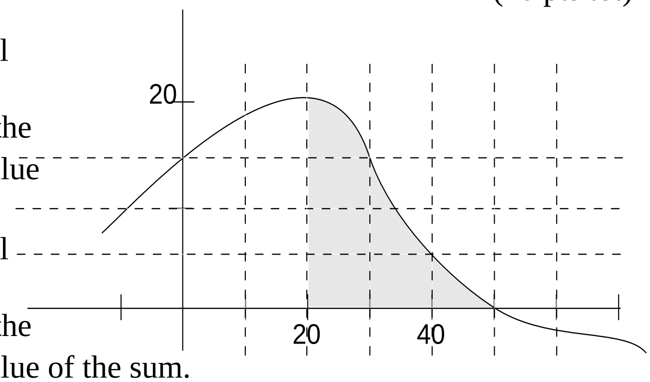
A.P. Calculus
Copy original problem.
Convince *me* that **you** understand the concept!

Name ______________________________

Per __________ Date ____________

Chapters 7 & 8 Exam

I The graph on the right **is the derivative** of $F(x)$ (i.e. This *is* the graph of $F'(x)$.) $F(x)$ is some function which is continuous and differentiable and $F(20)=150$. (40 pts tot)



a) Partition the interval [20, 50] into 3 sections of equal length. Choose the left edge of the section for the sample point and write the approximating sums for the shaded area under the curve $F'(x)$. Compute the value of the sum.

b) Partition the interval [20, 50] into 3 sections of equal length. Choose the right edge of the section for the sample point and write the approximating sums for the shaded area under the curve $F'(x)$. Compute the value of the sum.

c) Let the approximation of the shaded area be the average of your answers to parts a and b. Identify this average by calling it "*A*".

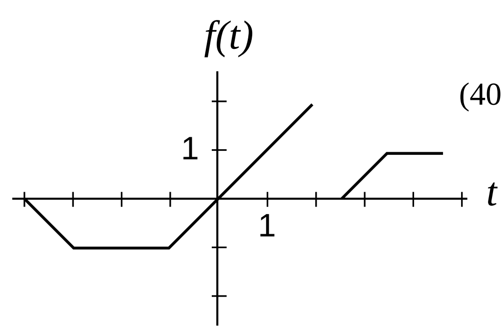
d) For what x value does $F(x)$ have a maximum? Explain!

e) **Using the First FTC**, determine an approximation for that maximum value of $F(x)$. (hint: Write the first FTC down, re-read this problem, look at your work, then work out the answer to this problem.)

II Let $f(x)=\dfrac{1}{x+1}$, $x_i=\dfrac{i}{n}$, $X_i=\dfrac{i-1}{n}$, and $i = 1, 2, \ldots, n$. (20 pts)

Let the points form a partition of the closed interval [0, 1]. Use summation notation to write the corresponding approximating sum. While keeping the sigma notation, simplify completely while removing the letters *f*, *X*, and *x*.

III Let $g(x)=\int_{-1}^{2x} f(t)\,dt$ when given the graph of $y=f(t)$: (40 pts tot)



a) Explain clearly why the domain of $g(x)$ is: $D_g \quad -2\le x\le 1$
Include reasoning how you know there is not a second interval.

b) For what values of x does $g'(x)=1$

c) Determine the coordinates of all extrema and all axis intercepts for the function $g(x)$.

d) Draw $g(x)$.

Extra Credit ------------------------------------ 5 pts ---

Given: $\dfrac{\pi}{2}<x<\pi$. Find $f'(x)$ if $f(x)=\int_0^{\sin x}\sin^{-1}t\ dt$.