$.

48. Equation of parabola parallel to Y-axis is

$y=lx^2+mx+n.....(1)$

Equation (1) passing through $(1,-3),(-1,5),(0,2)$

then

$-3=l+m+n.....(2)$

$5=l-m+n........(3)$

$2=n........(4)$

Solving we get, $l=-1, m=-4, n=2$

Required parabola equation is $y=-x^2-4x+2$

$(2,k)$ is a point on the parabola (eq (5)) then

$k=-10$

49. Given ellipse is $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(b>a).....(1)$

Given parabola is $y^2=8ax......(2)$

Differentiating eq(1) and (2) w.r.t "x",

we get

$\frac{2x}{a^2}+\frac{2yy'}{b^2}=1$ $2yy'=8a \Rightarrow y'=\frac{4a}{y}$

$\Rightarrow y'=\frac{-b^2x}{a^2y}$

Given eq (1) & (2) cut at right angles

$m_1m_2=-1$

$\Rightarrow \frac{4ab^2x}{a^2(8ax)}=-1 \quad (\because y^2=8ax)$

$\Rightarrow b^2=2b^2(1-e^2)$

$e^2=\frac{1}{2}\Rightarrow e^4=\frac{1}{4}$.

$\therefore |y_1-y_2|=4\sqrt{16a^2+4a}$

$|x_1-x_2|=2\sqrt{16a^2+4a}$

$\therefore lenght\ \ of\ \ \text{int}ercept=\sqrt{40}$

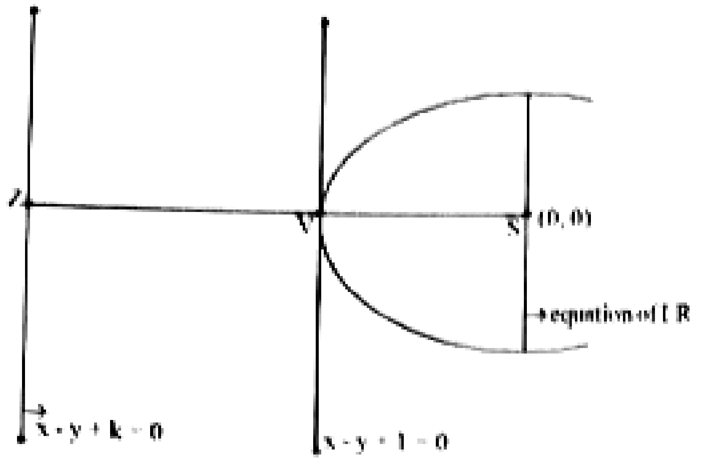
$(x_1-x_2)^2+(y_1-y_2)^2=40$

$8a^2+2a=1$

$(4a-1)(2a+1)=0$

$\therefore 4a=1 \quad a\neq\frac{-1}{2} \quad (\because a>0)$

50.



Equation of LR $x-y+\lambda=0 \rightarrow (1)$

Passes through (0,0)

$\boxed{\lambda=0}$

Equation of LR x – y = 0

$VZ = VS$ (difference between parallel lines same)

$$\frac{|1-0|}{\sqrt{2}}=\frac{|1-k|}{\sqrt{2}}$$

$$|1-k|=1$$

$$1-k=1, \quad 1-k=-1$$

$$k=0 \qquad \boxed{k=2}$$

Equation of directrix is $x-y+2=0$

51. $ax+by=1$ Given normal

$by=1-ax$

$$y=\frac{-a}{b}x+\frac{1}{b}, \ m=-\frac{a}{b}$$

$$y=mx+c \qquad c=\frac{1}{b}$$

Given parabola $y^2=4px$ $\boxed{a=p}$

$\boxed{c=-2am-am^3}$

$$\frac{1}{b}=-2(p)\left(\frac{-a}{b}\right)-p\left(\frac{-a^3}{b^3}\right)$$

$$\frac{1}{b}=\frac{2pa}{b}+\frac{pa^3}{b^3}$$

$$\frac{1}{b}=\frac{2pab^2+pa^3}{b^3}$$

$$b^2=2pab^2+pa^3$$

$\boxed{pa^3=b^2-2pab^2}$

52. Verify

53. Eliminate "t" in option (2)

$x^2-2=-2\cos t$

$x^2=2-2\cos t$

$x^2=2(2\sin^2 t/2)$

$x^2=4\sin^2 t/2$

$x^2=4(1-\cos^2 t/2)$

$x^2=4(1-y)$

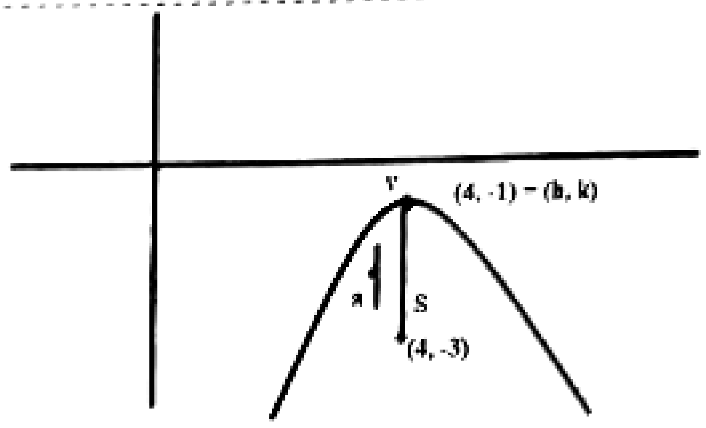
$\boxed{x^2=-4(y-1)}$

54. $|x_1+a|$ is focal distance $\quad 4a=8$

$a=2$

$|6+2|=8$

55.



