TABLES D'INTÉGRALES

FONCTIONS ÉLÉMENTAIRES

1. $\int u^n \, du = \frac{u^{n+1}}{n+1} + k, \text{ pour } n \neq -1$

2. $\int \frac{du}{u} = \ln |u| + k$

3. $\int e^u \, du = e^u + k$

4. $\int \cos u \, du = \sin u + k$

5. $\int \sin u \, du = -\cos u + k$

6. $\int \sin u \, du = -\cos u + k$

7. $\int \sec u \tan u \, du = \sec u + k$

8. $\int \csc^2 u \, du = -\cot u + k$

9. $\int \csc u \cot u \, du = -\csc u + k$

10. $\int \tan u \, du = \ln|\sec u| + k$
$= -\ln|\cos u| + k$

11. $\int \cot u \, du = \ln |\sin u| + k$

12. $\int \sec u \, du = \ln|\sec u + \tan u| + k$

13. $\int \csc u \, du = \ln|\csc u - \cot u| + k$
$= -\ln|\csc u + \cot u| + k$

14. $\int \frac{1}{\sqrt{1-u^2}} \, du = \text{Arc sin } u + k$

15. $\int \frac{1}{1+u^2} \, du = \text{Arc tan } u + k$

16. $\int \frac{1}{u\sqrt{u^2-1}} \, du = \text{Arc sec } u + k$

EXPRESSIONS COMPORTANT $a^2 - u^2$

17. $\int \frac{1}{a^2-u^2} \, du = \frac{1}{2a} \ln\left|\frac{u+a}{u-a}\right| + k$

18. $\int \frac{1}{\sqrt{a^2-u^2}} \, du = \text{Arc sin}\left(\frac{u}{a}\right) + k$

19. $\int \sqrt{a^2-u^2} \, du = \frac{u}{2}\sqrt{a^2-u^2} + \frac{a^2}{2} \text{Arc sin}\left(\frac{u}{a}\right) + k$

20. $\int \frac{\sqrt{a^2-u^2}}{u} \, du = \sqrt{a^2-u^2} - a \ln\left|\frac{a+\sqrt{a^2-u^2}}{u}\right| + k$

21. $\int \frac{\sqrt{a^2-u^2}}{u^2} \, du = \frac{-1}{u}\sqrt{a^2-u^2} - \text{Arc sin}\left(\frac{u}{a}\right) + k$

22. $\int \frac{u^2}{\sqrt{a^2-u^2}} \, du = \frac{-u}{2}\sqrt{a^2-u^2} - \frac{a^2}{2} \text{Arc sin}\left(\frac{u}{a}\right) + k$

23. $\int \frac{1}{u\sqrt{a^2-u^2}} \, du = \frac{-1}{a} \ln\left|\frac{a+\sqrt{a^2-u^2}}{u}\right| + k$

24. $\int \frac{1}{u^2\sqrt{a^2-u^2}} \, du = \frac{-\sqrt{a^2-u^2}}{a^2 u} + k$

25. $\int u^2\sqrt{a^2-u^2} \, du = \frac{u}{8}(2u^2-a^2)\sqrt{a^2-u^2} + \frac{a^4}{8} \text{Arc sin}\left(\frac{u}{a}\right) + k$

26. $\int (a^2-u^2)^{3/2}\,du = \frac{-u}{8}(2u^2-5a^2)\sqrt{a^2-u^2} + \frac{3a^4}{8}\operatorname{Arc\,sin}\left(\frac{u}{a}\right)+k$

27. $\int \frac{1}{(a^2-u^2)^{3/2}}\,du = \frac{u}{a^2\sqrt{a^2-u^2}}+k$

EXPRESSIONS COMPORTANT $u^2 + a^2$

28. $\int \frac{1}{u^2+a^2}\,du = \frac{1}{a}\operatorname{Arc\,tan}\left(\frac{u}{a}\right)+k$

29. $\int \sqrt{u^2+a^2}\,du = \frac{u}{2}\sqrt{u^2+a^2} + \frac{a^2}{2}\ln\left|u+\sqrt{u^2+a^2}\right|+k$

30. $\int u\sqrt{u^2+a^2}\,du = \frac{1}{3}(u^2+a^2)^{3/2}+k$

31. $\int \frac{\sqrt{u^2+a^2}}{u}\,du = \sqrt{u^2+a^2} - a\ln\left|\frac{a+\sqrt{u^2+a^2}}{u}\right|+k$

