

Name _____

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

1. (3 points) Find the average value of $f(x) = \frac{12x + 18}{x^2 + 3x + 10}$ on the interval $[1, 3]$. Write your answer in simplified form.

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

$$y = 2x$$

$$y = -3x + 60$$

$$y = 0$$

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 y -axis are squares.

(b) The volume of the solid formed when \mathbf{R} is revolved around the line $x = -5$. 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*.)