$$a=\sqrt{(-1+3)^2}=2$$

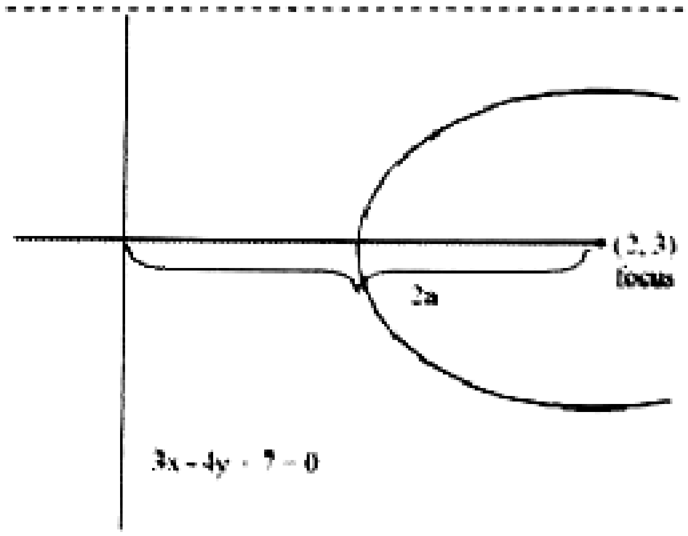
$$(x-h)^2=-4a(y-k)$$

$$(x-4)^2=-8(y+1)$$

$$x^2+16-8x=-8y-8$$

$$x^2-8x+8y+24=0$$

56.



$$(SP)^2=(PM)^2$$

$$(x-2)^2+(y-3)^2=\left[\frac{3x-4y+7}{\sqrt{16+9}}\right]^2$$

Equation of directrix $3x-4y+7=0$

$$2a=\frac{|6-12+7|}{\sqrt{9+16}}=\frac{1}{5}$$

Length of latus rectum = 2 (2a)

$$=2.\frac{1}{5}=\frac{2}{5}$$

57. $x=t^2+t+1,\quad y=t^2-t+1$

$x-y=2t \qquad x+y=2\left(t^2+1\right)$

$t=\dfrac{x-y}{2}$ eliminate "t"

$$x+y=2\left[\left(\frac{x-y}{2}\right)^2+1\right]$$

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

Compare with $y^2=4ax$

length of L.R $\boxed{4a=2}$.

58. $x^2-2x3+9=-4y-\lambda+9$

$$(x-3)^2=-4\left(y+\left(\frac{\lambda-9}{4}\right)\right)$$

$h=3,\ k=\dfrac{\lambda-9}{4}$

Equation of directrix $y-k-a=0$

$$y-\left(\frac{\lambda-9}{4}\right)-1=0$$

$$y=\frac{\lambda-9}{4}+1$$

Compare with $y=-1$

$\dfrac{\lambda-9}{4}+1=-1,\qquad \lambda=1$

$h=3,\ k=-2$ focus

$(h,k-a)=(3,-2-1)=(3,-3)$

59. $x^2+2x4+16=-12y-4+16$

$(x+4)^2=-12(y-1)$

Compare with $(x-h)^2=-4a(y-k)$

$h=-4 \qquad a=3 \qquad$ k = 1

Equation of directrix $y-k-a=0$

$\boxed{y=4}$

60. Verify option 4

$x^2=-12y \qquad$ focus = (0, -a) = (0, -3)

$4a=12 \qquad$ directrix y = a, y=3

$\boxed{a=3}$

61. PQ = double ordinate

AB = focal chord

$P=\left(at^2,2at\right)$

$Q=\left(at^2,-2at\right)$

$PQ=\sqrt{(2at+2at)^2}$

$4at=24$

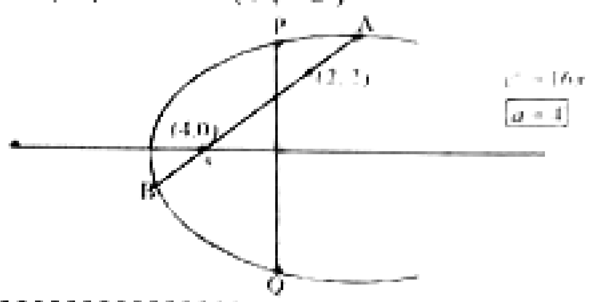
$4.4t=24$

$\boxed{t=3/2}$

Equation of AB $x+y-4=0\rightarrow(1)$

Equation of PQ $x=at^2$ $\boxed{x=9}\rightarrow(2)$

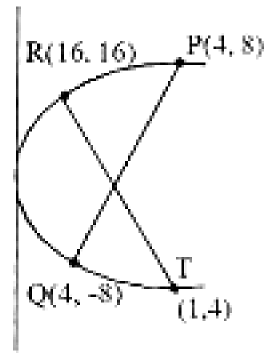
Solve (1) & (2) (9, -5)



