NAME (1 pt)
SAMPLE TEST, worth 100 points, Chapter 7

Show all work that leads to your answers. Good luck!

1. (15 pts)

TRUE or FALSE. Circle the correct response. (3 points each)

T F Suppose f is continuous on $\mathbb{R}$ and $F' = f$. Then, $\int_a^b f(x)\,dx = F(b) - F(a)$.

T F If f is continuous on $\mathbb{R}$, then $\int_a^b f(x)\,dx = \int_a^b f(t)\,dt$.

T F If $\int_a^b f(x)\,dx = 0$, then $f(x) = 0$ on $[a, b]$.

T F If f is continuous, then $\int_a^b f(x)\,dx$ is a function of x.

T F For all functions f that are defined at a, if $x \to a$, then $f(x) \to f(a)$.

2. (8 pts)

Find the area bounded by the graph of $\ln x$ and the x-axis on the interval $[e, e^2]$. Make a sketch that shows the area you are finding.

3. (12 pts)

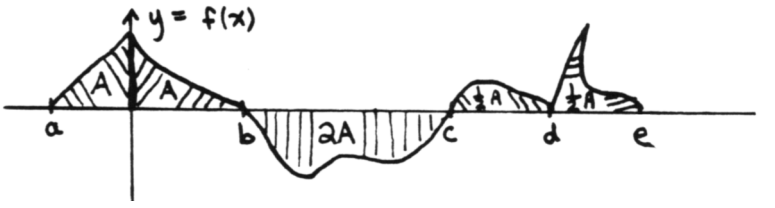
Refer to the sketch below, where certain areas are labeled. Evaluate the following integrals, if possible. If not possible with the given information, so state.

(3 pts) $\int_a^b f(t)\,dt$

(3 pts) $\int_b^0 f(x)\,dx$

(3 pts) $\int_a^c f(u)\,du$

(3 pts) Let $z \in (b, c)$, and find $\int_b^z f(x)\,dx + \int_z^c f(x)\,dx$



4. (5 pts) In a few words, discuss why the notation $\int_a^b f(x)\,dx$ is used for definite integrals.

5. (20 pts) Evaluate the following integrals. Use any appropriate techniques. Be sure to write complete sentences.

(5 pts) $\displaystyle\int_{-1}^{0} e^{3x}\,dx$

(5 pts) $\displaystyle\int_{0}^{1} (2x-1)^7\,dx$

(5 pts) $\displaystyle\int \frac{2t}{t-1}\,dt$

(5 pts) $\displaystyle\int \frac{1}{t\ln t}\,dt$

6. (8 pts) Find the area in the first quadrant, bounded by $y = x^2$ and $y = x^4$. Sketch the area that you are finding. Show all work that leads to your answer.

7. (13 pts)

(5 pts) Give two different partitions of the interval $[0, 1]$, each with norm $\frac{1}{3}$.

(8 pts) Find a Riemann sum for $f(x) = x^2$ corresponding to the partition $\{0, 1, 2\}$ of the interval $[0, 2]$. (There are many correct answers possible.) What is your Riemann sum an approximation to?

8. (18 pts)

Revolve the area shaded below around the y axis.

(8 pts) Find the volume of the resulting solid of revolution by using SHELLS.

(10 pts) Find the volume of the resulting solid of revolution by using horizontal DISKS.