EXERCISE-I

Parabola

1. The focus of the parabola $x^2 = -16y$ is
(A) (4, 0) (B) (0, 4)
(C) (–4, 0) (D) (0, –4)

2. If (2, 0) is the vertex and *y*-axis the directrix of a parabola, then its focus is
(A) (2, 0) (B) (–2, 0)
(C) (4, 0) (D) (–4, 0)

3. If the parabola $y^2 = 4ax$ passes through (–3, 2), then length of its latus rectum is
(A) 2/3 (B) 1/3
(C) 4/3 (D) 4

4. The ends of latus rectum of parabola $x^2 + 8y = 0$ are
(A) (–4, –2) and (4, 2) (B) (4, –2) and (–4, 2)
(C) (–4, –2) and (4, –2) (D) (4, 2) and (–4, 2)

5. The end points of latus rectum of the parabola $x^2 = 4ay$ are
(A) $(a, 2a), (2a, -a)$ (B) $(-a, 2a), (2a, a)$
(C) $(a, -2a), (2a, a)$ (D) $(-2a, a), (2a, a)$

6. The equation of the parabola with its vertex at the origin, axis on the *y*-axis and passing through the point (6, –3) is
(A) $y^2 = 12x + 6$ (B) $x^2 = 12y$
(C) $x^2 = -12y$ (D) $y^2 = -12x + 6$

7. Focus and directrix of the parabola $x^2 = -8ay$ are
(A) $(0, -2a)$ and $y = 2a$ (B) $(0, 2a)$ and $y = -2a$
(C) $(2a, 0)$ and $x = -2a$ (D) $(-2a, 0)$ and $x = 2a$

8. The equation of the parabola with focus (3, 0) and the directirx $x + 3 = 0$ is
(A) $y^2 = 3x$ (B) $y^2 = 2x$
(C) $y^2 = 12x$ (D) $y^2 = 6x$

9. Locus of the poles of focal chords of a parabola is of parabola
(A) The tangent at the vertex
(B) The axis
(C) A focal chord
(D) The directrix

10. The parabola $y^2 = x$ is symmetric about
(A) *x*-axis
(B) *y*-axis
(C) Both *x*-axis and *y*-axis
(D) The line $y = x$

11. The equation of the latus rectum of the parabola $x^2 + 4x + 2y = 0$ is
(A) $2y + 3 = 0$ (B) $3y = 2$
(C) $2y = 3$ (D) $3y + 2 = 0$

12. Vertex of the parabola $9x^2 - 6x + 36y + 9 = 0$ is
(A) $(1/3, -2/9)$ (B) $(-1/3, -1/2)$
(C) $(-1/3, 1/2)$ (D) $(1/3, 1/2)$

13. The equation of the parabola whose axis is vertical and passes through the points (0, 0), (3, 0) and (–1, 4) is
(A) $x^2 - 3x - y = 0$ (B) $x^2 + 3x + y = 0$
(C) $x^2 - 4x + 2y = 0$ (D) $x^2 - 4x - 2y = 0$

14. The equation of the parabola whose vertex is (–1, –2), axis is vertical and which passes through the point (3, 6), is
(A) $x^2 + 2x - 2y - 3 = 0$ (B) $2x^2 = 3y$
(C) $x^2 - 2x - y + 3 = 0$ (D) None of these

15. Axis of the parabola $x^2 - 4x - 3y + 10 = 0$ is
(A) $y + 2 = 0$ (B) $x + 2 = 0$
(C) $y - 2 = 0$ (D) $x - 2 = 0$

16. If the axis of a parabola is horizontal and it passes through the points (0, 0), (0, –1) and (6, 1), then its equation is
(A) $y^2 + 3y - x - 4 = 0$ (B) $y^2 - 3y + x - 4 = 0$
(C) $y^2 - 3y - x - 4 = 0$ (D) None of these

17. The equation of the latus rectum of the parabola represented by equation $y^2 + 2Ax + 2By + C = 0$ is
(A) $x = \dfrac{B^2 + A^2 - C}{2A}$ (B) $x = \dfrac{B^2 - A^2 + C}{2A}$
(C) $x = \dfrac{B^2 - A^2 - C}{2A}$ (D) $x = \dfrac{A^2 - B^2 - C}{2A}$

