



$$\begin{aligned}
17) \int \frac{x}{(x+a)^2} dx &= \frac{a}{a+x} + \ln(a+x), \quad a \neq b \\
18) \int \frac{x}{ax^2+bx+c} dx &= \frac{\ln(ax^2+bx+c)}{2a} - \frac{b}{a\sqrt{4ac-b^2}} \tan^{-1} \left\{ \frac{2ax+b}{\sqrt{4ac-b^2}} \right\} \\
19) \int \sqrt{x-a} dx &= \frac{2}{3}(x-a)^{3/2} \\
20) \int \frac{1}{\sqrt{x \pm a}} dx &= 2\sqrt{x \pm a} \\
21) \int \frac{1}{\sqrt{a-x}} dx &= 2\sqrt{a-x} \\
22) \int x\sqrt{x-a} dx &= \frac{2}{3}a(x-a)^{3/2} + \frac{2}{5}(x-a)^{5/2} \\
23) \int \sqrt{ax+b} dx &= \left( \frac{2b}{3a} + \frac{2x}{3} \right) \sqrt{b+ax} \\
24) \int (ax+b)^{3/2} dx &= \sqrt{b+ax} \left( \frac{2b^2}{5a} + \frac{4bx}{5} + \frac{2ax^2}{5} \right) \\
25) \int \frac{x}{\sqrt{x \pm a}} dx &= \frac{2}{3}(x \pm 2a)\sqrt{x \pm a} \\
26) \int \sqrt{\frac{x}{a-x}} dx &= -\sqrt{x}\sqrt{a-x} - a \tan^{-1} \left[ \frac{\sqrt{x}\sqrt{a-x}}{x-a} \right] \\
27) \int \sqrt{\frac{x}{x+a}} dx &= \sqrt{x}\sqrt{x+a} - a \ln[\sqrt{x} + \sqrt{x+a}] \\
28) \int x\sqrt{ax+b} dx &= \left( -\frac{4b^2}{15a^2} + \frac{2bx}{15a} + \frac{2x^2}{5} \right) \sqrt{b+ax} \\
29) \int \sqrt{x}\sqrt{ax+b} dx &= \left( \frac{b\sqrt{x}}{4a} + \frac{x^{3/2}}{2} \right) \sqrt{b+ax} - \frac{b^2 \ln(2\sqrt{a}\sqrt{x} + 2\sqrt{b+ax})}{4a^{3/2}} \\
30) \int x^{3/2} \sqrt{ax+b} dx &= \left( -\frac{b^2\sqrt{x}}{8a^2} + \frac{bx^{3/2}}{12a} + \frac{x^{5/2}}{3} \right) \sqrt{b+ax} \\
&\quad - \frac{b^3 \ln(2\sqrt{a}\sqrt{x} + 2\sqrt{b+ax})}{8a^{5/2}} \\
31) \int \sqrt{x^2 \pm a^2} dx &= \frac{1}{2}x\sqrt{x^2 \pm a^2} \pm \frac{1}{2}a^2 \ln(x + \sqrt{x^2 \pm a^2}) \\
32) \int \sqrt{a^2 - x^2} dx &= \frac{1}{2}x\sqrt{a^2 - x^2} - \frac{1}{2}a^2 \tan^{-1} \left[ \frac{x\sqrt{a^2 - x^2}}{x^2 - a^2} \right]
\end{aligned}$$

$$33) \int x\sqrt{x^2 \pm a^2} = \frac{1}{3}(x^2 \pm a^2)^{3/2}$$

$$34) \int \frac{1}{\sqrt{x^2 \pm a^2}} dx = \ln \left[ x + \sqrt{x^2 \pm a^2} \right]$$

$$35) \int \frac{1}{\sqrt{a^2 - x^2}} dx = -\tan^{-1} \left[ \frac{x\sqrt{a^2 - x^2}}{x^2 - a^2} \right]$$

$$36) \int \frac{x}{\sqrt{x^2 \pm a^2}} dx = \sqrt{x^2 - a^2}$$

$$37) \int \frac{x}{\sqrt{a^2 - x^2}} dx = -\sqrt{a^2 - x^2}$$

$$38) \int \frac{x^2}{\sqrt{x^2 \pm a^2}} dx = \frac{1}{2}x\sqrt{x^2 \pm a^2} \mp \frac{1}{2}\ln \left[ x + \sqrt{x^2 \pm a^2} \right]$$

$$39) \int \frac{x^2}{\sqrt{a^2 - x^2}} dx = -\frac{1}{2}x\sqrt{a^2 - x^2} - \frac{1}{2}a^2 \tan^{-1} \left[ \frac{x\sqrt{a^2 - x^2}}{x^2 - a^2} \right]$$

$$40) \int \sqrt{ax^2 + bx + c} = \left( \frac{b}{4a} + \frac{x}{2} \right) \sqrt{ax^2 + bx + c} \\ + \frac{4ac - b^2}{8a^{3/2}} \ln \left( \frac{2ax + b}{\sqrt{a}} + 2\sqrt{ax^2 + bx + c} \right)$$

$$41) \int x\sqrt{ax^2 + bx + c} = \left( \frac{x^3}{3} + \frac{bx}{12a} + \frac{8ac - 3b^2}{24a^2} \right) \sqrt{ax^2 + bx + c} \\ - \frac{b(4ac - b^2)}{16a^{5/2}} \ln \left( \frac{2ax + b}{\sqrt{a}} + 2\sqrt{ax^2 + bx + c} \right)$$

