CALCULUS II ASSIGNMENT 12

DUE MAY 2, 2019

1. Use the method of cylindrical shells to find the volume of the following solids rotation:

(i) Spin the region bound by $y = \sqrt[3]{x}$, $y = 0$, $x = 1$ around the y-axis;
(ii) Twist the area bound by $x = 1 + (y-2)^2$ and $x = 2$ about the x-axis;
(iii) Rotate the region between $y = x^2$ and $y = 6x - 2x^2$ around the y-axis;
(iv) Twirl the space between $y = \sqrt{x}$ and $x = 2y$ about the line $x = 5$.

2. Use both methods discussed in class to compute the volume of the solid obtained by spinning the region bound by the $y = \tan(x)$, $x = \pi/4$, and $y = 0$ around the y-axis.

3. Find the length of the following curve segments:

(i) $y = x - \log(x)$ between $1 \leq x \leq 4$;
(ii) $y = \frac{x^3}{3} - \frac{1}{4x}$ between $1 \leq x \leq 2$;
(iii) $y = \log(\sec(x))$ between $0 \leq x \leq \pi/4$;
(iv) $y = \frac{1}{2}x^2$ between $-1 \leq x \leq 1$.

4. Find the length of the curve defined by $x^{2/3} + y^{2/3} = 1$. In setting up you integral, it may be helpful to use the symmetry of this curve.