Section 2.2 – Derivative of Sine and Cosine

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

Code snippet:

import numpy as np

import numpy as np

for i in range(5):

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

 lim = np.sin(h)/h

 lim2 = (np.cos(h)-1)/h

 print(h,lim,lim2)

Sum of angle formulas:

$$\sin(\left(a+b\right))=\sin(\left(a\right))\cos(\left(b\right))+\cos(\left(a\right))\sin(\left(b\right))$$

$$\cos(\left(a+b\right))=\cos(\left(a\right))\cos(\left(b\right))-\sin(\left(a\right))\sin(\left(b\right))$$

Activity 1:

Part 1: Together with prof, use

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

to fill in the following table given that *f(x) = sin(x)* and use it to try and guess *f’(x).*

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | *f(x) = sin(x)* | Slope of tangent line to *f* at *x* using desmos with h=.001 | *cos(x)* |
| 0 |  |  |  |
| $$\frac{π}{2}$$ |  |  |  |
| $$π$$ |  |  |  |
| $$\frac{3π}{2}$$ |  |  |  |
| $$2π$$ |  |  |  |

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

Activity 2:

Part 1: Use

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

to fill in the following table given that *f(x) = cos(x)* and use it to try and guess *f’(x).*

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | *f(x) = cos(x)* | Slope of tangent line to *f* at *x* using desmos with h=.001 | *-1\*sin(x)* |
| 0 |  |  |  |
| $$\frac{π}{2}$$ |  |  |  |
| $$π$$ |  |  |  |
| $$\frac{3π}{2}$$ |  |  |  |
| $$2π$$ |  |  |  |

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

Part 3: Practice taking derivatives of sine and cosine functions with the associated Online Assignment in Canvas.