32. $\int \frac{\sqrt{u^2+a^2}}{u^2}\,du = \frac{-\sqrt{u^2+a^2}}{u} + \ln\left|u+\sqrt{u^2+a^2}\right|+k$

33. $\int \frac{u^2}{\sqrt{u^2+a^2}}\,du = \frac{u}{2}\sqrt{u^2+a^2} - \frac{a^2}{2}\ln\left|u+\sqrt{u^2+a^2}\right|+k$

34. $\int \frac{1}{u\sqrt{u^2+a^2}}\,du = -\frac{1}{a}\ln\left|\frac{a+\sqrt{u^2+a^2}}{u}\right|+k$

35. $\int \frac{1}{u^2\sqrt{u^2+a^2}}\,du = -\frac{\sqrt{u^2+a^2}}{a^2u}+k$

36. $\int \frac{1}{(u^2+a^2)^{3/2}}\,du = \frac{u}{a^2\sqrt{u^2+a^2}}+k$

37. $\int u^2\sqrt{u^2+a^2}\,du = \frac{u}{8}(2u^2+a^2)\sqrt{u^2+a^2} - \frac{a^4}{8}\ln\left|u+\sqrt{u^2+a^2}\right|+k$

38. $\int (u^2+a^2)^{3/2}\,du = \frac{u}{8}(2u^2+5a^2)\sqrt{u^2+a^2} + \frac{3a^4}{8}\ln\left|u+\sqrt{u^2+a^2}\right|+k$

EXPRESSIONS COMPORTANT $u^2 - a^2$

39. $\int \frac{1}{u^2-a^2}\,du = \frac{1}{2a}\ln\left|\frac{u-a}{u+a}\right|+k$

40. $\int \frac{1}{\sqrt{u^2-a^2}}\,du = \ln\left|u+\sqrt{u^2-a^2}\right|+k$

41. $\int \sqrt{u^2-a^2}\,du = \frac{u}{2}\sqrt{u^2-a^2} - \frac{a^2}{2}\ln\left|u+\sqrt{u^2-a^2}\right|+k$

42. $\int u\sqrt{u^2-a^2}\,du = \frac{1}{3}(u^2-a^2)^{3/2}+k$

43. $\int \frac{\sqrt{u^2-a^2}}{u}\,du = \sqrt{u^2-a^2} - a\operatorname{Arcsec}\left(\frac{u}{a}\right)+k$

44. $\int \frac{\sqrt{u^2-a^2}}{u^2}\,du = \frac{-\sqrt{u^2-a^2}}{u} + \ln\left|u+\sqrt{u^2-a^2}\right|+k$

45. $\int \frac{u}{\sqrt{u^2-a^2}}\,du = \sqrt{u^2-a^2}+k$

46. $\int \frac{u^2}{\sqrt{u^2-a^2}}\,du = \frac{u}{2}\sqrt{u^2-a^2} + \frac{a^2}{2}\ln\left|u+\sqrt{u^2-a^2}\right|+k$

47. $\int \frac{1}{u\sqrt{u^2-a^2}}\,du = \frac{1}{a}\operatorname{Arcsec}\left(\frac{u}{a}\right)+k$

48. $\int \frac{1}{u^2\sqrt{u^2-a^2}}\,du = \frac{\sqrt{u^2-a^2}}{a^2u}+k$

49. $\int \frac{1}{(u^2-a^2)^{3/2}}\,du = \frac{-u}{a^2\sqrt{u^2-a^2}} + k$

50. $\int u^2\sqrt{u^2-a^2}\,du = \frac{u}{8}(2u^2-a^2)\sqrt{u^2-a^2} - \frac{a^4}{8}\ln\left|u+\sqrt{u^2-a^2}\right| + k$

51. $\int (u^2-a^2)^{3/2}\,du = \frac{u}{8}(2u^2-5a^2)\sqrt{u^2-a^2} + \frac{3a^4}{8}\ln\left|u+\sqrt{u^2-a^2}\right| + k$

EXPRESSIONS COMPORTANT e^u

52. $\int e^u\,du = e^u + k$

53. $\int e^{au}\,du = \frac{1}{a}e^{au} + k$

54. $\int ue^{au}\,du = \frac{1}{a^2}e^{au}(u-1) + k$

55. $\int u^n e^{au}\,du = \frac{u^n e^{au}}{a} - \frac{n}{a}\int u^{n-1}e^{au}\,du$

