Math 213 - **Double Integrals Problems**
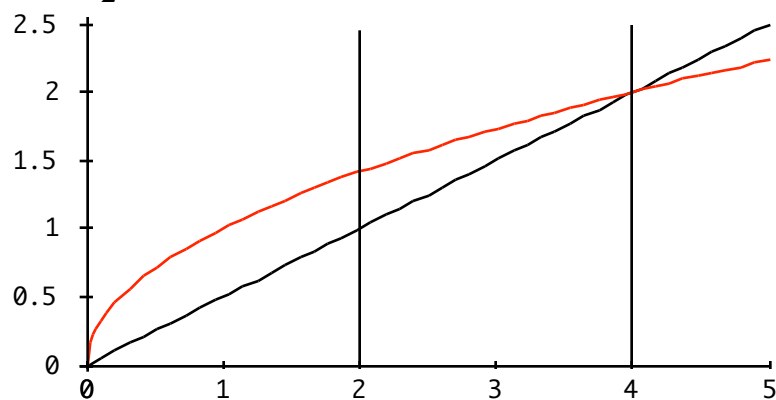
1.   Sketch the region in the xy plane that is the base of the volume integral, and evaluate the integral:

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$$\int_0^1 \int_{y=0}^{1+x} (3x + 2y)\, dy\, dx$$

2.   Integrate $\iint\limits_R xy\, dA$ where R is the region bounded by the graphs of

$y = \sqrt{x}, \quad y = \frac{1}{2}x, \quad x = 2, \quad x = 4$ as seen below.

3. Evaluate $\int_0^1 \int_{\sqrt{y}}^1 \sin(\pi x^3) \, dx \, dy$ by reversing the order of integration.

4. Set up an integral for both orders of integration. Do *not* evaluate.

$$\iint_R \frac{y}{x^2 + y^2} \, dA$$

where R is the triangle bounded by $y = x$, $y = 2x$, $x = 2$.

a. Sketch the region R.

b. Set up the integral for the order: $dy \, dx$.

c. Set up the integral for the order: $dx \, dy$.