62. One end of focal chord = $\left(at^2,2at\right)$

Other end of focal chord = $\left(\dfrac{a}{t^2},\dfrac{-2a}{t}\right)$

$QT=\sqrt{9+16}=5$



63. Given parabola $2x^2+5y-6x+1=0$

$$(x-3/2)^2=\frac{-5}{2}\left(y-\frac{7}{20}\right)$$

Compare with $(x-h)^2=-4a(y-k)$

$4a=\dfrac{5}{2}$

Focus = $(h,k-a) \qquad a=\dfrac{5}{8}$

$$=\left(\frac{3}{2},\frac{7}{10},\frac{-5}{8}\right)$$

$$=\left(\frac{3}{2},\frac{3}{40}\right)$$

vertex = $\left(\dfrac{3}{2},\dfrac{7}{20}\right)$

64. A = vertex
S = focus

$$A=\left(0+\sqrt{2}.\frac{1}{\sqrt{2}},0+\sqrt{2}.\frac{1}{\sqrt{2}}\right)$$

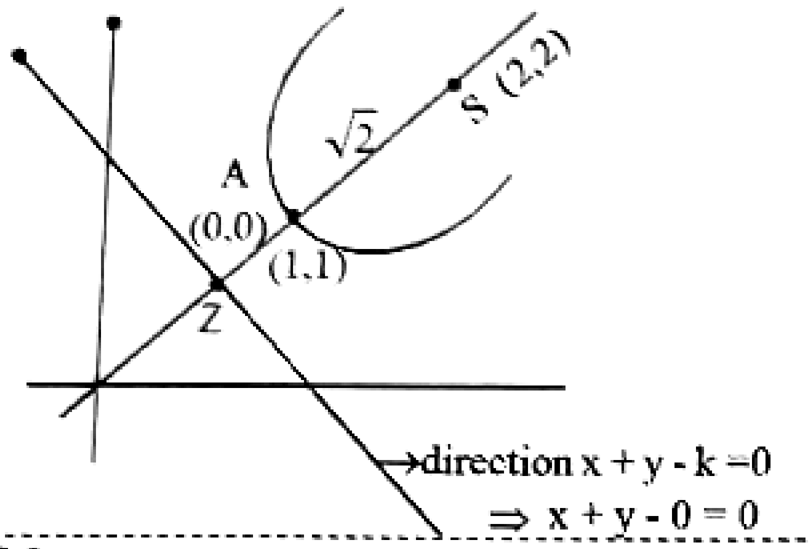
$$A=(1,1)$$

$$S=(2,2)$$

Equation of parabola

$$(x-2)^2+(y-2)^2=\left(\frac{x+y}{\sqrt{2}}\right)^2$$

$\Rightarrow (x-y)^2=8(x+y-2)$ option (1) satisfied



65. SP = PM

$$(x-2)^2+(y-3)^2=\left|\frac{x+2y+5}{\sqrt{1+4}}\right|^2$$

$$\Rightarrow 4x+4y^2-4xy-30x-50y+40=0$$

Statement – 1 is true

$$x^2-4x+16y+52=0$$

$$\Rightarrow (x-2)^2=-16(y+3)$$

$h=2,\ k=-3,\ 4a=16$

$a=4$

Equation of directrix $y-k+a=0$

$y+3-4=0$

$y-1=0$

Statement (2) is false

6.

$x=-2+2\left(\frac{y-2}{4}\right)^2$ eliminate "t"

