

Name(s): _____

Directions: You are encouraged to work together. If your group turns in (one copy of) the solutions at the end of today's class, each member of the group will receive up to five points. The points will be part of a fifteen point in class "quiz" taken over the next couple of days. Points will be taken off for answers without supporting work.

1. Estimate $\int_{-1}^1 1-x^2 dx$ using the Left-hand sum with four rectangles. Be sure to include the associated picture as well.

2. Evaluate the limit by identifying it as a definite integral.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \ln \left(\sqrt[n]{1 + \frac{k}{n}} \right) \quad \text{Hint: } \ln \left(\sqrt[n]{1 + \frac{k}{n}} \right) = \frac{1}{n} \ln \left(1 + \frac{k}{n} \right)$$

3. Solve the initial value problem $x \frac{dy}{dx} = \sqrt{x^2 - 4}$, $x \geq 2$, $y(2) = 0$

4. Find the following derivatives:

(a) $\frac{d}{dx} \left(\int_x^0 e^t dt \right)$

(b) $\frac{d}{dx} \left(\int_{\sqrt{x}}^{x^2} \sin(2s) ds \right)$

5. Find the average value of the function $f(t) = t^2 \ln t$ over the interval $1 \leq t \leq e$.

6. Determine definite integrals (but do not evaluate them) that represent the volume of the solid of revolution formed by rotating the region bounded by $y = \sqrt{4x}$, $y = 2x^2$, $x = 0$, and $x = 1$ (You should sketch the region)

(a) about the x -axis.

(b) about the y -axis.

(c) about the line $y = -2$.