Lab: Using computers to calculate derivative of exp fns

Online editor and compiler: https://replit.com/languages/python3

Code snippet:

import numpy as np

a=np.e

for i in range(5):

 h=(1/10)\*\*i

 lim = (a\*\*h-1)/h

 print(h,lim)

Activity 1:

Part 1: Use

 [*https://www.desmos.com/calculator/kak2bzhnkq*](https://www.desmos.com/calculator/kak2bzhnkq)

to fill in the following table:

|  |  |  |
| --- | --- | --- |
| *x* | *f(x) = exp(x)* | Slope of tangent line at x using desmos with h=.001 |
| 0 |  |  |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

Part 2: *If f(x) = exp(x),* calculate the derivative algebraically and use Python to approximate the associated numeric limit needed to find *f’(x)*.

Activity 2:

Part 1: If *f(x) = ax* where a is constant, calculate the derivative algebraically. There will be a numeric limit we need to solve in order to find *f’(x).*

Part 2: Use python and a calculator to fill in the following table:

|  |  |  |
| --- | --- | --- |
| *a* | $$\lim\_{h\to 0}\frac{a^{h}-1 }{h}$$ | $$ln⁡(a)$$ |
| 10 |  |  |
| 2 |  |  |
| 3 |  |  |
| *e* |  |  |

Part 3: What is the general formula for the derivates of

1. $f\left(x\right)=e^{x}$
2. $f\left(x\right)=a^{x}$

Part 4: Complete the webwork assignment on derivatives of power and exponential functions.