Name:
Section:

Show your work or you will not receive full credit

1:

a) Find the derivative of the following function:

$$f(x) = sin(2x)(3x-5)^2$$

b) Find $f(0)$.

---

a) By product and chain rule, we obtain

$$f'(x) = cos(2x)(2)(3x-5)^2 + sin(2x)(2)(3x-5)(3)$$
$$f'(x) = 2cos(2x)(3x-5)^2 + 6sin(2x)(3x-5)$$

b) $f(0) = sin(0)(3(0)-5)^2 = 0$ **(since *sin*(0) = 0)**

2: Bobo the clown left the circus to pursue in math, and tried to do implicit differentiation to solve for y' (i.e. $\frac{dy}{dx}$). However, he made a slight error here. Find the mistake, and find y' correctly. He was given the function $xy^3 + y + 5 = tan(x)$.

$$\begin{aligned} xy^3 + y + 5 &= tan(x) \qquad \textbf{Doing implicit differentiation WRT } x\textbf{, he got} \\ y^3 + 3xy^2 + y' &= sec^2(x) \\ y' &= sec^2(x) - y^3 - 3xy^2 \end{aligned}$$

Hint: the derivative of $tan(x)$ is indeed $sec^2(x)$

The mistake is when the product rule is applied to xy^3. When differentiating the function y^3, we should obtain $3y^2y'$. Thus when differentiating WRT x we have,

$$\begin{aligned} y^3 + 3xy^2y' + y' &= sec^2(x) \\ y'(3xy^2 + 1) &= sec^2(x) - y^3 \\ y' &= \frac{sec^2(x) - y^3}{(3xy^2 + 1)} \end{aligned}$$