Math 131 - Quiz 4

Name _____

April 2, 2020

Score _____

Show all work to receive full credit. Supply explanations when necessary. You must work individually on this quiz. This quiz is due no later than April 7.

1. (3 points) Consider the equation $x^2 + 2xy - 3y^2 = -7$ and its graph.

   (a) Use implicit differentiation to find dy/dx.

   (b) Find an equation of the line tangent to the graph the point $(x, y) = (1, 2)$.

   (c) Find an equation of the line normal to the graph at the point $(x, y) = (1, 2)$.

2. (2 points) Let $f(x) = x + \sqrt{x}$. Find $(f^{-1})'(2)$.

3. (3 points) Determine each derivative. Do not simplify, but show all your work.

(a) $\dfrac{d}{dx} \left[x \cot^{-1}(x^2) \right]$

(b) $\dfrac{d}{dt} e^{t^3 \ln t}$

(c) $\dfrac{d}{dr} \dfrac{\ln(9r)}{2^r}$

4. (2 points) Use logarithmic differentiation to find $\dfrac{dy}{dx}$ when $y = x^{\sqrt{x}}$.