$$\Rightarrow y^2-8x-4y-12=0$$

67. $a=4$

$L=(a,2a)$

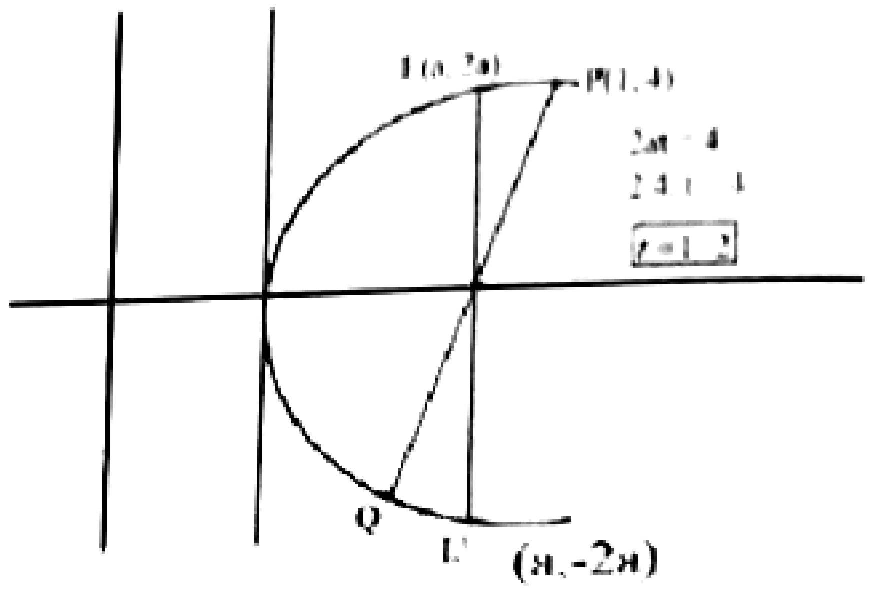
$L=(4,8)$

$L'=(4,-8)$

$P=(at^2,2at)$ $Q=\left(\frac{a}{t^2},\frac{-2a}{t}\right)$

$=(1,4)$ $Q=(16,-16)$

$$LQ=\sqrt{144+576}=\sqrt{720}=12\sqrt{5}$$



68. $y^2=32x$ $\boxed{a=8}$

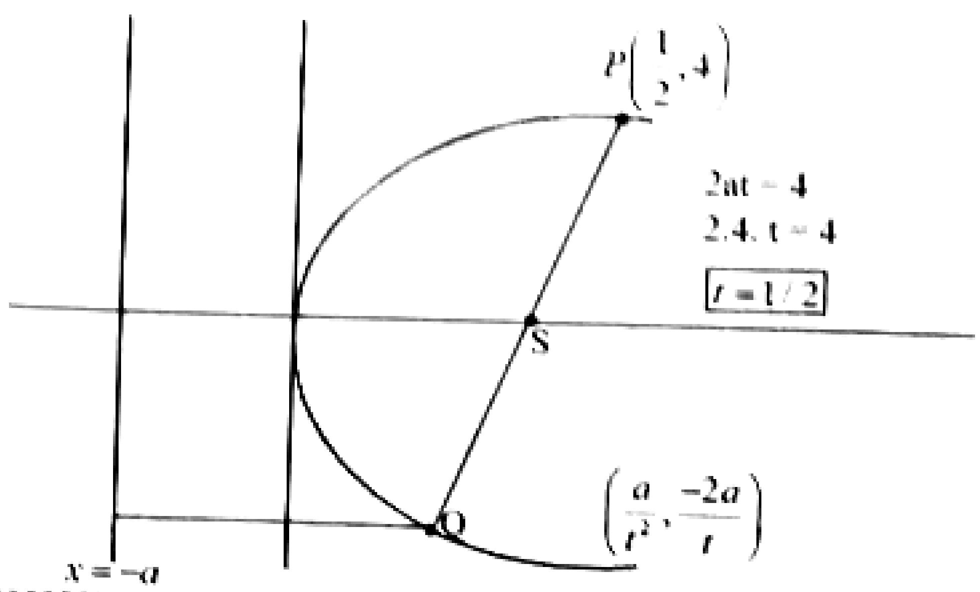
$$P=\left(\frac{1}{2},4\right)=(at^2,2at)$$

$$Q=\left(\frac{a}{t^2},\frac{-2a}{t}\right)$$

$$=(144,-64)$$

$$SQ=QN=\left|a+\frac{a}{t^2}\right|$$

$$=\left|8+\frac{8}{\frac{1}{16}}\right|=|128+8|=136$$



69. $t_1t_2=-1$ $y^2=8x$

Equation of $4a = 8$

$\boxed{a = 2}$

Equation of t_1t_2 is $y(t_1 + t_2) = 2x + 2at_1t_2 \rightarrow (1)$

(1) Passes through (1, 2)