18. The parametric equation of the curve $y^2 = 8x$ are

(A) $x = t^2, y = 2t$ (B) $x = 2t^2, y = 4t$

(C) $x = 2t, y = 4t^2$ (D) None of these

19. The equations $x = \frac{t}{4}, y = \frac{t^2}{4}$ represents

(A) A circle (B) A parabola

(C) An ellipse (D) A hyperbola

20. The equation of parabola whose vertex and focus are (0, 4) and (0, 2) respectively, is

(A) $y^2 - 8x = 32$ (B) $y^2 + 8x = 32$

(C) $x^2 + 8y = 32$ (D) $x^2 - 8y = 32$

21. Curve $16x^2 + 8xy + y^2 - 74x - 78y + 212 = 0$ represents

(A) Parabola (B) Hyperbola

(C) Ellipse (D) None of these

22. The length of the latus rectum of the parabola $9x^2 - 6x + 36y + 19 = 0$

(A) 36 (B) 9

(C) 6 (D) 4

23. The axis of the parabola $9y^2 - 16x - 12y - 57 = 0$ is

(A) $3y = 2$ (B) $x + 3y = 3$

(C) $2x = 3$ (D) $y = 3$

24. The vertex of a parabola is the point (*a, b*) and latus rectum is of length *l*. If the axis of the parabola is along the positive direction of *y*-axis, then its equation is

(A) $(x + a)^2 = \frac{1}{2}(2y - 2b)$

(B) $(x - a)^2 = \frac{1}{2}(2y - 2b)$

(C) $(x + a)^2 = \frac{1}{4}(2y - 2b)$

(D) $(x - a)^2 = \frac{1}{8}(2y - 2b)$

25. If the vertex of the parabola $y = x^2 - 8x + c$ lies on *x*-axis, then the value of *c* is

(A) –16 (B) –4

(C) 4 (D) 16

26. The equation of the parabola with focus (*a, b*) and directrix $\frac{x}{a} + \frac{y}{b} = 1$ is given by

(A) $(ax - by)^2 - 2a^3x - 2b^3y + a^4 + a^2b^2 + b^4 = 0$

(B) $(ax + by)^2 - 2a^3x - 2b^3y - a^4 + a^2b^2 - b^4 = 0$

(C) $(ax - by)^2 + a^4 + b^4 - 2a^3x = 0$

(D) $(ax - by)^2 - 2a^3x = 0$

27. The length of latus rectum of the parabola $4y^2 + 2x - 20y + 17 = 0$ is

(A) 3 (B) 6

(C) $\frac{1}{2}$ (D) 9

28. Eccentricity of the parabola $x^2 - 4x - 4y + 4 = 0$ is

(A) $e = 0$ (B) $e = 1$

(C) $e > 4$ (D) $e = 4$

29. The vertex of the parabola $3x - 2y^2 - 4y + 7 = 0$ is

(A) (3, 1) (B) (–3, –1)

(C) (–3, 1) (D) None of these

30. The focus of the parabola $4y^2 - 6x - 4y = 5$ is

(A) (–8/5, 2) (B) (–5/8, 1/2)

(C) (1/2, 5/8) (D) (5/8, –1/2)

31. The vertex of the parabola $x^2 + 8x + 12y + 4 = 0$ is

(A) (–4, 1) (B) (4, –1)

(C) (–4, –1) (D) (4, 1)

32. Focus of the parabola $(y - 2)^2 = 20(x + 3)$ is

(A) (3, –2) (B) (2, –3)

(C) (2, 2) (D) (3, 3)

33. The length of the latus rectum of the parabola $x^2 - 4x - 8y + 12 = 0$ is

(A) 4 (B) 6

(C) 8 (D) 10

34. The focus of the parabola $y = 2x^2 + x$ is

(A) (0, 0) (B) $\left(\frac{1}{2}, \frac{1}{4}\right)$

(C) $\left(-\frac{1}{4}, 0\right)$ (D) $\left(-\frac{1}{4}, \frac{1}{8}\right)$

35. The focus of the parabola $y^2 - x - 2y + 2 = 0$ is

(A) (1 / 4, 0) (B) (1, 2)

(C) (3/4, 1) (D) (5/4, 1)

