Integration Practice

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1 Introduction

This problem set aims to recover some basic integration skills that you might find useful in future calculus with curve, vector fields, etc (also in your physics class :))

2 Substitution Rule

1. $$\int \sin\frac{t}{2}\cos\frac{t}{2}dt$$

2. $$\int 18x^2\sqrt[4]{6x^3+5}dx$$

3. $$\int(1-\frac{1}{w})\cos(w-\log w)dw$$

   where log is the natural logarithm

4. $$\int\frac{x}{\sqrt{1-4x^2}}dx$$

5. $$\int\sec^2(4t)(3-\tan(4t))^3dt$$

6. $$\int\frac{3y}{(5y^2+4)^2}dy$$

7. $$\int\frac{3}{5y^2+4}dy$$

8. $$\int\frac{2t^3+1}{(t^4+2t)^3}dt$$

9.

$$\int \frac{2t^3+1}{t^4+2t}dt$$

10.

$$\int \frac{x}{\sqrt{1-4x^2}}dx$$

11.

$$\int \frac{1}{\sqrt{1-4x^2}}dx$$

12.

$$\int \tan(x)dx$$

13.

$$\int \frac{10x+3}{x^2+16}dx$$

14.

$$\int \sec(ydy$$

15.

$$\int \frac{\cos(\sqrt{x})}{\sqrt{x}}dx$$

16.

$$\int e^{t+e^t}dt$$

17.

$$\int \frac{\arcsin(x)}{\sqrt{1-x^2}}dx$$

3 Integration by Parts

1. $$\int (4x^3 - 9x^2 + 7x + 3)e^{-x}dx$$

2. $$\int x^2 \cos(x)dx$$

3. $$\int 6 \arctan(\frac{8}{w})dw$$