Math 112
Chapter 6: Bonus questions

1. Determine the area of the region bounded by the inequalities $x - 2y^2 \geq 0$ and $1 - x - |y| \geq 0$.
2. Find the number b so that the line $y = b$ divides the region bounded by the curves $y = x^2$ and $y = 4$ into two equal areas.
3. For what values of m do the line $y = mx$ and the curve $y = \dfrac{x}{x^2 + 1}$ enclose a region? Find the area of that region in terms of m.
4. Describe the volume represented by the integral $\displaystyle\int_1^3 2\pi y \ln y \, dy$.
5. Suppose g is a function that is increasing and concave up on $[a, b]$.
   Which is greater, $\bar{g}$ or $g\left(\dfrac{a+b}{2}\right)$? Why? *Hint: Draw a picture.*