NARAYANA IIT/PMT ACADEMY

DPP#02 **PARABOLA**

Topics	Position of Point w.r.t Parabola , Position of Line w.r.t Parabola

Position of Point

1.(E) With respect to parabola $y^2 = 2x$ the points P(4, 2) & Q(1, 4) are such that

(a) P & Q both lie inside parabola

(b) P & Q both lie outside parabola

(c) P lie inside & Q lie outside parabola

(d) Q lie inside & P lie outside parabola

2.(E) If the point (2a, a) lies inside the parabola $x^2 - 2x - 4y + 3 = 0$, then a lies in the interval

(a) $\left[\frac{1}{2}, \frac{3}{2}\right]$ (b) $\left(\frac{1}{2}, \frac{3}{2}\right)$

(c) (1, 3) (d) $\left(\frac{-3}{2}, \frac{-1}{2}\right)$

Position of Line

3.(E) The equation of the tangent to the parabola $y^2 = 4x + 5$ parallel to the line $y = 2x + 7$ is

(a) $2x - y - 3 = 0$ (b) $2x - y + 3 = 0$

(c) $2x + y + 3 = 0$ (d)None of these

4.(E) The line $lx + my + n = 0$ will touch the parabola $y^2 = 4ax$, if

(a) $mn = al^2$ (b) $lm = an^2$

(c) $ln = am^2$ (d) $mn = al$

5.(E) The line $x\cos\alpha + y\sin\alpha = p$ will touch the parabola $y^2 = 4a(x + a)$, if

(a) $p\cos\alpha + a = 0$ (b) $p\cos\alpha - a = 0$

(c) $a\cos\alpha + p = 0$ (d) $a\cos\alpha - p = 0$

6.(E) The straight line $y = 2x + \lambda$ does not meet the parabola $y^2 = 2x$, if

(a) $\lambda < \frac{1}{4}$ (b) $\lambda > \frac{1}{4}$

(c) $\lambda = 4$ (d) $\lambda = 1$

7.(E) 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) $3x + 2y + 36 = 0$

8.(E) A tangent to the parabola $y^2 = 8x$ makes an angle of 45^o 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

9.(E) 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) $\frac{\pi}{2}$

10.(M) Angle between the tangents drawn from (1, 4) to the parabola $y^2 = 4x$ is **[IIT-2004]**

(a) $\pi/2$ (b) $\pi/3$

(c) $\pi/6$ (d) $\pi/4$

11.(E) If the parabola $y^2 = 4ax$ passes through the point (1, –2), then the tangent at this point is

(a) $x + y - 1 = 0$ (b) $x - y - 1 = 0$

(c) $x + y + 1 = 0$ (d) $x - y + 1 = 0$

12.(E) 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.

13.(M) The 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 **[IIT -2001]**

(a) $\sqrt{3}y = 3x + 1$ (b) $\sqrt{3}y = -(x+3)$

(c) $\sqrt{3}y = x + 3$ (d) $\sqrt{3}y = -(3x+1)$

14.(M) 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 **[IIT - 2005]**

(a) (–6, –9) (b)(–13, –9)

(c) (–6, –7) (d)(13, 7)

15.(M) If two tangents drawn from the point (α, β) to the parabola $y^2 = 4x$ be such that the slope of one tangent is double of the other then

(a) $\beta = \frac{2}{9}\alpha^2$ (b) $\alpha = \frac{2}{9}\beta^2$

(c) $2\alpha = 9\beta^2$ (d) none of these

16.(E) The equation of tangents to the parabola $y^2 = 4ax$ at the ends of its latus rectum is **[AIEEE-2002]**

(a) x – y + a = 0 (b) x + y + a = 0

(c) x + y – a = 0 (d) both (a) and (b)

17.(E) The equation of a tangent to the parabola $y^2 = 8x$ is y = x + 2. The point on this line from which the other tangent to the parabola is perpendicular to the given tangent **[AIEEE 2007]**

(a) (–1, 1) (b) (0, 2)

(c) (2, 4) (d) (–2, 0)

18.(T) The locus of the point of intersection of the tangents to the parabola $x^2 - 4x - 8y + 28 = 0$ which are at right angle is

(a) y = 0 (b) y = – 1

(c) x = 1 (d) y = 1

19.(M) The parabola $y^2 = 4ax$ and circle $x^2 + y^2 + 2bx = 0$ have more than one common tangent if-

(a) ab > 0 (b) ab < 0

(c) ab < –2 (d) ab > 2

20.(T) If $P(t^2, 2t)$ $t \in [0, 2]$ is an arbitrary point on parabola $y^2 = 4x$. Q is foot of perpendicular from focus S on the tangent at P, then maximum area of ΔPQS is

(a) 1 (b) 2

(c) $\frac{5}{16}$ (d) 5

ANSWER KEY:

1	**c**	**2**	**b**	**3**	**b**	**4**	**c**	**5**	**a**
6	**b**	**7**	**b**	**8**	**c**	**9**	**d**	**10**	**b**
11	**c**	**12**	**b**	**13**	**c**	**14**	**c**	**15**	**b**
16	**d**	**17**	**d**	**18**	**d**	**19**	**a**	**20**	**d**