Name: _____   _____ / 25

There are 25 points possible on this quiz. *You should be able to complete it without using your notes or textbook – this is practice for your exams!* If you needed to look something up, you should talk to me about questions you might have. **Show all work for full credit** and use some words or sentences to help communicate your answers. **Do not use a calculator.** No aids (book, calculator, etc.) are permitted.

1. **[8 points]** Find the equation of the tangent line to the implicitly defined function

$$x^2 - (y+4)^3 = xy$$

at the point $P = (-4, -6)$ and sketch the tangent line on the graph. Clearly show your work.
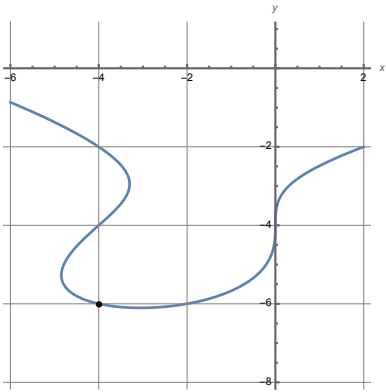
Equation of tangent line: _____

2. **[5 points]** Use **logarithmic differentiation** to find the derivative of

$$f(x) = (x^2 - 4x)^{3x}.$$

3. [12 points] Find the derivative for each function below. Use whatever technique you like. $\boxed{\text{Do not simplify}}$. You do need to use parentheses correctly.

    a. $h(x) = \frac{1}{x} + \ln(x)$

    b. $f(x) = \arcsin(7x)\left(\frac{1}{x^3}\right)$

    c. $y = (2^x + \arctan(x))^5$

    d. $g(x) = \dfrac{x^5 - 2}{e^{7x+6}}$