

## Math 1710: Tutorial 2 (areas and volumes)

1. Find the area of the region bounded by the given curves

(a)  $x = 2ye^{-y^2}$ ,  $y = x$

(b)  $y = \ln(x^2)$ ,  $y = 1 - x^2$ ,  $y = 1$

(c)  $y = \frac{3}{x+2}$ ,  $x = 0$ ,  $y = x^3 + 3x - 3$

(d)  $y^2 = x^2(x^2 - 4)$ ,  $x = 5$

(e)  $y = x - 1$ ,  $y^2 = 2x + 6$

2. Find the area of the region in the first quadrant that is bounded above by  $y = \sqrt{x}$  and below by the  $x$ -axis and the line  $y = x - 2$ .

3. Find the area of the region bounded by  $y = \sin x$ ,  $y = \cos x$  and the  $x$ -axis for  $\pi \leq x \leq 3\pi/2$ .

4. Suppose that the region bounded by the curves  $y = -x$  and  $y = x^3 - 2x^2$  is revolved about any one of the four lines indicated below:

(a) the  $x$ -axis,

(b) the  $y$ -axis,

(c) the line  $y = 1$ ,

(d) the line  $x = 3$ .

In each of the above four cases, find the volume of the resulting solid of revolution. In each case, you may use either the “washer” method or the “cylindrical shells” method, but should identify the “preferred” method in each case.