https://tinyurl.com/3w47vrh5

Derivatives of Trig Functions

Lab#5
35 Points

Academic Honesty Statement:

I understand that I may discuss this lab with others if I give them credit in this statement. I also understand that I am required to write my report--that to copy all or part of someone else's report or to allow someone else to copy all or part of my report constitutes plagiarism, which is a serious violation of academic honesty.
I discussed this lab with

I wrote my own report. I did not copy any of this report from anyone else and I did not allow anyone else to copy any of this report.
Signed

In this lab, you will be using MapleLearn. See the link on the Lab Page.

Click on block 1: You should see y = sin(x) graphed in green and the derivative of sin(x) graphed in red.

Question 1: Explain why the graph of the derivative of sin x "makes sense" compared to the graph of sin x. (discuss slopes in general) (1 point)

Question 2: From your knowledge of graphs of trig functions what function is the derivative of sin x? (You will be proving this derivative using the definition in Question 6)

Click on block 2: You should see y = cos(x) graphed in blue and the derivative of cos(x) graphed in purple.

Question 3: From your knowledge of graphs of trig functions what function is the derivative of cos x? (You will be proving this derivative using the definition in Question 7)

Click on each of the blocks 3 through 10 to see their graphs. Match the functions from blocks 3 through 6 with the derivatives from blocks 7 through 10. The graphs should be exactly the same in order to be a match. Fill out the derivatives below.

Question 4: State each derivative: (1 point each)

a. $\frac{d}{dx}\sin x =$

b. $\frac{d}{dx}\cos x =$

c. $\frac{d}{dx}\tan x =$

d. $\frac{d}{dx}\cot x =$

e. $\frac{d}{dx}\sec x =$

f. $\frac{d}{dx}\csc x =$

Question 5: Describe a way that will make it easier for you to remember these derivative formulas. Be as creative as you like. (1 point)

Click on the boxes 11 and 12, and choose evaluate limit for each. Copy and paste these here. You will need these to prove the derivatives of y = sin (x) and y = cos(x) in Questions 6 and 7.

Helpful identities:

$$\boldsymbol{sin(x+h) = sin(x)cos(h) + cos(x)sin(h)}$$

$$\boldsymbol{cos(x+h) = cos(x)cos(h) - sin(x)sin(h)}$$

Question 6: Using the <u>definition of the derivative with limits</u>, Prove $\frac{d}{dx}\sin x$ by hand. (5 points)

Question 7: Using the definition of the derivative with limits, Prove $\frac{d}{dx}\cos x$ by hand (5 points)