In-Class Assignment 2: The Area Between Two Curves

MATH 142

Directions: Work neatly on a separate sheet of paper. Your group will hand in one write-up with everyone's name on it. **DO NOT** fold the corner over to hold everything together!

Work together on each problem; do not delegate different problems to different people.

1. Let $f(x) = x^2$ and $g(x) = 8 - x^2$
   (a) Sketch graphs of f and g on the same set of axes with x ranging from -3 to 3.
   (b) Determine the points of intersection of the two graphs.
   (c) On your graphs, sketch four rectangles approximating the area between the two curves. Use right endpoints of the subintervals for your approximations.
   (d) What is the height of each rectangle? List all four heights. Be sure to show *how* you computed each height.
   (e) Write a Riemann sum for the approximation using n rectangles.
   (f) Write the corresponding integral for the area between the two curves.
   (g) Use your integral to compute the area between the two curves.
   (h) Letting A be the area under f, B be the area under g, and C be the area between f and g, write an equation relating A, B, and C, and state the area axiom that applies.
2. Find the area of the region described.
   (a) Between $f(x) = e^{3x}$ and $f(x) = e^{2x}$ to the left of the line $x = 1$.
   (b) Between $y = \sqrt{2x+3}$ and $y = \dfrac{2x+3}{2}$.
   (c) Between $x = 2y^2$ and $x = 4 + y^2$.
3. Integrate.
   (a) $\displaystyle\int_1^e \frac{\ln x}{x}\,dx$
   (b) $\displaystyle\int \frac{1}{1-2\sqrt{x}}\,dx$