36. The directrix of the parabola $x^2 - 4x - 8y + 12 = 0$ is

(A) $x = 1$ (B) $y = 0$

(C) $x = -1$ (D) $y = -1$

37. The equation of the parabola with focus (0, 0) and directrix $x + y = 4$ is

(A) $x^2 + y^2 - 2xy + 8x + 8y - 16 = 0$

(B) $x^2 + y^2 - 2xy + 8x + 8y = 0$

(C) $x^2 + y^2 + 8x + 8y - 16 = 0$

(D) $x^2 - y^2 + 8x + 8y - 16 = 0$

38. If (0, 6) and (0, 3) are respectively the vertex and focus of a parabola, then its equation is

(A) $x^2 + 12y = 72$ (B) $x^2 - 12y = 72$

(C) $y^2 - 12x = 72$ (D) $y^2 + 12x = 72$

39. The equation of the directrix of the parabola $x^2 + 8y - 2x = 7$ is

(A) $y = 3$ (B) $y = -3$

(C) $y = 2$ (D) $y = 0$

40. The equation of axis of the parabola $2x^2 + 5y - 3x + 4 = 0$ is

(A) $x = \frac{3}{4}$ (B) $y = \frac{3}{4}$

(C) $x = -\frac{1}{2}$ (D) $x - 3y = 5$

41. If $x^2 + 6x + 20y - 51 = 0$, then axis of parabola is

(A) $x + 3 = 0$ (B) $x - 3 = 0$

(C) $x = 1$ (D) $x + 1 = 0$

42. The equation of the tangent to the parabola $y = x^2 - x$ at the point where $x = 1$, is

(A) $y = -x - 1$ (B) $y = -x + 1$

(C) $y = x + 1$ (D) $y = x - 1$

43. The point of intersection of the latus rectum and axis of the parabola $y^2 + 4x + 2y - 8 = 0$

(A) (5/4, –1) (B) (9/4, –1)

(C) (7/2, 5/2) (D) None of these

44. The point of contact of the tangent $18x - 6y + 1 = 0$ to the parabola $y^2 = 2x$ is

(A) $\left(\frac{-1}{18}, \frac{-1}{3}\right)$ (B) $\left(\frac{-1}{18}, \frac{1}{3}\right)$

(C) $\left(\frac{1}{18}, \frac{-1}{3}\right)$ (D) $\left(\frac{1}{18}, \frac{1}{3}\right)$

45. The equation of the common tangent of the parabolas $x^2 = 108y$ and $y^2 = 32x$, is

(A) $2x + 3y = 36$ (B) $2x + 3y + 36 = 0$

(C) $3x + 2y = 36$ (D) $3x + 2y + 36 = 0$

46. The locus of a foot of perpendicular drawn to the tangent of parabola $y^2 = 4ax$ from focus, is

(A) $x = 0$ (B) $y = 0$

(C) $y^2 = 2a(x + a)$ (D) $x^2 + y^2(x + a) = 0$

47. If the straight line $x + y = 1$ touches the parabola $y^2 - y + x = 0$, then the co-ordinates of the point of contact are

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

(C) (0, 1) (D) (1, 0)

48. If the line $y = mx + c$ is a tangent to the parabola $y^2 = 4a(x + a)$ then $ma + \frac{a}{m}$ is equal to

(A) c (B) $2c$

(C) $-c$ (D) $3c$

49. A tangent to the parabola $y^2 = 8x$ makes an angle of 45° with the straight line $y = 3x + 5$, then the equation of tangent is

(A) $2x + y - 1 = 0$ (B) $x + 2y - 1 = 0$

(C) $2x + y + 1 = 0$ (D) None of these

50. The angle between the tangents drawn at the end points of the latus rectum of parabola $y^2 = 4ax$, is

(A) $\frac{\pi}{3}$ (B) $\frac{2\pi}{3}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

51. The line $y = mx + c$ touches the parabola $x^2 = 4ay$, if

(A) $c = -am$ (B) $c = -a/m$

(C) $c = -am^2$ (D) $c = a/m^2$

52. The locus of the point of intersection of the perpendicular tangents to the parabola $x^2 = 4ay$ is

(A) Axis of the parabola

(B) Directrix of the parabola

(C) Focal chord of the parabola

(D) Tangent at vertex to the parabola

53. The angle between the tangents drawn from the origin to the parabola $y^2 = 4a(x-a)$ is

(A) 90^o (B) 30^o

(C) $\tan^{-1}\frac{1}{2}$ (D) 45^o

54. If line $x = my + k$ touches the parabola $x^2 = 4ay$, then $k =$

(A) $\frac{a}{m}$ (B) *am*

(C) am^2 (D) $-am^2$

55. If y_1, y_2 are the ordinates of two points *P* and *Q* on the parabola and y_3 is the ordinate of the point of intersection of tangents at *P* and *Q*, then

(A) y_1, y_2, y_3 are in A.P.

(B) y_1, y_3, y_2 are in A.P.

