Math 1152, Quiz #1, Spring 2014   Name _____ KEY _____
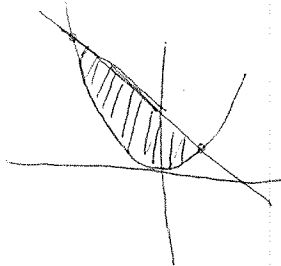
Instructions: Show all work. Use *exact* answers unless specifically asked to round. You may check your answers in the calculator, but you must show work to receive credit.

1. Find the area bounded by the curves $y = x^2$ and $2x + y = 4$. Sketch the graph of the region.

$y = -2x + 4$

$$x^2 = -2x + 4$$
$$x^2 + 2x - 4 = 0$$
$$x = \frac{-2 \pm \sqrt{4 + 16}}{2}$$
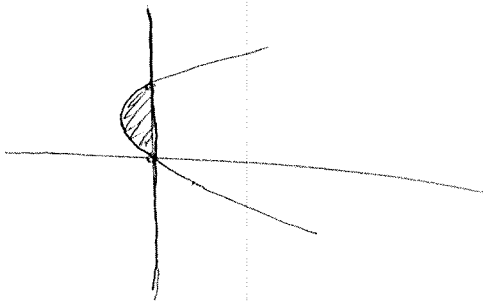$$= \frac{-2 \pm \sqrt{20}}{2} = \frac{-2 \pm 2\sqrt{5}}{2}$$
$$= -1 \pm \sqrt{5}$$

$$\int_{-1-\sqrt{5}}^{-1+\sqrt{5}} -2x + 4 - x^2 \, dx \quad \approx \quad 14.907$$

2. Find area bounded by the curves $x = y^2 - 4y$ and the y-axis. Sketch the graph of the region.

$y(y-4)$ $x = 0$

$$\int_0^4 0 - (y^2 - 4y) \, dy = \int_0^4 4y - y^2 \, dy$$

$$= 2y^2 - \frac{1}{3}y^3 \Big|_0^4 = 32 - \frac{64}{3} = \frac{32}{3}$$