

Problem	Section Name
1. Find $\lim_{x \rightarrow \infty} 3xe^{-3x}$ (A) $\frac{1}{3}$ (B) 3 (C) -1 (D) 1 (E) 0	
2. $\int x^2 \sin(3x^3 + 2) dx$ (A) $-9 \cos(3x^3 + 2) + C$ (B) $-\cos(3x^3 + 2) + C$ (C) $-\frac{\cos(3x^3+2)}{9} + C$ (D) $\frac{\cos(3x^3+2)}{9} + C$ (E) $9 \cos(3x^3 + 2) + C$	
3. Find $\frac{dy}{dx}$ if $y = \log_3(2x^3 + 4x^2)$ (A) $\frac{6x^2+8x}{(x^2+2x)\ln 3}$ (B) $\frac{3x+4}{(2x^3+4x^2)\ln 3}$ (C) $\frac{3x+4}{(x^2+2x)\ln 3}$ (D) $\frac{3x+4}{3\ln(x^2+2x)}$ (E) $\frac{6x^2+8x}{(3x^3+2x^2)\ln 3}$	
4. Verify whether $f(x) = 3x^2 - 12x + 1$ satisfies Rolle's Theorem on the interval $[0, 4]$ and find all the numbers c that satisfy $f'(c) = 0$. (A) $c = 0$ (B) $c = 1$ (C) $c = 2$ (D) $c = 4$ (E) No such value exists	
5. $\int \frac{\ln^3 x}{x} dx =$ (A) $\frac{\ln^3 x}{3} + C$ (B) $\frac{\ln^4 x}{4} + C$ (C) $\frac{\ln^5 x}{5} + C$ (D) $\ln^3 x + C$ (E) $\ln^4 x + C$	

6. $\lim_{x \rightarrow \infty} \frac{5x^2 - 3x + 1}{4x^2 + 2x + 5}$
(A) 0 (B) $\frac{4}{5}$ (C) $\frac{3}{11}$ (D) $\frac{5}{4}$ (E) ∞

*7. Which point on the curve $y = 5x^3 - 12x^2 - 12x + 64$ has a tangent line parallel to $y = 3$?
(A) $(0, -2)$ (B) $(2, 32)$ (C) $(\frac{2}{5}, 12)$ (D) $(-2, \frac{288}{25})$ (E) $(\frac{2}{5}, \frac{256}{25})$

*8. Find the distance traveled in the first four seconds, for a particle whose velocity is given by $v(t) = 7e^{-t^2}$, where t represents time.
(A) 0.976 (B) 6.204 (C) 6.359 (D) 12.720 (E) 7.000

*9. Find two non-negative numbers x and y whose sum is 100 and for which x^2y is a maximum.
(A) $x = 33.333$ and $y = 33.333$ (B) $x = 50$ and $y = 50$ (C) $x = 33.333$ and $y = 66.667$
(D) $x = 100$ and $y = 0$ (E) $x = 66.667$ and $y = 33.333$