

Homework assignment Week 17B (Nº49): Solve all of the problems and submit them in the beginning of our next class. Remember to show all your work. If you find more than one way to solve a particular problem, please label the solutions as A, B, etc. (ex. 13A, 13B, and so on). Each problem is worth a maximum of 10 points, but remember that each correct solution to a problem you come up with will get you the maximum number of points for that problem, so you may receive 40 points for one problem if you have found 4 different correct ways to solve it. TOTAL OF 400 PONTOS.

Differentiate 1-30. Solve 31-35.

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

2. $f(x) = \sqrt{(13x^2 - 5x + 8)}$

3. $f(x) = (1 - 4x - 7x^5)^{30}$

4. $f(x) = (4x + x^{-5})^{\frac{1}{3}}$

5. $f(x) = \left(\frac{8x-x^6}{x^3}\right)^{-\frac{4}{5}}$

6. $f(x) = \sin(5x)$

7. $f(x) = e^{5x^2+7x-13}$

8. $f(x) = 2^{\cot g(3x)}$

9. $f(x) = 3^{\sqrt{tg(x^2)}}$

10. $f(x) = \log_4(4 + \cos x)$

11. $f(x) = \cos^2(x^3)$

12. $f(x) = \ln(\cos^5(3x^4))$

13. $f(x) = \sqrt{\sin(7x + \ln(5x))}$

14. $f(x) = 10(1 + (2 - (6 + 7x^4)^9)^3)^5$

15. $f(x) = 4 \ln(\ln(\ln(\sec x)))$

16. $f(x) = tg^3 \sqrt{\cot g(7x)}$

17. $f(x) = \{tg[\sin(\sqrt{x^2 + 8x})]\}^5$

31. Assume that $h(x) = f(g(x))$, where both f and g are differentiable functions.

If $g(-1) = 2$, $g'(-1) = 3$, and $f'(2) = -4$, what is the value of $h'(-1)$?

32. Assume that $h(x) = (f(x))^3$, where f is a differentiable function. If $f(0) = -\frac{1}{2}$ and $f'(0) = \frac{8}{3}$, determine an equation of the line tangent to h at $x = 0$.

33. Determine a differentiable function $y = f(x)$ which has the properties $f'(x) = \{f(x)\}^2$ and $f(0) = -\frac{1}{2}$.

34. If f and g are differentiable functions such that $f(2) = 3$, $f'(2) = -1$, $f'(3) = 7$, $g(2) = -5$, $g'(2) = 2$, find the following:

a. $(g - f)'(2)$

b. $(fg)'(2)$

c. $\left(\frac{f}{g}\right)'(2)$

d. $(5f + 3g)'(2)$

e. $(f \circ f)'(2)$

f. $\left(\frac{f}{f+g}\right)'(2)$

35. Find the normal to the curve $x = \frac{t}{t+1}$ and $y = \frac{t}{t-1}$ and the point T, where $t = 2$.

18. $f(x) = x \sin\left(\frac{1}{x}\right) + \sqrt[4]{(1-3x)^2 + x^5}$

19. $f(x) = \left(\frac{x+4}{\sqrt{x^2+1}}\right)^3$

20. $f(x) = e^{2x \sin x} 2^{e^x \sin x}$

21. $f(x) = \sqrt{9x + 8\sqrt{(6x)^5 + 4^{3x^2+1}}}$

22. $f(x) = \{sec^2[x tg(secx tgx)]\}$

23. $f(x) = \sin^2(x tg^2(x^3)) + \cos^2(x tg^2(x^3))$

24. $f(x) = x^x$

25. $f(x) = 2x^{\left(\frac{1}{2}-e\right)}$

26. $f(x) = e^{\ln x^2} - 3x^{-7}$

27. $f(x) = \log_5(3x^2 + 4x)$

28. $f(x) = \frac{\frac{1}{x} - \frac{1}{x^2}}{x-1}$

29. $f(x) = \sqrt{\frac{2x+5}{7x-9}}$

30. $f(x) = \frac{(x-1)^3}{x(x+3)^4}$