

## 1 Anti-Derivatives

1. True    False    Just like differentiation where we can use the chain rule/product rule/quotient rule/etc. to always be able to find the derivative of a function, we can find similar rules to do the same with finding an anti-derivative.
2. True    False    There exists a unique anti-derivative.
3. Find an antiderivative of  $\frac{1}{2x}$ .
4. Find an antiderivative of  $5e^x$ .
5. Find an antiderivative to  $e$ .
6. Find an antiderivative of  $x + \sqrt{x}$ .
7. Find an antiderivative to  $8t^3 + 15t^2$ .
8. Find an antiderivative to  $\cos u$ .
9. Find an antiderivative to  $\sin(2t)$ .
10. Find the indefinite integral  $\int (4t^3 + 3t^2)dt$ .
11. Find the indefinite integral  $\int \frac{1}{3x}dx$ .

## 2 Fundamental Theorem of Calculus I

### 2.1 Concept

12. If  $F$  is an antiderivative for  $f$  on  $[a, b]$ , then  $\int_a^b f(x)dx = F(b) - F(a)$ .

## 2.2 Problems

13. Evaluate the integral  $\int_2^5 (x^2 + 1)dx$ .

14. Evaluate the integral  $\int_0^4 \sqrt{x}dx$ .

15. Evaluate the integral  $\int_1^8 \sqrt[3]{x}dx$ .

16. Evaluate the integral  $\int_0^1 e^{x+1}dx$ .