$\Rightarrow 2(t_1 + t_2) = 2(1) + 2(2)(-1)$

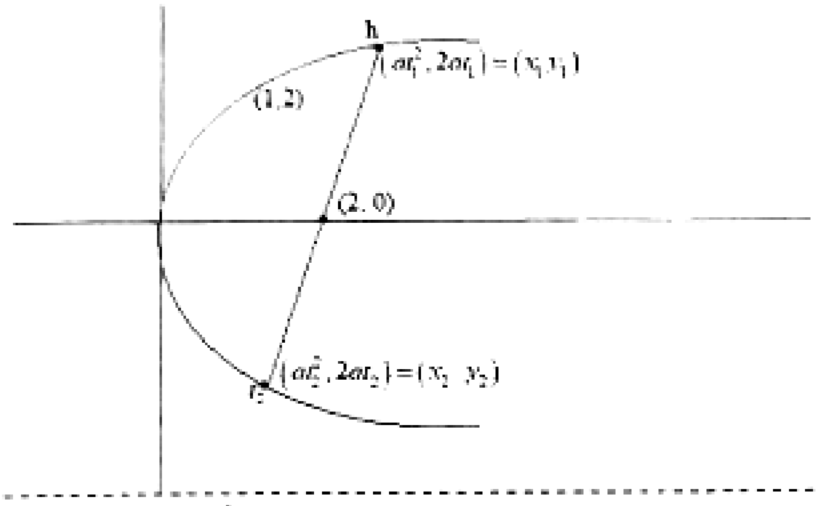
$2(t_1 + t_2) = 2 - 4$

$\boxed{t_1 + t_2 = -1}$

$x_1 + x_2 = a\left(t_1^2 + t_2^2\right)$

$= a\left(\left(t_1 + t_2\right)^2 - 2t_1t_2\right)$

$= 2(1 + 2) = 6$



70. Given $|x_1 + a| = 3$

$|2t^2 + 2| = 3$

$|t^2 + 1| = \frac{3}{2}$

$t = \pm\frac{1}{\sqrt{2}}$

71. $x^2 - 2x2 + 4 = -4y + 8 + 4$

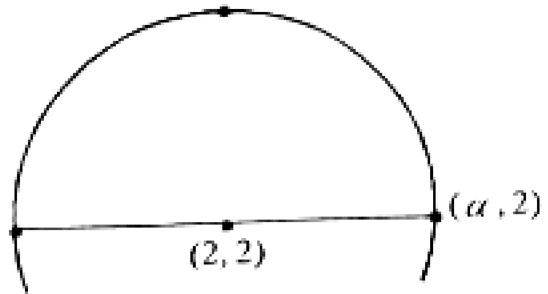
$(x - 2)^2 = -4(y - 3)$

Vertex = $(h, k) = (2, 3)$

Focus = $(h, k - a) = (2, 3 - 1) = (2, 2)$

Compare with $(x - h)^2 = -4a(y - k) \rightarrow (1)$

One end of latus rectum = (4, 2)



$(\alpha, 2)$ lies on (1)

$\alpha = 4$

For point of intersection of axes and directrix

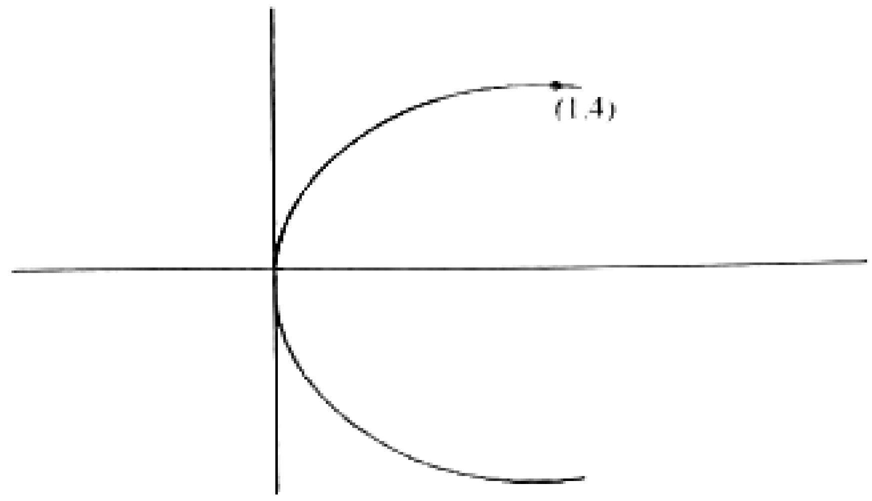
Solve directrix $y - 4 = 0$ and $x = 2 = (2, 4)$

72. Let the parabola be $y^2 = \frac{8}{p}x \rightarrow (1)$

(1,4) lies on (1)

$16 = \frac{8}{p}(1)$ $\boxed{p = 1/2}$ $\boxed{y^2 = 16x}$ is given parabola

$\boxed{a = 4}$



$(1, 4) = \left(at^2, 2at\right)$ $2at = 4$

$\boxed{t = 1/2}$

Length of focal chord = $a\left(t + \frac{1}{t}\right)^2$

$= 4\left(\frac{1}{2} + 2\right)^2$

$= 4.\left(\frac{5}{2}\right)^2$

$= 25$

73. $P(4,5)$, $y^2 - 4y - 3x + 7 = 0 \Rightarrow (y - 2)^2 = 3(x - 1)$

$h = 1, k = 4, a = \frac{3}{4}$

$focus\ S = (h + a, k) = \left(\frac{7}{4}, 2\right)$

$Equation\ of\ \overline{PS}\ is\ y - 5 = \frac{2 - 5}{\frac{7}{4} - 4}(x - 4) \Rightarrow 4x - 3y - 1 = 0$

$d = The\ distance\ from\ O(0,0)\ to\ l = \left|\frac{-1}{\sqrt{16 + 9}}\right| \Rightarrow \left|\frac{-1}{\sqrt{25}}\right|$

