

$$31. \int u^n e^{au} du = \frac{1}{a} u^n e^{au} - \frac{n}{a} \int u^{n-1} e^{au} du$$

$$32. \int e^{au} \sin bu du = \frac{e^{au}}{a^2 + b^2} (a \sin bu - b \cos bu) + C$$

$$33. \int e^{au} \cos bu du = \frac{e^{au}}{a^2 + b^2} (a \cos bu + b \sin bu) + C$$

$$34. \int \ln au du = u \ln au - u + C$$

$$35. \int u^n \ln u du = \frac{u^{n+1}}{(n+1)^2} [(n+1) \ln u - 1] + C$$

$$36. \int \frac{du}{u \ln u} = \ln |\ln u| + C$$

$$37. \int \sin au \sin bu du = \frac{\sin(a-b)u}{2(a-b)} - \frac{\sin(a+b)u}{2(a+b)} + C, a^2 \neq b^2$$

$$38. \int \cos au \cos bu du = \frac{\sin(a-b)u}{2(a-b)} + \frac{\sin(a+b)u}{2(a+b)} + C, a^2 \neq b^2$$

$$39. \int \sin au \cos bu du = -\frac{\cos(a-b)u}{2(a-b)} - \frac{\cos(a+b)u}{2(a+b)} + C, a^2 \neq b^2$$

$$40. \int \sin^n u du = -\frac{1}{n} \sin^{n-1} u \cos u + \frac{n-1}{n} \int \sin^{n-2} u du$$

$$41. \int \cos^n u du = \frac{1}{n} \cos^{n-1} u \sin u + \frac{n-1}{n} \int \cos^{n-2} u du$$

$$42. \int \tan^n u du = \frac{1}{n-1} \tan^{n-1} u - \int \tan^{n-2} u du, n \neq 1$$

$$43. \int \cot^n u du = \frac{-1}{n-1} \cot^{n-1} u - \int \cot^{n-2} u du, n \neq 1$$

$$44. \int \sinh u du = \cosh u + C$$

$$45. \int \cosh u du = \sinh u + C$$

$$46. \int \tanh u du = \ln(\cosh u) + C$$