

作業

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1 作業

1.1 求下列不定積分

1. $\int 1 - x + x^3 - \frac{1}{\sqrt[3]{x^2}} dx$

2. $\int \left(x - \frac{1}{\sqrt{x}}\right)^2 dx$

3. $\int (2^x + 3^x)^2 dx$

4. $\int \frac{3}{\sqrt{4 - 4x^2}} dx$

5. $\int \frac{x^2}{3(1 + x^2)} dx$

6. $\int \tan^2 x dx$

7. $\int \sin^2 x dx$

8. $\int \frac{\cos 2x}{\cos x - \sin x} dx$

9. $\int \sqrt{x\sqrt{x\sqrt{x}}} dx$

10. $\int \left(\sqrt{\frac{1+x}{1-x}} + \sqrt{\frac{1-x}{1+x}}\right) dx$

$$11. \int (\cos x + \sin x)^2 dx$$

$$12. \int \cos x \cos 2x dx$$

$$13. \int \frac{x^4 + x^{-4} + 2}{x^3} dx$$

$$14. \int |\sin x| dx$$

$$15. \int e^{-|x|} dx$$

1.2 採用換元法或分部積分計算下列不定積分

$$1. \int \cos(3x + 4) dx$$

$$2. \int xe^{2x^2} dx$$

$$3. \int \frac{1}{2x + 1} dx$$

$$4. \int (1 + x)^n dx$$

$$5. \int \left(\frac{1}{\sqrt{3 - x^2}} + \frac{1}{\sqrt{1 - 3x^2}} \right) dx$$

$$6. \int 2^{2x+3} dx$$

$$7. \int \sqrt{8 - 3x} dx$$

$$8. \int \sqrt[3]{7 - 5x} dx$$

$$9. \int x \sin x^2 dx$$

$$10. \int \frac{1}{\sin^2(2x + \pi/4)} dx$$

11. $\int \frac{1}{1 + \cos x} dx$
12. $\int \frac{1}{1 + \sin x} dx$
13. $\int \csc x dx$
14. $\int \frac{x}{\sqrt{1 - x^2}} dx$
15. $\int \frac{x}{4 + x^4} dx$
16. $\int \frac{1}{x \ln x} dx$
17. $\int \frac{x^4}{(1 - x^5)^3} dx$
18. $\int \frac{x^3}{(x^8 - 2)} dx$
19. $\int \frac{1}{x(1 + x)} dx$
20. $\int \cot x dx$
21. $\int \cos^5 x dx$
22. $\int \frac{1}{\sin x \cos x} dx$
23. $\int \frac{1}{e^x + e^{-x}} dx$
24. $\int \frac{2x - 3}{x^2 - 3x + 8} dx$
25. $\int \frac{x^2 + 2}{(x + 1)^3} dx$
26. $\int \frac{1}{\sqrt{x^2 + a^2}} (a > 0) dx$

$$27. \int \frac{1}{(x^2 + a^2)^{3/2}} (a > 0) dx$$

$$28. \int \frac{x^5}{\sqrt{1-x^2}} dx$$

$$29. \int \frac{\sqrt{x}}{1-\sqrt[3]{x}} dx$$

$$30. \int \frac{\sqrt{x+1}-1}{\sqrt{x+1}+1} dx$$

$$31. \int \arcsin x dx$$

$$32. \int \ln x dx$$

$$33. \int x^2 \cos x dx$$

$$34. \int \frac{\ln x}{x^3} dx$$

$$35. \int (\ln x)^2 dx$$

$$36. \int x \arctan x dx$$

$$37. \int \left[\ln(\ln x) + \frac{1}{\ln x} \right] dx$$

$$38. \int (\arcsin x)^2 dx$$

$$39. \int (\sec x)^3 dx$$

$$40. \int \sqrt{x^2 \pm a^2} dx (a > 0)$$

1.3 求下列不定積分

1. $\int [f(x)]^a f'(x) dx (a \neq -1)$

2. $\int \frac{f'(x)}{1 + [f(x)]^2} dx (a \neq -1)$

3. $\int \frac{f'(x)}{f(x)} dx$

4. $\int e^{f(x)} f'(x) dx$

1.4 求下列不定積分

1. $\int \frac{x^3}{x-1} dx$

2. $\int \frac{x-1}{x^2-7x+12} dx$

3. $\int \frac{1}{1+x^3} dx$

4. $\int \frac{1}{1+x^4} dx$

5. $\int \frac{1}{(x-1)(x^2+1)^2} dx$

6. $\int \frac{x-2}{(2x^2+2x+1)^2} dx$

7. $\int \frac{1}{5-3\cos x} dx$

8. $\int \frac{1}{2+\sin^2 x} dx$

9. $\int \frac{1}{1+\tan x} dx$

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

11. $\int \frac{1}{\sqrt{x^2 + x}} dx$

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