

Name _____

- You have 20 minutes
- No calculators
- Show sufficient work

1. (3 points) Find the average value of the function $f(x) = \frac{12}{4x^2 + 1}$ on the interval $[0, 1/2]$. Simplify your answer.

2. Let \mathbf{R} be the finite region bounded by the graphs determined by the following equations.

$$y = 5 \ln(x)$$

$$x = e^2$$

$$y = 15$$

Set up, but do not evaluate, definite integrals which represent the volumes of the following solids.

- (a) (3 points) The volume of the solid with base \mathbf{R} for which the cross-sections perpendicular to the x -axis are semicircles.

(b) The volume of the solid formed when \mathbf{R} is revolved around the line $y = 18$. Set up the integrals for this volume in the following two ways.

i. (2 points) Integrate with respect to x .

ii. (2 points) Integrate with respect to y . (Use different integrands in parts *i* and *ii*.)