3. *This Problem is a quickie. Don't spend much time on it. Just draw the sketch and think for a minute, or maybe 31.4 seconds.*

Think about the region \( R \) bounded by the curves \( y = x \) and \( y = x^2 \) in the first quadrant. **Sketch** this region, showing the two points of intersection.

**SOLUTION.**

Each of the following TWO problems (4-5) refers to this region \( R \) in the preceding problem. For Problems 4-5, determine an integral formula for each of the volumes indicated, drawing a sketch to show your method. In each case, show the appropriate “slice” or “strip” you are using for the calculation, and label your sketch clearly enough that it is clear how you get your answer. YOU DO NOT HAVE TO EVALUATE THE INTEGRALS; **just set them up, simplify** the integrand, and then leave them for someone else to do.

4B. Using strips or slices as we have done in this class, obtain a formula for the volume generated when \( R \) is rotated around the **horizontal line** \( y = 1. \)

**SOLUTION.**

\[
\Delta V = \pi \left[ (1-x^2)^2 - (1-x)^2 \right] \Delta x
\]

\[
= \pi \left[ x^4 - 3x^2 + 2x \right] \Delta x
\]

\[
V = \pi \int_0^1 \left[ x^4 - 3x^2 + 2x \right] dx
\]

**COMMENT.** As always done in class:

1. **DRAW A SKETCH BIG ENOUGH TO BE USEFUL.**
2. Slice perpendicular to the axis of rotation.
3. **SHOW THE SLICE** (see examples in book), locate the slice (\( x \) in this case), and show the width \( \Delta x \).
4. Calculate length of relevant radii (or sides) by “top - bottom” for vertical lengths, “right - left” for horizontal lengths.