

Problem	Section Name
<p>1. A side of a cube is measured to be 10 cm. Estimate the change in surface area of the cube when the side shrinks to 9.8 cm. (A) $+2.4 \text{ cm}^2$ (B) -2.4 cm^2 (C) -120 cm^2 (D) $+24 \text{ cm}^2$ (E) -24 cm^2</p>	
<p>2. $\frac{d}{dx} \left(\frac{x^3 - 4x^2 + 3x}{x^2 + 4x - 21} \right) =$ (A) $\frac{x^2 - x}{x + 7}$ (B) $\frac{x - 1}{x - 7}$ (C) $\frac{x^2 - 14x + 7}{(x - 7)^2}$ (D) $\frac{2x^2 + 13x - 7}{(x + 7)^2}$ (E) $\frac{x^2 + 14x - 7}{(x + 7)^2}$</p>	
<p>3. Find $\lim_{x \rightarrow 0} \frac{2x^3 - 3 \sin x}{x^4}$ (A) -1 (B) $\frac{1}{2}$ (C) 0 (D) 1 (E) <i>Non existent</i></p>	
<p>4. If $f(x) = e^{3x}$, then $f''(\ln 3) =$ (A) 9 (B) 27 (C) 81 (D) 243 (E) 729</p>	

5. $\int_0^4 x^3 dx =$

- (A) 16 (B) 32 (C) 48 (D) 56 (E) 64

*6. If the position of a particle is given by $x(t) = 2t^3 - 5t^2 + 4t + 6$, where $t > 0$. What is the distance traveled by the particle from $t = 0$ to $t = 3$?

- (A) $\frac{1}{27}$ (B) $\frac{28}{27}$ (C) 20 (D) 21 (E) $\frac{569}{27}$

*7. The average value of the function $f(x) = \ln^2 x$ on the interval $[2, 4]$ is

- (A) -1.204 (B) 1.204 (C) 2.159 (D) 2.408 (E) 8.636

*8. If $f(x)$ is continuous and differentiable and $f(x) = \begin{cases} ax^4 + 5x, & x \leq 2 \\ bx^2 - 3x, & x > 2 \end{cases}$, then $b =$

- (A) 0.5 (B) 0 (C) 2 (D) 6 (E) There is no value of b

*9. The second derivative of a function f is given by $f''(x) = x \sin x - 2$. How many points of inflection does f have on the interval $(-10, 10)$?

- (A) zero (B) two (C) four (D) six (E) eight