

Math 231 Calculus 1 Spring 12 Sample midterm 2

- (1) Find the second derivative of

$$y = \frac{1}{\sqrt{3-2x}}$$

- (2) Compute the derivative $\frac{dy}{dx}$. Do not simplify. Show your work.

(a) $y = \cos(2\sqrt{x})$

(b) $y = \tan^{-1}(e^{-2x})$

(c) $y = \sec(2x) \ln(x^2 + 1)$

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

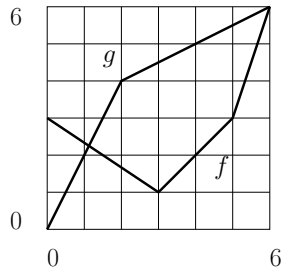


FIGURE 1

- (a) Let $h(x) = f(x)g(x)$. Find $h'(4)$.
(b) Let $h(x) = f(g(x))$. Find $h'(2)$.
- (4) Use implicit differentiation to find the tangent line to the ellipse $4x^2 + y^2 = 8$ at the point $(1, 2)$.
- (5) Find $\frac{dy}{dx}$ for the implicit function.

$$x^2y^3 + 2xy^2 = x + y$$

- (6) A house lies 4 miles from the freeway, on a road perpendicular to the freeway. If you drive on the freeway at 60 mph, how fast is your distance to the house changing when you are one mile past the junction?
- (7) Use a linear approximation to estimate $\sqrt[3]{65}$. What is the percentage error?

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- (8) Find the absolute maxima and minima of $f(x) = x^2 - 4x + 2$ on the interval $[-1, 5]$.