Exercises 8.1, Mathematics 1 (12-PHY-BIPMA1)
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1. Use substitutions to compute the following indefinite integrals:

$$\text{(a)} \int (x+1)^2 dx, \qquad \text{(b)} \int x \sin(x^2) dx, \qquad \text{(c)} \int \frac{x^3 dx}{x^2+1}, \qquad \text{(d)} \int x^2 e^{-x^3} dx,$$

$$\text{(e)} \int \frac{dx}{x \ln x}, \qquad \text{(f)} \int \frac{e^{\arccos x}}{\sqrt{1-x^2}} dx, \qquad \text{(g)} \int \frac{dx}{\sin x}.$$

2. Use integration by parts to compute the following indefinite integrals:

$$\text{(a)} \int \ln x dx, \qquad \text{(b)} \int x^2 e^x dx, \qquad \text{(c)} \int x \sin x dx, \qquad \text{(d)} \int \arcsin^2 x dx,$$

$$\text{(e)} \int e^{\alpha x} \sin(\beta x) dx, \text{ for any } \alpha, \beta \in \mathbb{R}, \qquad \text{(f)} \int x^n \ln x dx, \text{ for any } n \in \mathbb{N}.$$