

Worksheet 3

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1. Evaluate

$$\int \frac{x^3}{\sqrt{x^2 + 100}} dx.$$

2. Evaluate

$$\int \frac{dt}{\sqrt{t^2 - 6t + 13}}.$$

3. Prove the reduction formula

$$\int \frac{1}{(x^2 + 1)^{n+1}} dx = \frac{1}{2n} \frac{x}{(x^2 + 1)^n} + \frac{2n - 1}{2n} \int \frac{1}{(x^2 + 1)^n} dx.$$

4. Use the above reduction formula to evaluate

$$\int \frac{2u^3 - 5u^2 + 6u - 1}{(u^2 - 2u + 2)^2} du.$$