Name: _____

Give an answer. Show all work. No calculators are allowed.

1. Compute the derivative of

$$f(x) = x \tan(x^2) + 3(\sin(x))^2$$

2. Is the following function differentiable at 0? Why or why not?

$$f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right) & : x \neq 0 \\ 0 & : x = 0 \end{cases}$$

[Hint: use the definition of differentiability]