6. If $xy + x^2 = 6$, then the value of $\frac{dy}{dx}$ at $x = -1$ is

(A) -7 (B) -2 (C) 0 (D) 1 (E) 3

Ans

25. If y is a differentiable function of x, then the slope of the tangent to the curve $xy - 2y + 4y^2 = 6$ at the point where $y = 1$ is

(A) $\frac{1}{12}$ (B) $-\frac{1}{10}$ (C) $-\frac{1}{6}$ (D) $\frac{1}{4}$ (E) $-\frac{5}{6}$

Ans $\square$

9. If $x + 2xy - y^2 = 2$, then at the point $(1, 1)$, $\frac{dy}{dx}$ is

$1 + 2x\frac{dy}{dx} + 2y - 2y\frac{dy}{dx} = 0$

$\frac{dy}{dx} = \frac{-1-dy}{2x-2y} = \frac{-1-2}{2-2}$

(A) $\frac{3}{2}$ (B) $\frac{1}{2}$ (C) 0 (D) $-\frac{3}{2}$ (E) nonexistent

5. Consider the curve $x + xy + 2y^2 = 6$. The slope of the line tangent to the curve at the point (2,1) is

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

(B) $\frac{1}{3}$

(C) $-\frac{1}{3}$

(D) $-\frac{1}{5}$

(E) $-\frac{3}{4}$

Ans

15. The slope of the tangent line to the curve $2xy + \sin y = 2\pi$ at the point where $y = \pi$ is

(A) -2π

(B) $-\pi$

(C) 0

(D) π

(E) 2π

Ans

24. The slope of the line tangent to the graph of $\ln(x + y) = x^2$ at the point where $x = 1$ is

(A) 0 (B) 1 (C) $e - 1$ (D) $2e - 1$ (E) $e - 2$

Ans

8. If $\cos x = e^y$ and $0 < x < \frac{\pi}{2}$, what is $\frac{dy}{dx}$ in terms of x ?

(A) $-\tan x$

(B) $-\cot x$

(C) $\cot x$

(D) $\tan x$

(E) $\csc x$

Ans

4. If $y^2 - 3x = 7$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{-6}{7y^3}$ (B) $\frac{-3}{y^3}$ (C) 3 (D) $\frac{3}{2y}$ (E) $\frac{-9}{4y^3}$

Ans

28. At time t a particle moving along the x-axis is at position x. The relationship between x and t is given by: $tx = x^2 + 8$. At $x = 2$ the velocity of the particle is

(A) 1

(B) 2

(C) 6

(D) –2

(E) –1

Ans

#6 Consider the curve given by $xy^2 - x^3y = 6$.

(a) Show that $\frac{dy}{dx} = \frac{3x^2y - y^2}{2xy - x^3}$.

(b) Find all points on the curve whose x-coordinate is 1, and write an equation for the tangent line at each of these points.

(c) Find the x-coordinate of each point on the curve where the tangent line is vertical.

(a) $x \cdot 2y\frac{dy}{dx} + y^2 - \left(3x^2y + x^3\frac{dy}{dx}\right) = 0$ $2xy\frac{dy}{dx} + y^2 - 3x^2y - x^3\frac{dy}{dx} = 0$