

## 1 Fundamental Theorem of Calculus II

1. True    False     $\int_a^x f(u)du$  gives you a general form of an antiderivative (including the  $+C$ ).
2. True    False    Let  $F(x) = \int_0^x f(u)du$ . Then  $G(x)$  be another antiderivative of  $f(x)$ . For all  $x$  we have  $F(x) = G(x) - G(0)$ .
3. If  $\int_1^x f(u)du = \frac{1}{x} + a$ , find  $f, a$ .
4. Find  $\frac{d}{dx} \int_1^x \ln t dt$ .
5. Find  $\frac{d}{dx} \int_x^3 e^{se^s} dx$ .
6. Find  $\frac{d}{dt} \int_2^{t^2} \sqrt{1-x^3} dx$ .
7. Find  $\frac{d}{dx} \int_{2x}^{x^3} \frac{t}{2t+1} dt$ .

## Substitution Rule

8. Find  $\int \frac{\ln x}{x} dx$ .
9. Find  $\int x\sqrt{1-x} dx$ .
10. Find  $\int_0^{\sqrt{\pi}} x \cos(x^2) dx$ .
11. Find  $\int \sin(x) \sec^2(x) dx$ .
12. Find  $\int 2xe^{e^{x^2}} e^{x^2} dx$ .
13. Find  $\int xe^{x^2} dx$ .
14. Find  $\int \frac{\sin \sqrt{x}}{\sqrt{x}} dx$ .