

Name _____

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

1. (3 points) Find the average value of the function $f(x) = \frac{240}{\sqrt{8x+9}}$ on the interval $[-1, 2]$. Simplify your answer.

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

$$y = \frac{100}{x^2}$$

$$y = 25$$

$$x = 5$$

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 equilateral triangles. Hint: If S represents the length of each side in an equilateral triangle, then its area is equal to $\frac{\sqrt{3}}{4}S^2$.

(b) The volume of the solid formed when \mathbf{R} is revolved around the line $x = 9$. 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*.)