(C) y_1, y_2, y_3 are in G.P.

(D) y_1, y_3, y_2 are in G.P.

56. The equation of the tangent to the parabola $y^2 = 4ax$ at point $(a/t^2, 2a/t)$ is

(A) $ty = xt^2 + a$ (B) $ty = x + at^2$

(C) $y = tx + at^2$ (D) $y = tx + (a/t^2)$

57. The equation of common tangent to the circle $x^2 + y^2 = 2$ and parabola $y^2 = 8x$ is

(A) $y = x + 1$ (B) $y = x + 2$

(C) $y = x - 2$ (D) $y = -x + 2$

58. If the line $lx + my + n = 0$ is a tangent to the parabola $y^2 = 4ax$, then locus of its point of contact is

(A) A straight line (B) A circle

(C) A parabola (D) Two straight lines

59. The line $x - y + 2 = 0$ touches the parabola $y^2 = 8x$ at the point

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

(C) $(4, -4\sqrt{2})$ (D) $(2, 4)$

60. The tangent to the parabola $y^2 = 4ax$ at the point $(a, 2a)$ makes with *x*-axis an angle equal to

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{4}$

(C) $\frac{\pi}{2}$ (D) $\frac{\pi}{6}$

61. The tangent drawn at any point *P* to the parabola $y^2 = 4ax$ meets the directrix at the point *K*, then the angle which *KP* subtends at its focus is

(A) 30^o (B) 45^o

(C) 60^o (D) 90^o

62. The point of intersection of the parabola at the points t_1 and t_2 is

(A) $(at_1t_2, a(t_1 + t_2))$ (B) $(2at_1t_2, a(t_1 + t_2))$

(C) $(2at_1t_2, 2a(t_1 + t_2))$ (D) None of these

63. The angle of intersection between the curves $x^2 = 4(y+1)$ and $x^2 = -4(y+1)$ is

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$

(C) 0 (D) $\frac{\pi}{2}$

64. Angle between two curves $y^2 = 4(x+1)$ and $x^2 = 4(y+1)$ is

(A) 0^o (B) 90^o

(C) 60^o (D) 30^o

65. If The tangent to the parabola $y^2 = ax$ makes an angle of 45^o with *x*-axis, then the point of contact is

(A) $\left(\frac{a}{2}, \frac{a}{2}\right)$ (B) $\left(\frac{a}{4}, \frac{a}{4}\right)$

(C) $\left(\frac{a}{2}, \frac{a}{4}\right)$ (D) $\left(\frac{a}{4}, \frac{a}{2}\right)$

66. If the line $2x + y + k = 0$ is normal to the parabola $y^2 = -8x$, then the value of *k* will be
(A) -16 (B) -8
(C) -24 (D) 24

67. If a normal drawn to the parabola $y^2 = 4ax$ at the point $(a, 2a)$ meets parabola again on $(at^2, 2at)$, then the value of *t* will be
(A) 1 (B) 3
(C) -1 (D) -3

68. In the parabola $y^2 = 6x$, the equation of the chord through vertex and negative end of latus rectum, is
(A) $y = 2x$ (B) $y + 2x = 0$
(C) $x = 2y$ (D) $x + 2y = 0$

69. The length of chord of contact of the tangents drawn from the point (2, 5) to the parabola $y^2 = 8x$, is
(A) $\frac{1}{2}\sqrt{41}$ (B) $\sqrt{41}$
(C) $\frac{3}{2}\sqrt{41}$ (D) $2\sqrt{41}$

70. If '*a*' and '*c*' are the segments of a focal chord of a parabola and *b* the semi-latus rectum, then
(A) *a, b, c* are in A.P. (B) *a, b, c* are in G.P.
(C) *a, b, c* are in H.P. (D) None of these

71. If the segment intercepted by the parabola $y^2 = 4ax$ with the line $lx + my + n = 0$ subtends a right angle at the vertex, then
(A) $4al + n = 0$ (B) $4al + 4am + n = 0$
(C) $4am + n = 0$ (D) $al + n = 0$

72. A set of parallel chords of the parabola $y^2 = 4ax$ have their mid-point on
(A) Any straight line through the vertex
(B) Any straight line through the focus
(C) Any straight line parallel to the axis
(D) Another parabola

73. The equations of the normals at the ends of latus rectum of the parabola $y^2 = 4ax$ are given by
(A) $x^2 - y^2 - 6ax + 9a^2 = 0$
(B) $x^2 - y^2 - 6ax - 6ay + 9a^2 = 0$
(C) $x^2 - y^2 - 6ay + 9a^2 = 0$
(D) None of these

