(6.) (8 pts) [Show all work.]
If \( y \) satisfies the equation
\[
y^2 + 2xy - 3x = 0,
\]
(a) find \( \frac{dy}{dx} \).
By implicit differentiation:
\[
2y \frac{dy}{dx} + 2x \frac{dy}{dx} + 2y - 3 = 0
\]
so
\[
\frac{dy}{dx} \left(2y + 2x\right) = 3 - 2y
\]
\[
\frac{dy}{dx} = \frac{3 - 2y}{2y + 2x}
\]
(b) Based on your answer to part (a), is the graph increasing, decreasing, or neither (i.e., tangent horizontal or undefined) at the point \((1,1)\)? Explain.
\[
\frac{dy}{dx} \bigg|_{(1,1)} = \frac{3 - 2}{3 + 2} = \frac{1}{5}
\]
Thus, the graph is increasing at the point \((1,1)\) because the derivative (or slope) is positive at that point.

(7.) (12 pts) A laboratory study investigating the relationship between diet and weight in adult humans found that the weight, \( W \), of a subject, in pounds, was a function, \( f \), of the daily average number of calories, \( c \), consumed by the subject. In terms of diet and weight, interpret the following statements or expressions. [Be certain to include units and write in sentences.]

(a) \( f(1800) = 155 \)
A person who consumes an average 1800 calories per day weighs 155 lbs.

(b) \( f'(2000) = 0 \)
At 2000 daily average calories, the person's weight is stable -- neither increasing or decreasing.
The person's weight will not change if they consume 2000 calories.

(c) \( f^{-1}(162) \)
The expression \( f^{-1}(162) \) represents the average daily calories that a person weighing 162 lbs consumes.

(d) What are the units of \( f'(c) \)?
The units of \( f'(c) \) are in pounds per calorie.