John Kaminsky

From: John Kaminsky
Sent: Saturday, November 11, 2023 8:54 AM
To: Amanda Rogers
Subject: RE: Questions About Practice Test

Hello Amanda,

The limit definition of the derivative can be written as either $f'(a) = \lim_{x \to a} \frac{f(x)-f(a)}{x-a}$ or $f'(a) = \lim_{h \to 0} \frac{f(a+h)-f(a)}{h}$. They are equivalent. So in both problems, I am recognizing I can transform the limit into a derivative and then use the derivative to solve the problem.

In the first, I do that by rationalizing the denominator to get the x-a denominator I want.

In the second, I transform the limit problem into a derivative problem since it will be easier to solve that way.

Sincerely,
Dr. Kaminsky

From: Amanda Rogers <arogers@eastsideprep.org>
Sent: Friday, November 10, 2023 7:00 PM
To: John Kaminsky <jkaminsky@eastsideprep.org>
Subject: Questions About Practice Test

Hello Dr. Kaminsky,

I hope you are doing well.

I have two questions about how to solve a couple of the challenge problems.

1) For challenge problem 2: How do you know that $f'(a) = \lim_{x \to a} \frac{f(x)-f(a)}{x-a}$? When I tried to find the derivative of $\lim_{x \to a} \frac{f(x)-f(a)}{\sqrt{x}-\sqrt{a}}$, I was not able to make it equal $\lim_{x \to a} \frac{f(x)-f(a)}{x-a}$.
2) For challenge problem 3: How do you know that $\lim_{x \to a} \frac{e^{\sin(x)}-e^{\sin(a)}}{x-a}$ is the derivative of $f(x) = e^{\sin(x)}$ at $a = \pi$?

Thank you so much!

-Amanda