

## The Substitution Rule and Integration by Parts

1. Evaluate the following indefinite integrals:

(a)  $\int x e^{x^2} dx$

(b)  $\int \sqrt{5x+2} dx$

(c)  $\int \sin(x) \cos(x) dx$

(d)  $\int \frac{\sin(x)}{\cos(x)} dx$

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

(f)  $\int e^{kx} dx$

2. Evaluate the following definite integrals:

(a)  $\int_0^4 \sqrt{2x+1} \, dx$

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

(c)  $\int_0^1 \frac{e^x + 1}{e^x + x} \, dx$