

Question 1 Indefinite Integral

$$\int 7xe^{3x^2} dx =$$

- (A) $\frac{1}{42}e^{3x^2} + C$
- (B) $\frac{6}{7}e^{3x^2} + C$
- (C) $\frac{7}{6}e^{3x^2} + C$
- (D) $7e^{3x^2} + C$
- (E) $42e^{3x^2} + C$

Question 2: Tangent Line

Find the equation of the tangent line to $9x^2 + 16y^2 = 52$ through $(2, -1)$.

- (A) $-9x + 8y - 26 = 0$
- (B) $9x - 8y - 26 = 0$
- (C) $9x - 8y - 106 = 0$
- (D) $8x + 9y - 17 = 0$
- (E) $9x + 16y - 2 = 0$

Question 3: position/velocity/acceleration

A particle's position is given by $s = t^3 - 6t^2 + 9t$. What is its acceleration at time $t = 4$?

- (A) 0
- (B) 9
- (C) -9
- (D) -12
- (E) 12

Question 4: Derivative of an exponential function

If $f(x) = 3^{\pi x}$ then $f'(x) =$

(A) $\frac{3^{\pi x}}{\pi \ln 3}$

(B) $\frac{3^{\pi x}}{\ln 3}$

(C) $\frac{3^{\pi x}}{\pi}$

(D) $\pi(3^{\pi x - 1})$

(E) $\pi \ln 3(3^{\pi x})$

Question 5: Average Value of a function

The average value of $f(x) = \frac{1}{x}$ from $x = 1$ to $x = e$ is

(A) $\frac{1}{e+1}$

(B) $\frac{1}{1-e}$

(C) $e-1$

(D) $1 - \frac{1}{e^2}$

(E) $\frac{1}{e-1}$