

MAT 115 Worksheet 8
Thursday, Oct 26 2017

Important info: Welcome to the MAT 115 workshop! My name is **Diego Avalos** (avalosgalvez@cpp.edu), and I will be your workshop facilitator. We meet on Tuesdays and Thursdays from 4 to 5:50 pm in room 4-1-314. My office hour is on Mondays from 11:30 am to 12:30 pm in room 94-219. All worksheets and solutions may be found at the website www.diegoavalos.net/teaching/mat115workshop2017.

1. Use cylindrical shells to find the volume of the solid that is generated when the region under the curve $y = x^3 - 3x^2 + 2x$ over $[0, 1]$ is revolved about the y -axis.
2. Use cylindrical shells to find the volume of the solid generated when the region enclosed by the given curves is revolved about the x -axis.
 - (a) $y^2 = x, y = 1, x = 0$
 - (b) $y = x^2, x = 1, y = 0$
 - (c) $xy = 4, x + y = 5$
3. Use cylindrical shells to find the volume of the cone generated when the triangle with vertices $(0, 0), (0, r), (h, 0)$, where $r > 0, h > 0$, is revolved about the x -axis.
4. Let V_x and V_y be the volumes of the solids that result when the region enclosed by $y = 1/x, y = 0, x = 1/2$, and $x = b$ ($b > 1/2$) is revolved about the x -axis and y -axis, respectively. Find a value of b for which $V_x = V_y$.
5. The region bounded by curves $y = 1 + \sqrt{x}, y = 1 - \sqrt{x}$, and the line $x = 1$ is revolved about the y -axis. Find the volume of the resulting solid by (a) integrating with respect to x and (b) integrating with respect to y .
6. Find the exact arclength of the curve over the interval
 - (a) $y = 3x^{3/2} - 1$ from $x = 0$ to $x = 1$
 - (b) $y = x^{2/3}$ from $x = 1$ to $x = 8$
 - (c) $24xy = y^4 + 48$ from $y = 2$ to $y = 4$
7. Compute the following integrals using integration by parts
 - (a) $\int x e^{-2x} dx$
 - (b) $\int x \sin 3x dx$
 - (c) $\int_1^e x^2 \ln x dx$