$\Rightarrow \frac{1}{5}$

74. Given points (0,−1),(6,1),(−2,−3) Eq of parabola is
$x = ly^2 + my + n \rightarrow (1)$

By solving in $I.P.E$ process we get $l = \frac{1}{2}, m = 3, n = \frac{5}{2}$

req parabola is

$x = \frac{1}{2}y^2 + 3y + \frac{5}{2}$

$put\ y = 0$

$2x = 5$

$x = \frac{5}{2}$

req point $(\frac{5}{2}, 0)$

75. $4x^2 - 12x = -4y - 5$

$4[x^2 - 3x] = -4y - 5$

$4\left[x^2 - 2\left(\frac{3}{2}\right)x + \frac{9}{4} - \frac{9}{4}\right] = -4y - 5$

$4\left[(x - 3/2)^2\right] - 9 = -4y - 5$

$4(x - 3/2)^2 = -4y + 4 = -4(y - 1)$

$(x - 3/2)^2 = -(y - 1)$

$A(3/2, 1),\ 4a = 1$

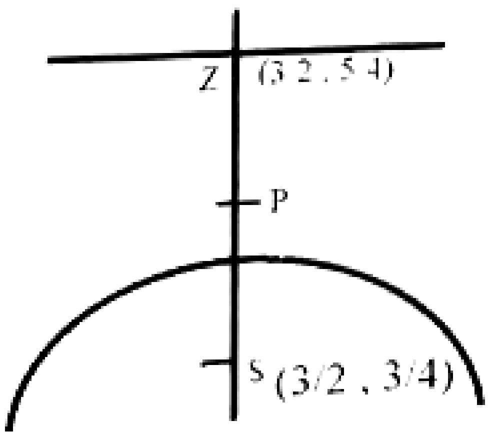
$a = 1/4$

$S(3/2,\ 3/4),\ Z(3/2\ ,\ 5/4)$

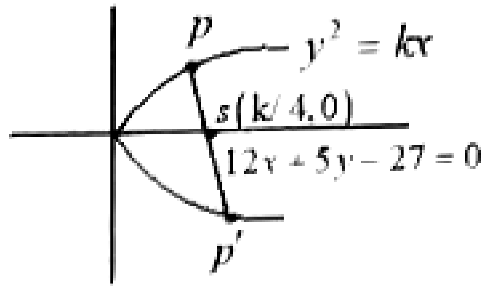
'p' divides sz in the Ratio 2:1

$\left(\frac{3 + \frac{3}{2}}{3}, \frac{\frac{5}{2} + \frac{3}{4}}{3}\right)$

$p\left(\frac{3}{2}, \frac{13}{12}\right)$



76.



$Given\ \ y^2 = kx$

$4a = k$

$a = \frac{k}{4}$

$s = \left(\frac{k}{4}, 0\right)$

$S\ lines\ on\ 12x + 5y - 27 = 0$

$12\left(\frac{k}{4}\right) - 27 = 0$

$3k = 27$

$k = 9$

$S = \left(\frac{9}{4}, 0\right)$

$W.K.T\ \frac{1}{sp} + \frac{1}{sp^1} = \frac{1}{a}$

$\frac{sp^1 + sp}{sp.sp^1} = \frac{4}{9}$

$9\left(sp^1 + sp\right) = 4\left(sp.sp^1\right)$

77.

$9y^2 + 12y + 9x - 14 = 0$

$9\left(y + \frac{2}{3}\right)^2 = -9(x - 2)$

$V = \left(2, \frac{-2}{3}\right)$

$l_1 = x + 3y = 0 \rightarrow (1)$

$l \Rightarrow x = 2 + \frac{1}{4} = \frac{9}{4} \rightarrow (2)$

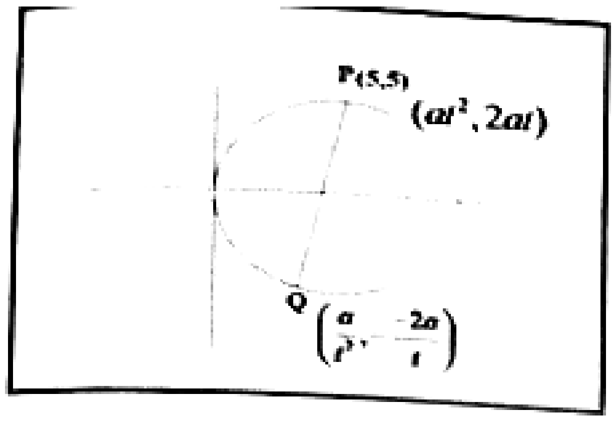
solve (1)&(2) $x = \frac{9}{4}, y = \frac{-x}{3} = \frac{-9}{4 \times 3} = \frac{-3}{4}$

$x + y = \frac{9}{4} - \frac{3}{4} = \frac{6}{4} = \frac{3}{2}$

78. Take O.V with vertex (2, 3)

79. Eqn of parabola parallel to y – axis is
$y = lx^2 + mx + n$
$\Rightarrow\ \ 5y = -3x^2 + 9x + 2$
By option verification

80.



