Last Name: _____

First Name: _____

Student ID: _____

Assignment

Please attatch all work to this assignment. The assignment is due on Tuesday December 7.

For all question circle the letter next to the derivative of f.

1. $f(x) = (x^3+2)^2 + x(2+x)(3x+5) - x^6$

a. $f'(x) = 12x^2 + 22x + 10$

b. $f'(x) = 21x^2 + 22x + 10$

c. $f'(x) = 12x^3 + 57x^2 + 20$

d. $f'(x) = 21x^2 + 16x + 16$

2. $f(x) = (x^3 - 10x + 5)\left(x^2 - \dfrac{5}{x}\right)$

a. $f'(x) = 5x^4 + 30x^2 - \dfrac{25}{x^2}$

b. $f'(x) = (3x^2 - 10)(2x + 5x^{-2})$

c. $f'(x) = 5x^4 - 30x^2 + \dfrac{25}{x^2}$

d. $f'(x) = \dfrac{5}{x^{-4}} - 30x^2 - 25x^{-2}$

3. $f(x) = \dfrac{(3x+1)^3}{(3x+2)^3}$

a. $f'(x) = \dfrac{81x^2 + 54x + 9}{(3x+2)(3x+2)^3}$

b. $f'(x) = \dfrac{9(3x+1)^2}{(3x+2)^3}$

c. $f'(x) = \dfrac{27(3x+1)^2}{(3x+2)^2}$

d. $f'(x) = \dfrac{27(3x+1)^3}{(3x+2)^3}$

4. $f(t) = \dfrac{(5t^2+4)(2t)}{\sqrt[3]{t^4}}$

a. $f'(t) = \dfrac{10t^3+8t}{(t^{4/3})^2}$

b. $f'(t) = \dfrac{10t^2+4}{t^{-1}/2}$

c. $f'(t) = \dfrac{(30t^{10/3}+8t^{7/3}) - (\frac{40}{30}t^{10/3}+16t^{4/3})}{\sqrt[3]{t^4}}$

d. $f'(t) = \dfrac{50t^2-8}{3t^{4/3}}$

5. $f(x) = \dfrac{x^2+5x}{\sqrt{x^4+1}}$

a. $f'(x) = \dfrac{(2x+5)(x^4+1)^{1/2} - 2x^3(x^2+5x)}{(x^4+1)}$

b. $f'(x) = \dfrac{(2x+5)(x^4+1) - (x^2+5x)4x^3)}{2(x^4+1)^{1/2}(x^4+1)}$

c. $f'(x) = \dfrac{2(2x+5)(x^4+1) - 4x^3(x^2+5x)}{2(x^4+1)^{3/4}}$

d. $f'(x) = \dfrac{-5x^4+2x+5}{x^4+1}$

6. $f(x) = \dfrac{(x+3)^4}{(x^2+5)^{1/2}}$

a. $f'(x) = \dfrac{4(x+3)^3(x^2+5)^{1/2} - \left[(x+3)^4 \cdot \frac{(x^2+5)^{1/2}}{2} \cdot (2x)\right]}{(x^2+5)}$

b. $f'(x) = \dfrac{(x+3)^3(3x^2-3x+20)}{(x^2+5)^{3/2}}$

c. $f'(x) = \dfrac{(x+3)^3(3x+10)(x+2)}{(x^2+5)^{1/2}(x^2+5)}$

d. $f'(x) = \dfrac{4(x+3)^3(x^2+5)^{1/2} - \left[(x+3)^4 \cdot \frac{1}{2(x^2+5)^{1/2}} \cdot (2x)\right]}{(x^2+5)^{1/2}}$

7. $f(x) = \dfrac{(3x^4+4x^3-7)^5}{(x^4+6x^2-6x)^8}$

a. $f'(x) = \dfrac{(x^4+6x^2-6x)^8 \cdot 5(3x^4+4x^3-7)^4 \cdot (12x^3+12x^2) - (3x^4+4x^3-7)^5 \cdot 8(x^4+6x^2-6x)^7 \cdot (4x^3+12x-6)}{(x^4+6x^2-6x)^{16}}$

b. $f'(x) = \dfrac{(x^4+6x^2-6x)^8 - 5(3x^4+4x^3-7)^4 \cdot (12x^3+12x^2) - (3x^4+4x^3-7)^5 - 8(x^4+6x^2-6x)^7 \cdot (4x^3+12x-6)}{(x^4+6x^2-6x)^{16}}$

c. $f'(x) = \dfrac{(3x^4+4x^3-7)^5 \cdot 8(x^4+6x^2-6x)^7 \cdot (4x^3+12x-6) - (x^4+6x^2-6x)^8 \cdot 5(3x^4+4x^3-7)^4 \cdot (12x^3+12x^2)}{(x^4+6x^2-6x)^{16}}$

d. $f'(x) = \dfrac{(x^4+6x^2-6x)^8 \cdot 5(3x^4+4x^3-7)^4 \cdot (12x^3+12x^2) - (3x^4+4x^3-7)^5 \cdot 8(x^4+6x^2-6x)^7 \cdot (4x^3+12x-6)}{(x^4+6x^2-6x)^{64}}$

