

CALCULUS JOURNAL
Derivatives

1. In terms of a graph, a derivative represents _____
_____.
2. Explain what each of the following parts of the first definition of the derivative means in terms of a graph.

$$\frac{f(x) - f(a)}{x - a}$$

$$\lim_{x \rightarrow a}$$

3. a) Give 3 examples of notation for the 1st derivative. _____
 b) Give two examples of notation for the 2nd derivative. _____
4. Given any function, how do you find the equation of the tangent line at $x = -2$?
 1) _____
 2) _____
 3) _____
5. (a) What is the difference in how you find the derivative of $f(x) = \csc(\tan^8 3x)$ and $f(x) = \csc x \tan^8 3x$? _____

6. (b) What is the difference in how you find the derivative of $f(x) = \cos^7(3x^8 - 5)$ and $f(x) = \cos(3x^8 - 5)^7$? _____

7. a) The differential dx represents _____.
 b) Differentials are most commonly used to calculate _____
8. a) The graph of a differentiable function does NOT have any _____
 _____.
9. Create a function for each of the following situations that would require the indicated rules in order to find its derivative. You do not have to find the derivative.
 a) Requires a chain rule within a product rule _____
 b) Requires a quotient rule within a chain rule _____
 c) Requires a chain rule with 4 segments in the chain _____
 d) Requires a product rule and a chain rule within a quotient rule _____

