

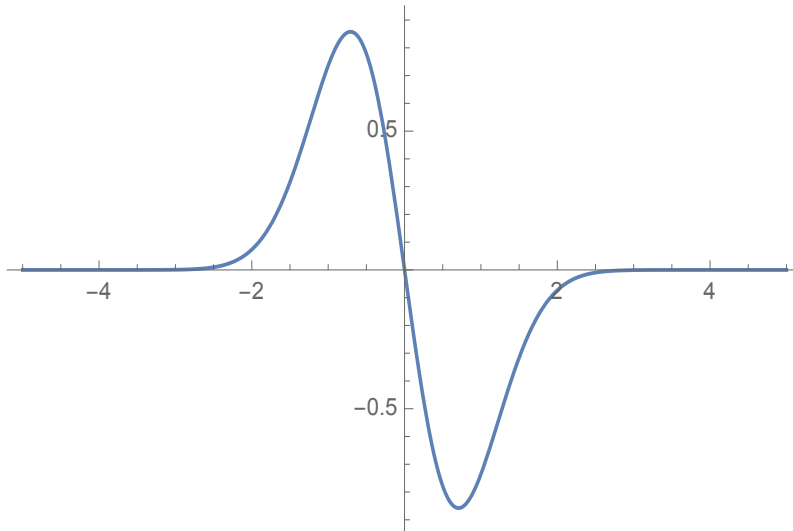
Name:

Math 115 Exam 2

February 14, 2019

1. WRITE YOUR NAME ON THIS TEST!
2. Except where indicated, merely finding the answer to a problem is not enough to receive full credit; you must show how you arrived at that answer.
3. Unless indicated, DO NOT convert irrational numbers such as $\sqrt{3}$ or π into decimal approximations; just leave them as they are.
4. If you have a question, raise your hand or come up and ask me.

1) (8 points) Below is the graph of a function f . Sketch the graph of f' .



2) Let $f(x) = -7x^5 + 6x^4 - 2x^3 + 5x + 13$.

a) (6 points) Using the definition of the derivative, express the slope of the tangent line to the graph of f at $x = 1$ as a limit BUT DO NOT COMPUTE THE LIMIT.

b) (9 points) Obtain the equation of the tangent line at $x = 1$ to the graph of f , using any method at your disposal other than merely your calculator.

3) Calculate f' for the following functions.

a) (7 points) $g(x) = \frac{7 - 3x}{8x + 9}$.

b) (10 points) $f(x) = (2x + 5)\sqrt{x^4 + 1}$.

4) Compute the following limits.

a) (10 points) $\lim_{\theta \rightarrow 0^+} \frac{\sin^2(9\sqrt{\theta})}{2\theta}$

b) (10 points) $\lim_{x \rightarrow 2} \frac{\sqrt[3]{5x^2 + 7} - 3}{x - 2}$

BONUS: (10 points) For ALL odd differentiable functions f , show that f' is even.