

INDEFINITE INTEGRAL

Evaluate:

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

2. $\int \frac{x^3 + \sqrt{x} - \sqrt[3]{x^4}}{\sqrt[5]{x}} dx,$

3. $\int \frac{2t^3 - 3t\sqrt[3]{x} + 5t\sqrt[5]{t^2}}{t\sqrt{t}} dt,$

4. $\int \frac{1}{\sqrt[5]{2kx}} dx,$

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

6. $\int (3 + 2\sqrt[4]{x})^3 dx,$

7. $\int \left(e^x - \cos x + \frac{1}{1+x^2} \right) dx$

8. $\int \left(\cosh x + \frac{3}{\sinh^2 x} - \sinh x \right) dx$

9. $\int \frac{3 \cdot 2^x - 2 \cdot 3^x}{2^x} dx,$

10. $\int \tan^2 x dx,$

11. $\int \coth^2 x dx,$

12. $\int \frac{4-x}{2+\sqrt{x}} dx,$

13. $\int \frac{8-x^3}{2-x} dx,$

14. $\int \frac{x^3+27}{x+3} dx,$

15. $\int \frac{1-x^2}{1+x} dx,$

16. $\int \frac{(1+x)^2}{x(1+x^2)} dx,$

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

18. $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x - \sin x \cos x + \cos^2 x} dx$

