

Math 1a – Quiz 5

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1. (4 points) For each of the two graphs below, sketch the graph of the derivative f' .

2. (4 points) Compute the derivatives of the following functions. You do not need to simplify your answers.

(a) $z = (w^4 + w^{-4})e^w$

(b) $v(t) = \frac{t^{5/4} + 3}{t^{5/2} - 9}$

3. (3 points) Let $f(x) = |e^x - 1|$.

(a) Sketch the graph of $f(x)$.

(b) For what values of x is $f(x)$ not differentiable? Why?

4. (3 points) Let $f(x) = \begin{cases} x^2 \sin \frac{1}{x} & \text{if } x \neq 0 \\ 1 & \text{if } x = 0 \end{cases}$.

Does $f'(0)$ exist? Justify your answer.

5. (1 point) **True or false:**

Let $f(x)$ be a function that is differentiable for all x . Then

$$\lim_{t \rightarrow 0} \frac{f(x) - f(e^t)}{x - e^t} = f'(0)$$