Unit 2 Quiz 1: Basic Derivatives, including Definition

Name: _____ Date: _____ Period: _____

Show (and properly label) all work. Simplify and circle final answers. Do NOT use a calculator. 5 pts/question.

1. Find the derivative of the following using the formal definition: $h(x) = -12x^2 - 4x + 5$

2. Which of the following is equivalent to $\lim_{\Delta x \to 0} \frac{40(x+\Delta x)^9 - 40x^9}{\Delta x}$?

   a) 0 b) $4x^{10}$ c) $360x^8$ d) $40x^9$ e) nonexistent

3. Find the derivative $y = \sqrt[3]{x} - \frac{1}{\sqrt[5]{x}}$ *(write final answer without negative exponents, but you do not have to combine fractions)*

4. Find the derivative: $f(x) = \pi^2 - 3\pi + 1$

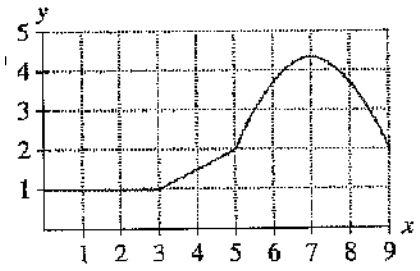
5. Find the derivative (*Hint: distribute first to rewrite the function!*): $y = \sqrt[4]{x}\left(\sqrt{x} + 3\right)$

6. Find the slope of the tangent line to $f(x) = \frac{1}{2}x^2 + 3x + 3$ at the point (-2,-1).

7. Determine whether $y = \sqrt{-5x^2 + 70}$ is increasing or decreasing at $x = 3$. Justify your answer.

8. The line tangent to the graph of $h(x)$ at $(4,8)$ passes through $(6,-3)$. What is $h'(4)$? Explain briefly, both with a description and with a value.

9. Use the graph of $f(x)$ shown to the right. Which is larger, $f'(6)$ OR $f'(6.7)$? Justify your answer.



10. Determine the point(s) at which the graph of the following function has a horizontal tangent: $y = \frac{8}{3}x^3 + 5x^2 - 3x - 1$

<u>EXTRA CREDIT</u> (5 points):

Find the equation of the line that is tangent to $f(x) = x^2 - 4x - 7$ and parallel to $2x + y = 4$.