MATH 1910 QUIZ 2

20 points

NAME:_____

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

8 pts (a) Use the Sum Rule, Constant Multiple Rule, and specific derivative formulas to determine the formula for the derivative function $r = f'(t)$. You must show your steps for full credit.

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

4 pts (b) Construct the point-slope 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. The point-slope formula for the tangent line will have the form $y = f'(-1) \cdot [t + 1] + f(-1)$. We know

$$f(-1) = 2(-1)^3 - 3(-1)^2 - 4 = -9 \qquad f'(-1) = 6(-1)^2 - 6(-1) = 12$$

Therefore, the tangent line is given by the formula $y = 12(t + 1) - 9$.

8 pts 2. The diagram below shows the graph of a function $y = f(x)$. Construct a rough sketch for the derivative function $r = f'(x)$ on the grid provided. Your sketch should indicate where the graph of the derivative function is above the x-axis and below the x-axis, as well as input values where $f'(x) = 0$ or $f'(x)$ is undefined.