19. $\int \frac{\cos 2x}{\sin^2 x \cos^2 x} dx,$

20. $\int \frac{\sin 2x}{\cos x} dx,$

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

INTEGRATION BY SUBSTITUTION

1. $\int \frac{1}{\sin^2(7x+2)} dx,$

2. $\int \frac{1}{\sqrt[5]{2x+7}} dx,$

3. $\int \frac{1}{\sqrt{3x-8}} dx,$

4. $\int \frac{x}{\sqrt{3x-8}} dx,$

5. $\int (2x+8)^9 dx,$

6. $\int \frac{1}{\sqrt{1-9x^2}} dx,$

$$7. \int \frac{x}{\sqrt{1-9x^2}} dx,$$

$$8. \int \frac{x}{\sqrt{9-x^2}} dx,$$

$$9. \int \frac{1}{1+4x^2} dx,$$

$$10. \int \frac{x}{1+4x^2} dx$$

$$11. \int \frac{5x}{1+x^4} dx,$$

$$12. \int x e^{x^2} dx,$$

$$13. \int x^3 (2x^4 + 8)^{19} dx,$$

$$14. \int x \sqrt{x^2 + 9} dx,$$

$$15. \int x^3 \sqrt{x^2 + 9} dx,$$

$$16. \int x^7 \sqrt[5]{x^8 - 5} dx,$$

$$17. \int e^{x^4} \sqrt{e^x + 2} dx,$$

$$18. \int \frac{\ln^3 x}{x} dx,$$

$$19. \int \frac{\arcsin^{11} x}{\sqrt{1-x^2}} dx,$$

$$20. \int \frac{1}{\tan^3 x \cos^2 x} dx,$$

$$21. \int \frac{\sqrt[4]{\arctan x}}{1+x^2} dx,$$

$$22. \int \frac{\cos x}{1+4\sin^2 x} dx,$$

$$23. \int \frac{e^x}{1+e^{2x}} dx,$$

$$24. \int \frac{5^x}{\sqrt{1-25^x}} dx,$$

$$25. \int x^2 e^{x^3} dx,$$

$$26. \int \frac{e^{\frac{1}{x}}}{x^2} dx,$$

$$27. \int \frac{\cos \sqrt{x}}{\sqrt{x}} dx,$$

$$28. \int \frac{e^x}{\sqrt[5]{e^x - 88}} dx,$$

$$29. \int \frac{\tan x}{(1 + \tan^4 x) \cos^2 x} dx,$$

$$30. \int \frac{\sin \sqrt{x}}{\sqrt{x}} dx,$$

$$31. \int \frac{\cos x}{\sqrt{8 \sin x - 1}} dx,$$

$$32. \int \frac{x}{7-4x^2} dx,$$

$$33. \int \frac{e^x}{4+3e^x} dx,$$

$$34. \int \frac{1}{x(3 \ln x + 5)} dx,$$

$$35. \int \frac{1}{x \ln x} dx,$$

$$36. \int \frac{\cot x}{\ln(\sin x)} dx,$$

$$37. \int \frac{x}{\sqrt{x+1}} dx.$$

INTEGRATION BY PARTS

$$1. \int x \cos 5x dx,$$

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

$$3. \int x^2 e^{3x} dx,$$

$$4. \int x^2 5^x dx,$$

$$5. \int \ln x dx,$$

$$6. \int \arcsin 3x dx,$$

$$7. \int \operatorname{arccot} x dx,$$

$$8. \int \operatorname{arcsinh} x dx,$$

$$9. \int \operatorname{arccosh} x dx,$$

$$10. \int \sin(\ln x) dx,$$

$$11. \int x \arctan x dx$$

$$12. \int \frac{x}{\sin^2 x} dx,$$

$$13. \int \frac{x}{\sinh^2 x} dx$$

$$14. \int \frac{x \sin x}{\cos^3 x} dx,$$

$$15. \int \frac{\ln^2 x}{x^2} dx,$$

$$16. \int \frac{\ln^2 x}{\sqrt[4]{x}} dx,$$

$$17. \int \frac{\ln(\sin x)}{\sin^2 x} dx,$$

$$18. \int \sin \sqrt{x} dx,$$

$$19. \int \cosh^2 x dx,$$

$$20. \int \sin^2 x dx,$$

$$21. \int x^3 e^{-x^2} dx,$$

$$22. \int x \tan^2 x dx,$$

$$23. \int \frac{x}{\sqrt{x+1}} dx,$$

$$24. \int \frac{x}{\sqrt{3x-8}} dx.$$

INTEGRATION OF RATIONAL FUNCTIONS

$$1. \int \frac{x}{(x+1)(x+2)(x-3)} dx,$$

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

$$3. \int \frac{1}{(x-1)^3 x^2} dx,$$

$$4. \int \frac{x^5 + 2}{x^3 - 1} dx,$$

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

$$6. \int \frac{x^4}{(x^2 - 1)(x + 2)} dx,$$

$$7. \int \frac{x^2 + 6x + 5}{x^2 - 6x + 5} dx,$$

$$8. \int \frac{x^2 - 6x + 5}{x^2 + 6x + 5} dx,$$

$$9. \int \frac{x+7}{x^2 + 1} dx,$$

$$10. \int \frac{x+5}{4x^2 + x + 7} dx,$$

$$11. \int \frac{x-1}{x^2 - 4} dx,$$

$$12. \int \frac{x^3 + 1}{x^2 - 4} dx,$$

$$13. \int \frac{x^3 + 1}{x^2 + 4} dx,$$

$$14. \int \frac{4}{x^2 - 2x - 3} dx,$$

$$15. \int \frac{x^4 + 6x^3 + 10x^2 + x}{x^2 + 6x + 10} dx,$$

$$16. \int \frac{x+1}{(x^2+1)^3} dx.$$

INTEGRATION OF TRIGONOMETRIC FUNCTIONS

$$1. \int \frac{1}{\sin x - \cos x + \sqrt{2}} dx,$$

$$2. \int \frac{\cos^4 x}{\sin x} dx,$$

$$3. \int \frac{\cos^3 x}{\sin^2 x} dx,$$

$$4. \int \frac{1}{1 - \sin^4 x} dx,$$

$$5. \int \sin^3 x \cos^3 x dx,$$

$$6. \int \cos^9 x dx,$$

$$7. \int \cos^6 x dx,$$

$$8. \int \sin^6 x dx,$$

$$9. \int \frac{1}{\sqrt[4]{\sin^3 x \cos^5 x}} dx,$$

$$10. \int \cos 2x \cos 4x dx,$$

$$11. \int \sin 3x \cos 8x dx.$$

INTEGRATION OF IRRATIONAL FUNCTIONS

$$1. \int \frac{\sqrt[6]{x} + 1}{\sqrt[6]{x^7} + \sqrt[4]{x^5}} dx,$$

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

$$3. \int \frac{1}{\sqrt{x^2 - 6x + 15}} dx,$$

$$4. \int \frac{3x - 2}{\sqrt{x^2 + 5x - 10}} dx,$$

$$5. \int \frac{1}{\sqrt{4 - 2x - x^2}} dx,$$

$$6. \int \sqrt{x^2 - 2x - 1} dx,$$

$$7. \int \frac{6x^3 - 22x^2 + 21x - 7}{\sqrt{x^2 - 4x + 3}} dx,$$

$$8. \int \frac{x^2 + x + 1}{(x^2 + 1)\sqrt{x^2 + 1}} dx.$$

MISCELLANEOUS PROBLEMS

$$1. \int \arcsin^2 x dx,$$

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

$$3. \int x \cos \sqrt{x} dx,$$

$$4. \int x^2 e^x \sin x dx,,$$

$$5. \int \arcsin \sqrt{x} \, dx,$$

$$6. \int x^2 \arcsin x \, dx,,$$

$$7. \int \sqrt{1 - \sin x} \, dx,$$

$$8. \int \sqrt{e^x + 1} \, dx,$$

$$9. \int e^{-\sqrt{x}} \, dx,$$

$$10. \int x^2 \arctan x \, dx,$$

$$11. \int \ln(x^2 + 1) \, dx,$$

$$12. \int \frac{\arcsin x}{x^2} \, dx,$$

$$13. \int \frac{\arctan e^x}{e^x} \, dx,$$

$$14. \int \frac{\operatorname{arccot} x}{x^2(1+x^2)} \, dx,$$

$$15. \int \frac{x \arcsin x}{\sqrt{1-x^2}} \, dx,$$

$$16. \int \frac{\arcsin \frac{x}{2}}{\sqrt{2-x}} \, dx,$$

$$17. \int \frac{x e^x}{(1+x)^2} \, dx,$$

$$18. \int \frac{\ln x - 1}{\ln^2 x} \, dx,$$

$$19. \int \frac{\sin^3 x}{\sqrt[5]{\cos^3 x}} \, dx,$$

$$20. \int \frac{\sinh \sqrt{1-x}}{\sqrt{1-x}} \, dx,$$

$$21. \int \frac{e^{2x}}{\sqrt[4]{e^x + 1}} \, dx,$$

$$22. \int \frac{\sqrt{1+x}}{x} \, dx,$$

$$23. \int \frac{\ln(x+1)}{\sqrt{1+x}} \, dx,$$

$$24. \int \frac{1 + \sqrt{x}}{1 - \sqrt{x}} \, dx,$$

$$25. \int \frac{\ln(x^2 + 1)}{x^3} \, dx,$$

$$26. \int \frac{e^x - 1}{e^x + 1} \, dx,$$

$$27. \int \frac{x \ln(1 + \sqrt{1+x^2})}{\sqrt{1+x^2}} \, dx,$$

$$28. \int x^3 \ln(x^2 + 3) \, dx,$$

$$29. \int \operatorname{arccot} \sqrt{x} \, dx,$$

$$30. \int (e^x + e^{-x})^2 \, dx,$$

$$31. \int \frac{\ln(x+1)}{x^2} \, dx.$$