

Tuesday Math 135 review problems for section F2

These problems are mostly from previous Math 135 finals. Almost any Math 135 final will have problems covering this material.

Computations of derivatives

1. Find $\frac{dy}{dx}$.

a) $y = \frac{2x^2+5}{5x^3+1}$ b) $y = e^{-\sqrt{x^2-1}}$ c) $xy^3 = \cos(7x+5y)$ d) $xe^y = \sin(xy)$ e) $y = x \ln(3x+5)$

f) $2x^3+5x^2y+y^3 = 2$ g) $y = \ln(x^4+3x+1)$ h) $y = \frac{3x^3-1}{3x^4+1}$ i) $y = x^5 \tan(3x)$ j) $y = (4x+3)\sqrt{x^3+7}$

2. Suppose $f(x)$ is a differentiable function satisfying $f'(1) = 3$ and $f'(\frac{\pi}{4}) = -2$. If $g(x) = f(\tan x)$, find $g'(\frac{\pi}{4})$.

3. An equation of the tangent line to $y = f(x)$ when $x = 1$ is known to be $2x + y + 3 = 0$. Find $f(1)$ and $f'(1)$.

4. Suppose U is a differentiable function with $U(8) = 5$ and $U'(8) = 3$, and that $V(x) = U(x^3)$. What are $V(2)$ and $V'(2)$? Use this information to write an equation of the tangent line to $y = V(x)$ when $x = 2$.

5. A function is defined implicitly by the equation $x^2 - y^2 - 5xy + x + y = 10$. Find y' in terms of x and y . Find an equation for the line tangent to the graph of this function at the point $(1, 2)$.

Log/exp etc.

1. Find the range of $f(x) = e^{-2x} + e^{3x}$.

2. Find the range of $f(x) = \frac{\ln(x^2+1)}{x^2+1}$.

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