Math 135, Calculus 1, Fall 2020

Written Homework 09-18

Directions: Write your solutions neatly and clearly, and submit to Canvas. In these problems, you should show all of your work in complete mathematical "sentences", writing complete English sentences when you explain your logic. You are free (and encouraged!) to work with others, but make sure the solutions you write up your solutions indepedently.

Exercise 1. If you invest x dollars at 6% interest compounded annually, then the amount $A(x)$ of the investedment after one year is $A(x) = 1.06x$.

(a) Find $A \circ A$, $A \circ A \circ A$, and $A \circ A \circ A \circ A$. What do these compositions represent?
(b) Find a formula for the composition of n copies of A.

Exercise 2. The point $P(0.5, 0)$ lies on teh curve $y = \cos(\pi x)$.

(a) If Q is the point $(x, \cos(\pi x))$, use our calculator to find the slope of the secant line PQ (correct to six decimal places) for the following values of x:

    i. 0
    ii. 0.4
    iii. 0.49
    iv. 0.499
    v. 1
    vi. 0.6
    vii. 0.51
    viii. 0.501

(b) Using the results of part (a), guess the value of the slope of the tangent line to the curve at $P(0, 5, 0)$.
(c) Sketch the curve, two of the secant lines, and the tangent line.