74. If the normals at two points *P* and *Q* of a parabola $y^2 = 4ax$ intersect at a third point *R* on the curve, then the product of ordinates of *P* and *Q* is
(A) $4a^2$ (B) $2a^2$
(C) $-4a^2$ (D) $8a^2$

75. If $x = my + c$ is a normal to the parabola $x^2 = 4ay$, then the value of *c* is
(A) $-2am - am^3$ (B) $2am + am^3$
(C) $-\frac{2a}{m} - \frac{a}{m^3}$ (D) $\frac{2a}{m} + \frac{a}{m^3}$

76. If the normal to $y^2 = 12x$ at (3, 6) meets the parabola again in (27, -18) and the circle on the normal chord as diameter is
(A) $x^2 + y^2 + 30x + 12y - 27 = 0$
(B) $x^2 + y^2 + 30x + 12y + 27 = 0$
(C) $x^2 + y^2 - 30x - 12y - 27 = 0$
(D) $x^2 + y^2 - 30x + 12y - 27 = 0$

77. The length of the normal chord to the parabola $y^2 = 4x$, which subtends right angle at the vertex is
(A) $6\sqrt{3}$ (B) $3\sqrt{3}$
(C) 2 (D) 1

78. If $x + y = k$ is a normal to the parabola $y^2 = 12x$, then *k* is
(A) 3 (B) 9
(C) -9 (D) -3

79. The normal at the point $(bt_1^2, 2bt_1)$ on a parabola meets the parabola again in the point $(bt_2^2, 2bt_2)$, then
(A) $t_2 = -t_1 - \frac{2}{t_1}$ (B) $t_2 = -t_1 + \frac{2}{t_1}$
(C) $t_2 = t_1 - \frac{2}{t_1}$ (D) $t_2 = t_1 + \frac{2}{t_1}$

80. The focal chord to $y^2 = 16x$ is tangent to $(x-6)^2 + y^2 = 2$, then the possible value of the slope of this chord, are
(A) $\{-1, 1\}$ (B) $\{-2, 2\}$
(C) $\{-2, 1/2\}$ (D) $\{2, -1/2\}$

81. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose vertices are at the parabola, then the length of its side is equal to

(A) $8a$ (B) $8a\sqrt{3}$

(C) $a\sqrt{2}$ (D) None of these

82. The ordinates of the triangle inscribed in parabola $y^2 = 4ax$ are y_1, y_2, y_3, then the area of triangle is

(A) $\frac{1}{8a}(y_1 + y_2)(y_2 + y_3)(y_3 + y_1)$

(B) $\frac{1}{4a}(y_1 + y_2)(y_2 + y_3)(y_3 + y_1)$

(C) $\frac{1}{8a}(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)$

(D) $\frac{1}{4a}(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)$

83. From the point (–1, 2) tangent lines are drawn to the parabola $y^2 = 4x$, then the equation of chord of contact is

(A) $y = x + 1$ (B) $y = x - 1$

(C) $y + x = 1$ (D) None of these

84. For the above problem, the area of triangle formed by chord of contact and the tangents is given by

(A) 8 (B) $8\sqrt{3}$

(C) $8\sqrt{2}$ (D) None of these

85. The point on parabola $2y = x^2$, which is nearest to the point (0, 3) is

(A) (±4, 8) (B) $(\pm 1, 1/2)$

(C) (±2, 2) (D) None of these

86. From the point (–1, –60) two tangents are drawn to the parabola $y^2 = 4x$. Then the angle between the two tangents is

(A) 30° (B) 45°

(C) 60° (D) 90°

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

(A) (3, –4), (13, 4) (B) (–3, –4), (13, –4)

(C) (3, 4), (–13, 4) (D) (5, –8), (–5, 8)

88. Tangent to the parabola $y = x^2 + 6$ at (1, 7) touches the circle $x^2 + y^2 + 16x + 12y + c = 0$ at the point

(A) (–6, –9) (B) (–13, –9)

(C) (–6, –7) (D) (13, 7)

89. The angle of intersection between the curves $x^2 = 8y$ and $y^2 = 8x$ at origin is

(A) $\pi/4$ (B) $\pi/3$

(C) $\pi/6$ (D) $\pi/2$

90. If the line $y = 2x + k$ is a tangent to the curve $x^2 = 4y$, then k is equal to

(A) 4 (B) 1/2

(C) –4 (D) –1/2