In-Class Assignment 3: Volumes of Solids of Revolution

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. Set up an integral to find the volume of each object described. Integrate if directed.
   
   (a) \( y = \tan^3 x, y = 1, x = 0 \) about \( y = 1 \). DO NOT integrate.
   
   (b) \( y = \frac{1}{1 + x^2}, y = 0, x = 0, x = 2 \) about \( x = 2 \). DO NOT integrate.
   
   (c) \( y = 4x - x^2, y = 3 \) about \( x = 1 \). Integrate.
   
   (d) A solid with a circular base and square vertical cross-sections.
   
   (e) \( x = 2\sqrt{y}, x = 0, x = 9 \) about the \( y \)-axis.

2. Find the volume of a square-based pyramid with side length \( b \) and height \( h \). [Hint: use similar triangles to determine the areas of cross-sections.]

3. Stewart 6E, Section 6.3, Number 46 (page 369). (See screen.)