

Name \_\_\_\_\_

- You have 15 minutes
- No calculators
- Show sufficient work

1. (4 points) Determine the average value of the function  $f(x) = \frac{10x}{e^{x^2}}$  on the interval  $[1, 3]$ .

2. (3 points each) Let  $\mathbf{R}$  be the finite region bounded by  $x = y^2$  and  $x = 20 - y$ . In the following manner set up, but do not evaluate, definite integrals which represent the volume of the solid obtained when  $\mathbf{R}$  is revolved around the horizontal line  $y = 8$ .

(a) Integrate with respect to  $x$ .

(b) Integrate with respect to  $y$ . (The integrands in parts (a) and (b) should be different.)