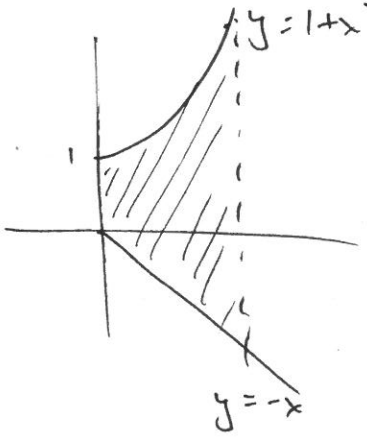
Math 1215: Quiz #3 **Winter 2018**

Name: SOLUTIONS	A#:	Section:

1. Find the area bounded between $y = x^2 + 1$ and $y = -x$ over the interval $0 \leq x \leq 2$.



$$A = \int_0^2 \left(x^2 + 1 - (-x)\right) dx$$
$$= \int_0^2 \left(x^2 + 1 + x\right) dx$$
$$= \left(\frac{1}{3}x^3 + x + \frac{1}{2}x^2\right)_0^2$$
$$= \left(\frac{8}{3} + 2 + \frac{4}{2}\right) - 0$$
$$= \boxed{\frac{20}{3}}$$

2. Find the volume of the solid obtained by revolving the segment of the curve $y = \sqrt{x}$ between $x = 1$ and $x = 4$ about the x-axis.

$$V = \int_1^4 \pi (\sqrt{x})^2 dx$$
$$= \pi \int_1^4 x \, dx$$
$$= \pi \left.\frac{1}{2}x^2\right]_1^4$$
$$= \frac{\pi}{2}\left(4^2 - 1^2\right)$$
$$= \boxed{\frac{15\pi}{2}}$$

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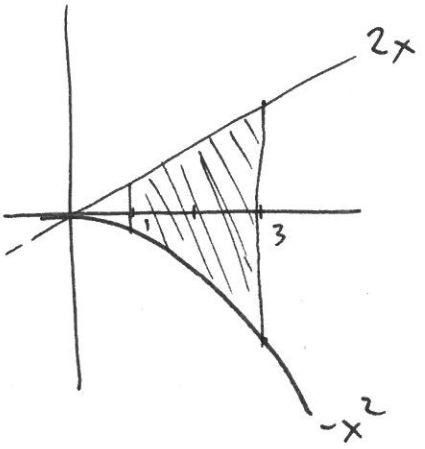
Name: SOLUTIONS	A#:	Section:

1. Find the area bounded between $y = 2x$ and $y = -x^2$ over the interval $1 \leq x \leq 3$.



$$\text{Area} = \int_1^3 (2x - (-x^2))\,dx$$
$$= \int_1^3 (2x + x^2)\,dx$$
$$= \left(x^2 + \frac{1}{3}x^3\right)\Big|_1^3$$
$$= (9 + 9) - \left(1 + \frac{1}{3}\right)$$
$$= \boxed{\frac{50}{3}}$$

2. Find the volume of the solid obtained by revolving the segment of the curve $y = e^x$ between $x = 0$ and $x = 1$ about the x-axis.

$$\text{Volume} = \int_0^1 \pi (e^x)^2\,dx$$
$$= \pi \int_0^1 e^{2x}\,dx$$
$$= \pi \cdot \frac{1}{2} e^{2x}\Big]_0^1$$
$$= \boxed{\frac{\pi}{2}(e^2 - 1)}$$

v3.2