Worksheet 30: Substitutions

Russell Buehler

b.r@berkeley.edu

1. Evaluate:

(a)
$$\int \sqrt{x^2 - 1} \ x^5 dx$$

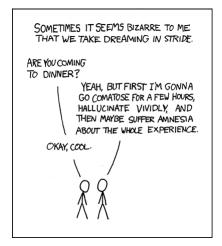
(b)
$$\int \frac{z^2}{z^3+1} dx$$

(c)
$$\int \frac{\sin(x)}{1+\cos^2(x)} dx$$

(d)
$$\int \sqrt{x^2 + 1} \ x^3 dx$$

2. Evaluate:

(a)
$$\int_1^e \frac{\ln(x)}{x} dx$$



www.xkcd.com

(1.)	c1		2	,
(b)	J_0	xe		ax

(c)
$$\int_0^a x\sqrt{a^2 - x^2} dx$$

3. Sketch the lines y = 2x and y = 3x. Construct a series that gives exactly the area between the two over the interval [0,2].

4. How might you express the area from (3) as an integral?

5. What if the lines were x = 3y, x = 2y, and I wanted the area between the two horizontally?

6. Sketch the region enclosed by the two curves and find its area: $y = x^2$, $y = 4x - x^2$