$4a=5 \Rightarrow a=\frac{5}{4}$ n

$2at=5 \Rightarrow \boxed{t=2}$

$Q\left(\frac{5}{16},\frac{-5}{4}\right)$

The equation of tangent

$yy_1=\frac{5}{2}(x+x_1)$

$y\left(\frac{-5}{4}\right)=\frac{5}{2}\left(x+\frac{5}{16}\right)$

$-8y=16x+5$

$\boxed{y=0} \Rightarrow 0=16x+5$

$x=-15/16$

81. Given circles

$s=x^2+y^2-6x-6y+13=0$

$s^1=x^2+y^2-8y+9=0$

Equation of $\overline{AB}$ *is*

$s-s^1=0$

$-6x+2y+4=0$

$3x-y-2=0$

Vertex = (0,0)

Let (h,k) be the perpendicular from

(0,0) are the directrix $\overline{AB}$ is

$$\frac{h-0}{3}=\frac{k-0}{-1}=-\frac{(0-0-2)}{10}$$

$$\frac{h}{3}=\frac{k}{-1}=\frac{1}{5} \Rightarrow h=\frac{3}{5}, k=\frac{-1}{5}$$

$$\therefore z=\left(\frac{3}{5},\frac{-1}{5}\right)$$

Let $S=(x,y)$

$\Lambda=$ Midpoint of sz

$$(0,0)=\left(\frac{x+\frac{3}{5}}{2},\frac{y-\frac{1}{5}}{2}\right)$$

$$x=\frac{-3}{5},\ y=\frac{1}{5}$$

$$\therefore focus=\left(\frac{-3}{5},\frac{1}{5}\right)$$

82. Given directrix equation x+2y-1=0 & Focus

S(1,0) and $P(x,y)$

W.K.T SP=PM.

$(x-1)^2+(y-0)^2=\frac{|x+2y-1|^2}{5}$

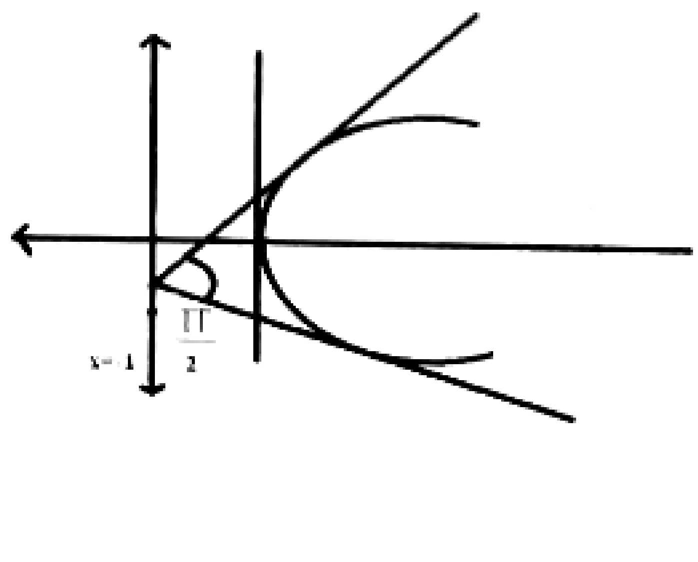
$\boxed{4x^2-4xy+y^2-8x+4y+4=0}$

83. $y^2=4x$

$a=1$

$(x_1,y_1)=(-1,-2)$ lies on the direction of perabola.

$\therefore$ Angle between the tangent $=\frac{\pi}{2}$

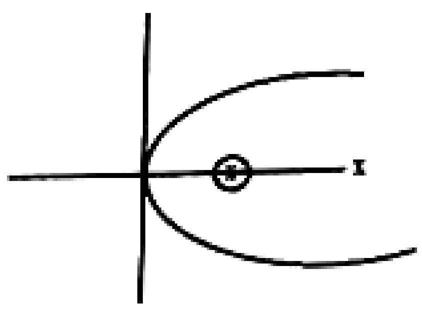


84. Given equation of the parabola is $y^2 = 4x$ $a=1$
Equation of the normal to the parabola having slope m is $y = mx - 2am - am^3$
This line passing through (5,0)
$m=0,\ m=\sqrt{3}$
Hence equation of the normal is
$\sqrt{3}x - y - 5\sqrt{3} = 0$

85. The common tangent of
$x^2 + y^2 = 2a^2$ and $y^2 = 8ax$ are $y = \pm(x+2a)$
Given that $x^2+y^2=8$
$y^2 = 16x$
$\therefore \boxed{a=2}$
Common tangents are
$y = \pm(x+4)$
$y = x+4$ & $y = -x-4$

86. $y^2 = kx$ *focal* distance$=x_1 + a$
$2+\frac{k}{4} = 3 \Rightarrow k = 4$
$y^2 = 4x$
$y_1^2 = 8 \Rightarrow y_1 = \pm 2\sqrt{2}$
$y^2 = 4x, P = \left(2, \pm 2\sqrt{2}\right)$
$Eq^n of$ tangent at 'p'is
$y\left(\pm 2\sqrt{2}\right) - 2(x+2) = 0$
$x \pm \sqrt{2}y + 2 = 0$

