Worksheet 31: Volume

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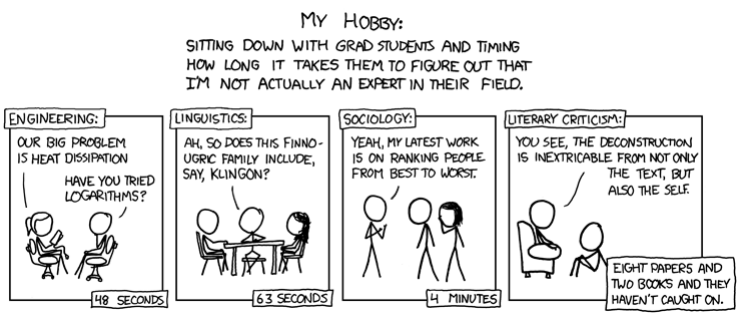

www.xkcd.com

1. If I want to find the area over $[a, b]$ bounded above and below by $f(x)$ and $g(x)$ respectively where both are continuous over the interval and $f(x) > g(x) > 0$ over the interval, what would I use for an integral?

2. If I want to find the area over $[a, b]$ bounded above and below by $f(x)$ and $g(x)$ respectively where both are continuous over the interval, what would I use for an integral? How would I solve for the integral?

3. Sketch the region enclosed by the given curves and find its area:

   (a) $y = |x|$, $y = x^2 - 2$

   (b) $x = y^4, y = \sqrt{2 - x}, y = 0$

4. What formulas represent the volume of a solid of revolution?

5. Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

   (a) $y = \frac{1}{4}x^2, y = 5 - x^2$; about the x-axis

   (b) $y = \frac{1}{4}x^2, x = 2, y = 0$; about the y-axis

   (c) $y = e^{-x}$, $y = 1, x = 2$; about $y = 2$

6. Use the shell method to find the volume of the solid obtained by rotating the region bounded by the given curves about the y-axis.

   (a) $y = x^3$, $y = 0$, $x = 1$, $x = 2$