MATH 1910 QUIZ 2

20 points

NAME:_____

1. Let $y = f(t) = 2t^3 - 3t^2 - 4$.

8 pts (a) Use the derivative rules to determine the formula for the derivative function f'. You must show your steps for full credit.

$$\begin{aligned} f'(t) &= \frac{d}{dt}\left[2t^3 - 3t^2 - 4\right] \\ &= \frac{d}{dt}\left[2t^3\right] + \frac{d}{dt}\left[-3t^2\right] + \frac{d}{dt}\left[-4\right] \\ &= 2\frac{d}{dt}\left[t^3\right] - 3\frac{d}{dt}\left[t^2\right] + \frac{d}{dt}\left[-4\right] \\ &= 2(3t^2) - 3(2t) + 0 \\ &= 6t^2 - 6t \end{aligned}$$

4 pts (b) Construct the formula for the tangent line to the graph of f at the point $(-1, f(-1))$. You must show your steps for full credit.

Solution. First, we know that $f(-1) = -9$, and we know that $f'(-1) = 12$. Therefore, the formula for the tangent line to the graph of f at $(-1, f(-1))$ is

$$y + 9 = 12\left[t + 1\right] \qquad \text{OR} \qquad y = 12t + 3$$

8 pts 2. Differentiate the function $h(x) = \dfrac{1 - 3x}{1 + 4x}$. You must show your steps for full credit.

$$\text{Let } f(x) = 1 - 3x \qquad \text{AND} \qquad g(x) = 1 + 4x$$

$$f'(x) = -3 \qquad\qquad g'(x) = 4$$

$$\begin{aligned} h'(x) &= \frac{(1 + 4x)(-3) - (1 - 3x)(4)}{(1 + 4x)^2} \\ &= \frac{-3 - 12x - 4 + 12x}{(1 + 4x)^2} \\ &= -\frac{7}{(1 + 4x)^2} \end{aligned}$$