56. $\int e^{au}\sin bu\,du = \frac{e^{au}}{a^2+b^2}(a\sin bu - b\cos bu) + k$

57. $\int e^{au}\cos bu\,du = \frac{e^{au}}{a^2+b^2}(a\cos bu + b\sin bu) + k$

EXPRESSIONS COMPORTANT ln *u*

58. $\int \ln u\,du = u\ln u - u + k$

59. $\int u\ln u\,du = \frac{u^2}{2}\ln u - \frac{u^2}{4} + k$

60. $\int u^n \ln u\,du = \frac{u^{n+1}}{n+1}\left(\ln u - \frac{1}{n+1}\right) + k$

61. $\int \ln^2 u\,du = u\ln^2 u - 2u\ln u + 2u + k$

PRODUITS ET PUISSANCES DE FONCTIONS TRIGONOMÉTRIQUES

62. $\int \sin^2 u\,du = \frac{u}{2} - \frac{1}{4}\sin 2u + k$

63. $\int \cos^2 u\,du = \frac{u}{2} + \frac{1}{4}\sin 2u + k$

64. $\int \tan^2 u\,du = \tan u - u + k$

65. $\int \cot^2 u\,du = -\cot u - u + k$

66. $\int \sec^2 u\,du = \tan u + k$

67. $\int \csc^2 u\,du = -\cot u + k$

68. $\int \sin^n u\,du = \frac{-1}{n}\sin^{n-1}u\cos u + \frac{n-1}{n}\int \sin^{n-2}u\,du$

69. $\int \cos^n u\,du = \frac{1}{n}\cos^{n-1}u\sin u + \frac{n-1}{n}\int \cos^{n-2}u\,du$

70. $\int \tan^n u\,du = \frac{1}{n-1}\tan^{n-1}u - \int \tan^{n-2}u\,du$

71. $\int \cot^n u\,du = \frac{-1}{n-1}\cot^{n-1}u - \int \cot^{n-2}u\,du$

72. $\int \sec^n u\,du = \frac{1}{n-1}\sec^{n-2}u\tan u + \frac{n-2}{n-1}\int \sec^{n-2}u\,du$

73. $\int \csc^n u\,du = \frac{-1}{n-1}\csc^{n-2}u\cot u + \frac{n-2}{n-1}\int \csc^{n-2}u\,du$

74. $\int \sin au\sin bu\,du = -\frac{\sin[(a+b)u]}{2(a+b)} + \frac{\sin[(a-b)u]}{2(a-b)} + k$

75. $\int \cos au\cos bu\,du = \frac{\sin[(a+b)u]}{2(a+b)} + \frac{\sin[(a-b)u]}{2(a-b)} + k$

76. $\int \sin au\cos bu\,du = -\frac{\cos[(a+b)u]}{2(a+b)} - \frac{\cos[(a-b)u]}{2(a-b)} + k$

77. $\int u\sin u\,du = \sin u - u\cos u + k$

78. $\int u\cos u\,du = \cos u + u\sin u + k$

79. $\int u^2 \sin u \, du = 2u \sin u + (2 - u^2)\cos u + k$

80. $\int u^2 \cos u \, du = 2u \cos u + (u^2 - 2)\sin u + k$

81. $\int u^n \sin u \, du = -u^n \cos u + n \int u^{n-1} \cos u \, du$

82. $\int u^n \cos u \, du = u^n \sin u - n \int u^{n-1} \sin u \, du$

83. $\int \sec^3 au \, du = \frac{1}{2a}(\sec au \tan au) + \frac{1}{2a}(\ln|\sec au + \tan au|) + k$

EXPRESSIONS COMPORTANT DES FONCTIONS TRIGONOMÉTRIQUES INVERSES

84. $\int \text{Arc sin } u \, du = u \text{ Arc sin } u + \sqrt{1 - u^2} + k$

85. $\int \text{Arc cos } u \, du = u \text{ Arc cos } u - \sqrt{1 - u^2} + k$

86. $\int \text{Arc tan } u \, du = u \text{ Arc tan } u - \frac{1}{2}\ln\left(1 + u^2\right) + k$