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Daily Practice Problems

JEE MATHEMATHICS

Topic: Tangent & Normal

Q.1 The equation of tangent to the curve y = sin x at the point (π, 0) is -

(A) x + y = 0 (B) x + y = π

(C) x – y = π (D) x – y = 0

Q.2 If normal to the curve y = f(x) at a point makes 135º angle with x- axis, then at that point dy/dx equals-

(A) 1 (B) –1 (C) 0 (D) ∞

Q.3 The slope of the curve y = sin x + $\cos^2$ x is zero at the point, where-

(A) x = $\frac{\pi}{4}$ (B) x = $\frac{\pi}{2}$ (C) x = π (D) No where

Q.4 The equation of the tangent to the curve y = cos x at x = π/3 is-

(A) $3x - 2\sqrt{3}y = \pi + \sqrt{3}$

(B) $3x + 2\sqrt{3}y = \pi + \sqrt{3}$

(C) $3x + 2\sqrt{3}y = \pi - \sqrt{3}$

(D) None of these

Q.5 The equation of tangent to the curve y = 2 sin x + sin 2x at the point x = π/3 is-

(A) 2y = 3 (B) $3y = \sqrt{2}$

(C) $2y = 3\sqrt{3}$ (D) 2y = 3

Q.6 The equation of the tangent to the curve

$y = be^{-x/a}$ at the point where it meets y– axis is

(A) $\frac{x}{b} + \frac{y}{a} = 1$ (B) $\frac{x}{a} + \frac{y}{b} = 1$

(C) $\frac{x}{b} + \frac{y}{a} = 2$ (D) $\frac{x}{a} + \frac{y}{b} = 2$

Q.7 The equation of the tangent to the curve $1/\sqrt{x} + 1/\sqrt{y} = 2/\sqrt{a}$ at point (a, a) is-

(A) $a/\sqrt{x} + a/\sqrt{y} = 2\sqrt{a}$

(B) $x + y = 2a$

(C) $\sqrt{x} + \sqrt{y} = 2\sqrt{a}$

(D) None of these

Q.8 $y = x - 11$ is a tangent to the curve $y = x^3 - 11x + 5$ at the point-

(A) (2,–9) (B) (3, –8)

(C) (11, 0) (D) None of these

Q.9 If tangent at a point of the curve y = f(x) is perpendicular to 2x – 3y = 5, then at that point dy/dx equals-

(A) 2/3 (B) –2/3

(C) 3/2 (D) –3/2

Q.10 At what point the tangent to the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ is perpendicular to the x- axis-

(A) (0, 0) (B) (a, a)

(C) (a, 0) (D) (0, a)

Q.11 At what point of the curve $y = 2x^2 - x + 1$ tangent is parallel to y = 3x + 4

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

(C) (–1, 4) (D) (2, 7)

Q.12 If tangent of the curve $x = t^2 - 1$, $y = t^2 - t$ is perpendicular to x- axis, then-

(A) $t = 0$ (B) $t = 1/\sqrt{2}$

(C) $t = \infty$ (D) $t = -1/\sqrt{3}$

Q.13 The equation of tangent to the curve $y = 1 - e^{x/2}$ at the point where it meets y- axis is-

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

(C) $x - y = 2$ (D) None of these

Q.14 The point where the tangent line to the curvey $= e^{2x}$ at (0, 1) meets x- axis is-

(A) (1, 0) (B) (–1, 0)

(C) (–1/2, 0) (D) None of these

Q.15 The point on the curve $y = x^2 - 3x + 2$ at which the tangent is perpendicular to the line $y = x$ is-

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

(C) (–1, 6) (D) (2, –2)

Q.16 The equation of tangent to the curve $\left(\frac{x}{a}\right)^n + \left(\frac{y}{b}\right)^n = 2$ at the point (a, b) for all values of $n \in N$ is-

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

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

Q.17 The equation of tangent at the point (at^2, at^3) on the curve $ay^2 = x^3$ is-

(A) $3tx - 2y = at^3$ (B) $tx - 3y = at^3$

(C) $3tx + 2y = at^3$ (D) None of these

Q.18 The slopes of the tangents to the curve $y = (x + 1)(x - 3)$ at the points where it crosses x- axis are-

(A) ±2 (B) ±3

(C) ±4 (D) None of these

Q.19 The coordinates of the point on the curve $y = x^2 + 3x + 4$, the tangent at which passes through the origin are-

(A) (–2, 2), (2, 14)

(B) (1, –1), (3, 4)

(C) (2, 14), (2, 2)

(D) (1, 2), (14, 3)

Q.20 The angle made by tangent at the point (2, 0) of the curve $y = (x – 2)(x – 3)$ with x- axis is-

(A) $\pi/4$ (B) $\pi/2$

(C) $\frac{3\pi}{4}$ (D) π

Q.21 If the curve $y = x^2 + bx + c$, touches the line $y = x$ at the point (1, 1), then values of b and c are-

(A) –1, 2 (B) –1, 1

(C) 2, 1 (D) –2, 1

Q.22 The line $x/a + y/b = 1$ touches the curve $y = be^{-x/a}$ at the point-

(A) (0, a) (B) (0, 0)

(C) (0, b) (D) (b, 0)

Q.23 If the tangent to the curve $f(x) = x^2$ at any point (c, f(c)) is parallel to line joining the points (a, f(a)) and (b, f(b)) on the curve, then a, c, b are in-

(A) H.P. (B) G.P.

(C) A.P. (D) A.P. and G.P. both

Q.24 A tangent to the curve $y = x^2 + 3x$ passes through a point (0, –9) if it is drawn at the point-

(A) (–3, 0) (B) (1, 4)

(C) (0, 0) (D) (–4, 4)

Q.25 The coordinates of the points on the curve $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$, where tangent is inclined an angle $\pi/4$ to the x-axis are-

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

(C) $\left(a\left(\frac{\pi}{2}+1\right), a\right)$ (D) $\left(a, a\left(\frac{\pi}{2}+1\right)\right)$

Q.26 If the area of the triangle included between the axes and any tangent to the curve $xy^n = a^{n+1}$ is constant, then value of n is-

(A) –1 (B) 1 (C) .2 (D) –2

Q.27 The angle made by the tangent to the curve $x = e^t \cos t$, $y = e^t \sin t$ at point $t = \pi/4$ with x– axis is -

(A) 0 (B) $\pi/4$ (C) $\pi/3$ (D) $\pi/2$

Q.28 The points at which the tangent to the curve $y = x^3 + 5$ is perpendicular to the line $x + 3y = 2$ are -

(A) (6, 1), (–1, 4) (B) (6, 1), (4, –1)

(C) (1, 6), (1, 4) (D) (1, 6), (–1, 4)

Q.29 The coordinates of any point P on a curve are represented by $x = \frac{1}{2}t^2$, $y = \frac{1}{3}t^3$, where t is a parameter, then equation of tangent to the curve at P is-

(A) $6tx - 6y = t^3$ (B) $4tx + 3y = t^3$

(C) $3tx + 2y = t^3$ (D) $3tx + y = t^3$

Q.30 The set of points where the tangent to the curve $y^3 - 3xy + 2 = 0$ is horizontal is-

(A) {(1, 1)} (B) {(0, 0)}

(C) {(0, 1)} (D) ϕ

ANSWER KEY

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.	B	A	B	B	C	B	B	A	D	D
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	B	A	A	C	B	B	A	C	A	C
Que.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans.	B	C	C	A	C	B	D	D	A	D