

Math 231 Calculus 1 Fall 14 Sample Midterm 2

(1) Find the derivatives of the following functions

(a) $x^2 e^{-5x^2}$

(b) $\frac{\sqrt{x}}{2 - \sec(3x)}$

(c) x^{4x}

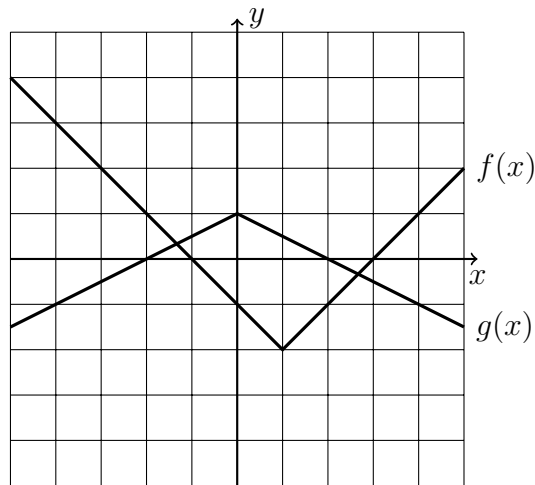
(d) $\ln(\tan(4x))$

(e) $\tan^{-1}(2/\sqrt{x})$

(f) $\cos^{-1}(1 - x)$

(2) Find the second derivatives of the functions above.

(3) The graphs of the functions f and g are shown below.



(a) Let $h(x) = f(x)g(x)$. Find $h'(-3)$.

(b) Let $h(x) = f(g(x))$. Find $h(4)$.

(4) Use implicit differentiation to find the tangent line to the ellipse $4x^2 + 2y^2 = 18$ at the point $(-2, 1)$.

(5) Find $\frac{dy}{dx}$ for the implicit function $xy^2 + 2x^2y^2 = -\sin(xy)$.

(6) You inflate a spherical balloon at a rate of 10cm^3 per second. How fast is the area of the balloon increasing when the radius is 10cm ?

(7) Use a linear approximation to estimate $\sqrt[3]{26}$. What is the percentage error?