# Eight Embedded Questions for MAC 2233 Final Exam

1. What is the slope of the the line $4x + 7y = 9$?

   (A) $\frac{7}{4}$ (B) $-\frac{7}{4}$ (C) $\frac{4}{7}$ (D) $-\frac{4}{7}$ (E) none of these

2. Let $f(t) = t^4 - 3t^2 + 6t + 6$. Find $f'(t)$.

   (A) $4t^3 - 6t + 12$ (B) $4t^3 - 6t + 6$ (C) $12t^2 - 6$ (D) $12t^2 - 12$ (E) none of these

3. Find $\lim_{x \to 3} \frac{x^2 - 5x + 6}{x - 3}$.

   (A) $-1$ (B) 1 (C) 5 (D) no limit (E) none of these

4. Differentiate the function $y = \frac{x - 1}{x + 1}$.

   (A) $\frac{2}{(x+1)^2}$ (B) $-\frac{2}{(x+1)^2}$ (C) $\frac{2}{(x-1)^2}$ (D) $-\frac{2}{(x-1)^2}$ (E) none of these

5. Compute $\frac{dy}{dx}$ if $y = u^2 - 5u + 4$ and $u = 4x - 5$.

   (A) $2x - 5$ (B) $2u - 5$ (C) $8x - 30$ (D) $32x - 60$ (E) none of these

6. Given $x^2 + x^2y + y^2 = 3$. Find $\frac{dy}{dx}$ by using implicit differentiation.

   (A) $-\frac{2x + 2xy}{x^2 + 2y}$ (B) $\frac{2x + 2xy}{x^2 + 2y}$ (C) $-\frac{x^2 + 2y}{2x + 2xy}$ (D) $\frac{x^2 + 2y}{2x + 2xy}$ (E) none of these

7. Let $P(t)$ be the population (in millions) of a certain city $t$ years after 1970, and suppose that $P(t)$ satisfies the differential equation $P'(t) = 0.05P(t)$ and $P(0) = 3$. Find a formula for $P(t)$.

   (A) $3e^{-0.05t}$ (B) $3e^{0.05t}$ (C) $5e^{-0.03t}$ (D) $5e^{0.03t}$ (E) none of these

8. Set up the definite integral that gives the area of the region bounded by the curves $y = x^2$ and $y = x$.

   (A) $\int_{-1}^{1} (x^2 - x)\, dx$ (B) $\int_{-1}^{1} (x - x^2)\, dx$ (C) $\int_{0}^{1} (x^2 - x)\, dx$

   (D) $\int_{0}^{1} (x - x^2)\, dx$ (E) none of these