BC Calculus **Name**_____

2020 Exam Practice

FR #2 (25 minutes: 15 points)

Set a timer for 25 minutes to complete this problem. You may use your notes, textbooks, or any materials I gave you throughout the year. You are not expected to use a calculator, but you may use one if you would like. You should show all your steps as if you did not have a calculator. I am guessing that the 25-minute problem will be worth 15 points and the 15-minute problem will be worth 10 points for a total of 25 points. The college board has said that the 25-minute problem will be worth 60% and the 15-minute problem will be worth 40%, so that is my best guess at how it may be broken down this year. Please show all appropriate mathematics: no bald answers!

The function $f(x)$ is given by this accumulation function:

$$f(x) = \int_2^x t \cdot e^t dt$$

a) Find all intervals on which $f(x)$ is increasing or decreasing. Give reasons for your answers. [3 points]

b) Find all intervals on which $f(x)$ is concave up and concave down. Give reasons for your answer. [3 points]

c) Find $f(x)$ by completing the definite integral. Show all steps. [3 points]

The function $f(x)$ is given by this accumulation function:

$$f(x) = \int_2^x t \cdot e^t dt$$

d) On the interval [-1,4], find the absolute maximum and absolute minimum values of $f(x)$. Justify your answers. [3 points]

e) Find the equation of the line tangent to $f(x)$ at the point when $x = 2$. Use the equation of the tangent line to approximate the value of $f(4)$. [3 points]