

These are questions taken off old math127 exams. They are offered to give you a sense of the types of questions you could see on your final exam. They are by no means intended to be a “sneak peak” at the final exam, rather they are intended to give you a means of practicing on the *types* of questions I will put on the exam.

- If  $f(x) = 3x^9 - 8x$ , then which of the following is equivalent to  $f'(x)$ ?
  - $f'(x) = 27x^8$
  - $f'(x) = 3x^{10} + 8$
  - $f'(x) = 27x^8 - 8$
  - $f'(x) = 3x^8 - 8x$
  
- If  $g(x) = \frac{3}{\sqrt{x}}$ , then which of the following is equivalent to  $g'(x)$ ?
  - $g'(x) = \frac{-3}{2x^{3/2}}$
  - $g'(x) = \frac{-3}{2x^{2/3}}$
  - $g'(x) = \frac{1}{2}x^{1/2}$
  - $g'(x) = \frac{2}{3}x^3$
  
- If  $y = 5^x$ , then which of the following is equivalent to  $\frac{dy}{dx}$ ?
  - $\frac{dy}{dx} = x5^{x-1}$
  - $\frac{dy}{dx} = 5(4^x)$
  - $\frac{dy}{dx} = (\ln 5)(5^x)$
  - $\frac{dy}{dx} = 25^{2x}$
  
- Which of the following is the equation of the tangent line to  $f(x) = 5^x + 3x^2$  at  $x = 3$ ?
  - $y = 102.3x - 3.1$
  - $y = 5.4x + 6.7$
  - $y = 219.2x - 505.5$
  - $y = 125.5x + 338.8$
  
- If  $f(x) = (5x + e^x)^7$ , then which of the following is equivalent to  $f'(x)$ ?
  - $f'(x) = 7(5x + e^x)$
  - $f'(x) = (35 + 7e^x)(5x + e^x)^6$
  - $f'(x) = 7(5x + e^x)^6$
  - $f'(x) = (49 + e^x)^7$
  
- If  $f(x) = e^{2x^4}$ , then which of the following is equivalent to  $f'(x)$ ?
  - $f'(x) = e^x(8x^3)$
  - $f'(x) = e^{8x^3}$
  - $f'(x) = 8x^3$
  - $f'(x) = 8x^3 e^{2x^4}$

7. Which of the following is the equation of the tangent line to  $f(x) = (e^{2x} + 7x^2)^3$  at  $x = 0$ ?
- (A)  $y = 6x + 1$   
 (B)  $y = 15x - 3$   
 (C)  $y = 6x - 1$   
 (D)  $y = x^2 + 15$
8. If  $f(x) = x^3 e^{2x}$ , then which of the following is equivalent to  $f'(x)$ ?
- (A)  $f'(x) = 3x^2 + 2e^{2x}$   
 (B)  $f'(x) = 2e^{2x}x^3 + 3x^2 e^{2x}$   
 (C)  $f'(x) = 2e^{2x}x^3 + e^{2x}$   
 (D)  $f'(x) = 2e^{2x}x^3 + 3x^2$
9. If  $f(x) = \frac{5x^2}{x^3+1}$ , find  $f'(x)$  and evaluate at  $x = 2$ .
- (A) 15  
 (B)  $-\frac{20}{27}$   
 (C) -13  
 (D) 5.25
10. If  $f(t) = \cos(t^2 + 5t)$ , then which of the following is equivalent to  $f'(t)$ ?
- (A)  $f'(t) = -2t \cdot \sin(t^2 + 5t)$   
 (B)  $f'(t) = (2t + 5) \cdot \sin(t^2 + 5t)$   
 (C)  $f'(t) = -(2t + 5) \cdot \sin(t^2 + 5t)$   
 (D)  $f'(t) = \cos(2t + 5)$
11. Suppose  $f(x) = x^5$  and  $g(x) = e^{4x} + \sin(6x)$ . If  $h(x) = f(g(x))$  then which of the following is equivalent to  $h'(x)$ ?
- (A)  $20x^4 e^{4x^5} + 30x^4 \cos(6x^5)$   
 (B)  $5(e^{4x} + \sin(6x))^4 \cdot 4e^{4x} + 6\cos(6x)$   
 (C)  $5(e^{4x} + \sin(6x))^4$   
 (D)  $5(e^{4x} + \sin(6x))^4 \cdot (4e^{4x} + 6\cos(6x))$
12. Which of the following is the second derivative of  $y = \sin(x^2)$ ?
- (A)  $y'' = -4x^2 \sin(x^2) + 2\cos(x^2)$   
 (B)  $y'' = -2x^2 \cos(x^2) - 2\sin(x^2)$   
 (C)  $y'' = -2x \sin(x^2)$   
 (D)  $y'' = -2\cos(x^2)$

13. If  $g(x) = [\ln(3x^2 + 4x - 7)]$  then which of the following is equivalent to  $g'(x)$ ?

(A)  $g'(x) = \ln(3x^2 + 4x - 7)$

(B)  $g'(x) = \frac{\ln(3x^2+4x-7)}{3x^2+4x-7}$

(C)  $g'(x) = \frac{30x+20}{3x^2+4x-7}$

(D)  $g'(x) = \frac{6x+4}{3x^2+4x-7}$

(E)  $g'(x) = \frac{3x^2+4x-7}{6x+6}$

14. If  $f(x) = \cos(4x)$ , then which of the following is equivalent to  $f''(\pi)$ ?

(A) 0

(B) -16

(C) 16

(D) -4

15. If  $f(x) = \sin(2x) \cdot \cos(3x)$ , then which of the following is equivalent to  $f'(x)$ ?

(A)  $f'(x) = 2 \cos(3x) \cdot \cos(2x) - 3 \sin(3x) \cdot \sin(2x)$

(B)  $f'(x) = 3 \sin(2x) \cdot \cos(3x) - 2 \sin(2x) \cdot \cos(3x)$

(C)  $f'(x) = -6 \sin(2x) \cdot \cos(3x)$

(D)  $f'(x) = 2 \sin(2x) \cdot \cos(3x) + 3 \sin(2x) \cdot \cos(3x)$