Name: Solutions

Math 105B: Winter 2013
Quiz 5: March 1

Correct answers accompanied by incorrect or incomplete work will not receive full credit. Good Luck!

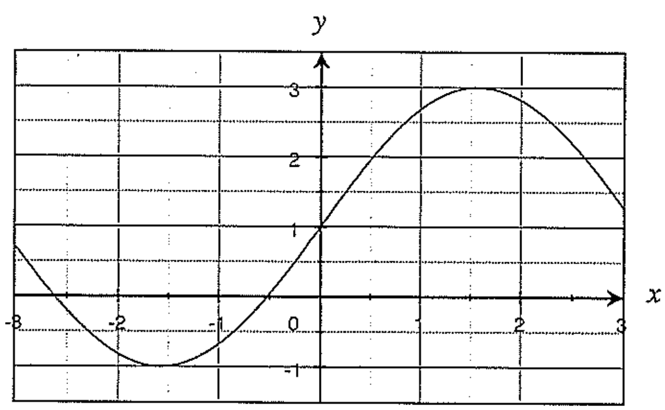
1. Compute the derivative of $h(t) = \dfrac{1-t^2}{\ln t}$.

$$h'(t) = \frac{(1-t^2)' \ln t - (\ln t)' (1-t^2)}{(\ln t)^2}$$

$$h'(t) = \frac{(-2t) \ln t - \frac{1}{t}(1-t^2)}{(\ln t)^2}$$

2. Suppose that

- $f(0) = 3$
- f' is shown below
- $g(x) = 5\sin(x) f(x)$



$$g'(x) = 5 \sin x\, f'(x) + [5 \sin x]' f(x)$$

$$g'(x) = 5 \sin x\, f'(x) + 5 \cos x\, f(x)$$

$$g'(0) = 5 (\sin 0) f'(0) + 5 \cos(0) f(0)$$

$$g'(0) = 5 \cdot 0 \cdot 1 + 5 \cdot 1 \cdot 3$$

$$\boxed{g'(0) = 15}$$

Evaluate $g'(0)$.

3. Determine whether F is an antiderivative of f

$$f(x) = x^2 \sin(2x^3), \qquad F(x) = \cos(2x^3)$$

$F'(x) = -\sin(2x^3)\,(6x^2)$

and $F'(x) \neq f(x)$ so $F(x)$ is not the antiderivative of f

4. Compute the derivative of $p(x) = \left(2^x + \ln(3x^2 - 4x)\right)^{100}$

$$p'(x) = 100\left(2^x + \ln(3x^2-4x)\right)^{99} \cdot \left[2^x + \ln(3x^2-4x)\right]'$$

$$= 100\left(2^x + \ln(3x^2-4x)\right)^{99} \cdot \left[2^x \ln 2 + \frac{1}{3x^2-4x} \cdot (3x^2-4x)'\right]$$

$$= 100\left(2^x + \ln(3x^2-4x)\right)^{99} \left[2^x \ln 2 + \frac{1}{3x^2-4x}(6x-4)\right]$$