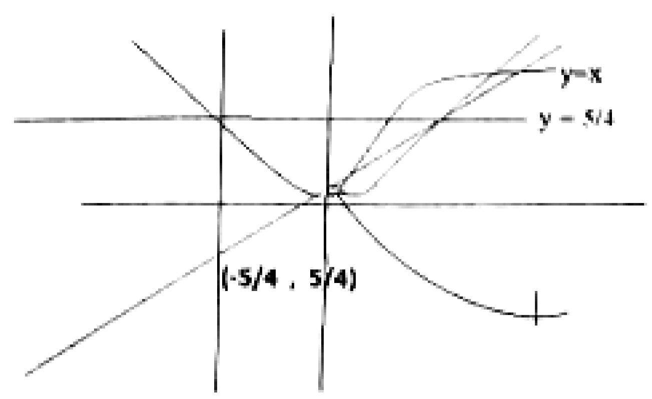
87. Given parabola $y^2 = 12x$
The
Equation of normal
With slope (m) is
$Y = mx - 2am - am^3$
Passes through (8,0)
$0 = 8m - 6m - 3m^3$
$m\left(2-3m^2\right) = 0$
$m = 0,$ *slopes of non horizontal normals*
are $\sqrt{\frac{2}{3}}, -\sqrt{\frac{2}{3}}$



$$\tan\theta = \left|\left(\frac{m_1 - m_2}{1+m_1m_2}\right)\right| = \frac{\sqrt{\frac{2}{3}}+\sqrt{\frac{2}{3}}}{1-\frac{2}{3}} = 2\sqrt{6}$$

88. $x - 2y + k = 0$, $y^2 - 4x - 4y + 8 = 0$
$x = 2y - k$
$y^2 - 4(2y-k) - 4y + 8 = 0$
$y^2 - 12y + 4k + 8 = 0$
$b^2 - 4ac = 0$
$144 - 4(4k+8) = 0$
$9 - k - 2 = 0$
$k = 7$

89. $y^2 = 5x$
Equation of the directrix is
$x + \frac{5}{4} = 0$
Equation of latus rectum of $x^2 = 5y$ is
$y = \frac{+5}{4}$ $\quad$ $x = \frac{-5}{4}$
Required area of ΔABC is $\frac{1}{2}\left(\frac{5}{4}+\frac{5}{4}\right)\left(\frac{5}{4}+\frac{5}{4}\right)$
$y = x = \frac{25}{8}$
$y = 5/4$
$x = \frac{-5}{4}$



$x = \frac{-5}{4}$

90. $y^2 = 8x = 4(2)x$ ______ (1)

$2x+3y+n=0$ __________ (2)

if (2) is tangent to (1)

$am^2 = \ln$

(2)(9) = 2n

$\boxed{n=9}$

$(2n, 4\sqrt{n}) = (18,12)$

Eqof Tangents at p (18,12) is $s_1 = 0$

$yy_1 - 4(x+x_1) - 0$

$12y - 4(x+18) = 0$

$3y - (x+18) = 0$

$3y - x - 18 = 0$

$x - 3y + 18 = 0$

Eq of normal p (18,12)is

3x+y+k=0

3(18)+12k=0

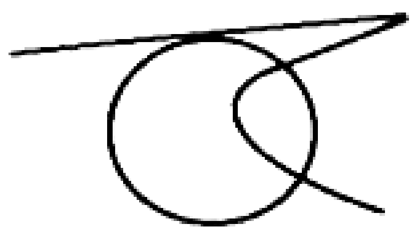
K=-66

$\boxed{3x + y - 66 = 0}$

91. $y^2 = 8\sqrt{5}x = 4(2\sqrt{5})x$, vertex A (0,0)

$x^2+y^2=1$, c (0,0), r=1

$y = mx + \dfrac{2\sqrt{5}}{m}$



$m^2x - my + 2\sqrt{5} = 0$

$\boxed{r=d}$

$1 = \dfrac{2\sqrt{5}}{\sqrt{m^4 + m^2}}$

$m^4+m^2-20=0$

$(m^2-4)(m^2+5)=0$

$m^2=4$

m=2

$\therefore 4x - 2y + 2\sqrt{5} = 0$

$2x - y + \sqrt{5} = 0$

$a = 2, c = \sqrt{5}$

$a^2c^2 = 4 \times 5 = 20$

92. P is point of contact of

$x^2 - 4x - 4y + 16 = 0$ & $y = 2x - 5$

$\Rightarrow x^2 - 4x - 4(2x-5) + 16 = 0$

$\Rightarrow \quad x^2 - 12x + 36 = 0$

$\Rightarrow \quad (x-6)^2 = 0$

$x = 6 \Rightarrow y = 12 - 5 = 7$

$\therefore P(6,7)$

Normal with slope= $\dfrac{-1}{2}$ is

$y - 7 = \dfrac{-1}{2}(x-6)$

$2y - 14 = -x + 6$

$x + 2y - 20 = 0$

$\Rightarrow \dfrac{1}{2}x + y - 10 = 0$

$\therefore a = \dfrac{1}{2}, c = -10$

$\Rightarrow ac = -5$