

Name _____

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

1. (3 points) Find the average value of the function $f(x) = \frac{20x}{(x^2 + 1)^2}$ on the interval $[1, 3]$.
Simplify your answer.

2. Let \mathbf{R} be the finite region bounded by the graphs of $y = \sqrt{x - 3}$, $y = x - 5$ and $y = 0$. 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 $y = -1$. Determine 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 .)