

1. Let $f(x) = 1/(6x)$

- (a) Compute $\int f(x) dx$ without using substitution.
(b) Compute $\int f(x) dx$ making the substitution $u = 6x$.
(c) What just happened?
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2. Use substitution to calculate the following integrals:

$$\begin{array}{lll} \text{(a)} \int x \cos(x^2) dx & \text{(b)} \int (2-x)^8 dx & \text{(c)} \int \frac{3}{x \ln(x)} dx \\ \text{(d)} \int_2^5 \sqrt{7x-9} dx & \text{(e)} \int_0^\pi \frac{\sin(x)}{2+\cos(x)} dx & \text{(f)} \int \frac{1}{\sqrt{9-x^2}} dx \end{array}$$

3. Let

$$Q(t) = \int_{e^{2t}}^{t^2-1} \sec(\sqrt{x})(xe^x) dx.$$

Find $Q'(t)$.

4. Compute the definite integrals and draw the area you are computing:

$$\text{(a)} \int_{-\pi}^{2\pi} |\sin(x)| dx \quad \text{(b)} \int_1^{e^3} \frac{1}{x} dx \quad \text{(c)} \int_{-2}^2 x^4 - 15$$