8. $f(x) = \dfrac{5x^2-\pi^3}{\sqrt{2x^3}}$

a. $f'(x) = \dfrac{10x}{2x^3} - \dfrac{(5x^2-\pi^3)(6x^2)}{(4x^3)^3/2}$

b. $f'(x) = \dfrac{10x}{2x^3} - \dfrac{(5x^2-\pi^3)(6x^2)}{2(2x^3)^3/2}$

c. $f'(x) = \dfrac{5x^2+3\pi^3}{2^{3/2}x^{5/2}}$

d. $f'(x) = \dfrac{5x}{x^3} - \dfrac{(5x^2-\pi^3)(6x^2)}{2(2x^3)^3/2}$

9. $f(x) = \dfrac{\sqrt{5x^2+4x+8}}{x^2+4}$

a. $f'(x) = \dfrac{32x^2+16}{(5x^2+4x+8)^{1/2}(x^2+4)^2}$

b. $f'(x) = \dfrac{(10x+4)(x^2+4) - 4x(5x^2+4x+8)}{2(5x^2+4x+8)^{1/2}}$

c. $f'(x) = \dfrac{-10x^3-12x^2+8x+16}{2(5x^2+4x+8)^{1/2}(x^2+4)^2}$

d. $f'(x) = \dfrac{(-10x^3-12x^2+8x+16)(x^2+4)^2}{2(5x^2+4x+8)^{1/2}}$

10. $f(x) = \dfrac{(x^2+7)(2x)}{x}$

a. $f'(x) = 4x^2 - 2$

b. $f'(x) = 2x^3$

c. $f'(x) = 4x^{-2}$

d. $f'(x) = 4x$

11. $f(x) = \dfrac{(5x-1)(2x^2) - (4x^2-6)}{(x+1)^2}$

a. $f'(x) = \dfrac{10x^3 + 30x^2 - 12x - 12}{(x+1)^4}$

b. $f'(x) = \dfrac{2(x+1)^3 - 10x^3 + 36x^2 - 12x - 6}{(x+1)^4}$

c. $f'(x) = \dfrac{-10x^3 + 36x^2 - 12x - 4}{x+1}$

d. $f'(x) = \dfrac{10x^3 + 30x^2 - 12x - 12}{(x+1)^3}$

12. $f(x) = \left[\dfrac{(x-7)(x+3)}{x^2}\right]^5$

a. $f'(x) = 5\left[\dfrac{(x-7)(x+3)}{x^2}\right]^4 \cdot \dfrac{-2x^2+8x}{x^4}$

b. $f'(x) = \dfrac{10x(x+3)^4(x-7)^4(2x+21)}{x^{12}}$

c. $f'(x) = \left[\dfrac{\frac{d}{dx}(x-7)(x+3)}{x^2}\right]^5$

d. $f'(x) = 5\left[\dfrac{-2x^2+8x}{x^4}\right]^4 \dfrac{4x^5 - 24x^4}{x^8}$

13. $f(x) = 6x^2 - 8x^2 - \dfrac{1}{x}$

a. $f'(x) = \dfrac{12x^3 - 16x^3 + 1}{x^2}$

b. $f'(x) = \dfrac{-4x^3 - 1}{x^2}$

c. $f'(x) = \dfrac{4x^3 + 1}{x^2}$

d. $f'(x) = \dfrac{-4x + 1}{x^2}$

14. $f(x) = \dfrac{(x+5)(x-2)}{(x^2-1)}$

a. $f'(x) = \dfrac{-3(x^2 - 6x + 1)}{x^4 - 2x^2 + 1}$

b. $f'(x) = \dfrac{9x^2 - 22x - 3}{(x^2-1)^2}$

c. $f'(x) = \dfrac{-3(x^2 - 6x + 1)}{x^4 - 1}$

d. $f'(x) = \dfrac{9x^2 - 22x - 3}{x^4 - 1}$