$$42) \int \frac{1}{\sqrt{ax^2 + bx + c}} dx = \frac{1}{\sqrt{a}} \ln \left[ \frac{2ax + b}{\sqrt{a}} + 2\sqrt{ax^2 + bx + c} \right]$$

$$43) \int \frac{x}{\sqrt{ax^2 + bx + c}} dx = \frac{1}{a} \sqrt{ax^2 + bx + c} - \frac{b}{2a^{3/2}} \ln \left[ \frac{2ax + b}{\sqrt{a}} + 2\sqrt{ax^2 + bx + c} \right]$$

$$44) \int \ln x dx = x \ln x - x$$

$$45) \int \ln(ax + b) dx = \frac{ax + b}{a} \ln(ax + b) - x$$

$$46) \int \ln(a^2 x^2 \pm b^2) dx = x \ln(a^2 x^2 \pm b^2) + \frac{2b}{a} \tan^{-1} \left( \frac{ax}{b} \right) - 2x$$

$$47) \int \ln(a^2 - b^2 x^2) dx = x \ln(a^2 - b^2 x^2) + \frac{2a}{b} \tan^{-1} \left( \frac{bx}{a} \right) - 2x$$

$$48) \int \ln(ax^2 + bx + c)dx = \frac{1}{a} \sqrt{4ac - b^2} \tan^{-1} \left[ \frac{2ax + b}{\sqrt{4ac - b^2}} \right] - 2x + \left( \frac{b}{2a} + x \right) \ln(ax^2 + bx + c)$$

$$49) \int x \ln(ax + b)dx = \frac{b}{2a}x - \frac{1}{4}x^2 + \frac{1}{2} \left( x^2 - \frac{b^2}{a^2} \right) \ln(ax + b)$$

$$50) \int x \ln(a^2 - b^2x^2)dx = -\frac{1}{2}x^2 + \frac{1}{2} \left( x^2 - \frac{a^2}{b^2} \right) \ln(a^2 - b^2x^2)$$

$$51) \int e^{ax}dx = \frac{1}{a}e^{ax}$$

$$52) \int \sqrt{x}e^{ax}dx = \frac{1}{a}\sqrt{x}e^{ax} + \frac{i\sqrt{\pi}}{2a^{3/2}}\operatorname{erf}(i\sqrt{ax}) \text{ where } \operatorname{erf}(x) = \frac{2}{\sqrt{\pi}} \int_0^x e^{-t^2} dt$$

$$53) \int xe^x dx = (x-1)e^x$$

$$54) \int xe^{ax}dx = \left( \frac{x}{a} - \frac{1}{a^2} \right) e^{ax}$$

$$55) \int x^2 e^x dx = e^x(x^2 - 2x + 2)$$

$$56) \int x^2 e^{ax}dx = e^x \left( \frac{x^2}{a} - \frac{2x}{a^2} + \frac{2}{a^3} \right)$$

$$57) \int x^3 e^x dx = e^x(x^3 - 3x^2 + 6x - 6)$$

$$58) \int x^n e^{ax}dx = (-1)^n \frac{1}{a} \Gamma[1+n, -ax] \text{ where } \Gamma(a, x) = \int_x^\infty t^{a-1} e^{-t} dt$$

$$59) \int e^{ax^2}dx = -i \frac{\sqrt{\pi}}{2\sqrt{a}} \operatorname{erf}(ix\sqrt{a})$$

$$60) \int \sin x dx = -\cos x$$

$$61) \int \sin^2 x dx = \frac{x}{2} - \frac{1}{4} \sin 2x$$

$$62) \int \sin^3 x dx = -\frac{3}{4} \cos x + \frac{1}{12} \cos 3x$$

$$63) \int \cos x dx = \sin x$$

$$64) \int \cos^2 x dx = \frac{x}{2} + \frac{1}{4} \sin 2x$$

$$65) \int \cos^3 x dx = \frac{3}{4} \sin x + \frac{1}{12} \sin 3x$$

$$66) \int \sin x \cos x dx = -\frac{1}{2} \cos^2 x$$

$$\begin{aligned}
67) \int \sin^2 x \cos x dx &= \frac{1}{4} \sin x - \frac{1}{12} \sin 3x \\
68) \int \sin x \cos^2 x dx &= -\frac{1}{4} \cos x - \frac{1}{12} \cos 3x \\
69) \int \sin^2 x \cos^2 x dx &= \frac{x}{8} - \frac{1}{32} \sin 4x \\
70) \int \tan x dx &= -\ln \cos x \\
71) \int \tan^2 x dx &= -x + \tan x \\
72) \int \tan^3 x dx &= \ln[\cos x] + \frac{1}{2} \sec^2 x \\
73) \int \sec x dx &= \ln \frac{\cos(x/2) + \sin(x/2)}{\cos(x/2) - \sin(x/2)} \\
74) \int \sec^2 x dx &= \tan x \\
75) \int \sec^3 x dx &= \frac{1}{2} \sec x \tan x + \ln \frac{\cos(x/2) + \sin(x/2)}{\cos(x/2) - \sin(x/2)} \\
76) \int \sec x \tan x dx &= \sec x \\
77) \int \sec^2 x \tan x dx &= \frac{1}{2} \sec^2 x \\
78) \int \sec^n x \tan x dx &= \frac{1}{n} \sec^n x, \quad n \neq 0 \\
79) \int \csc x dx &= \ln \tan(x/2) \\
80) \int \csc^2 x dx &= -\cot x \\
81) \int \csc^3 x dx &= -\frac{1}{2} \cot x \csc x - \frac{1}{2} \ln(\cos(x/2) \sin(x/2)) \\
82) \int \csc^n x \cot x dx &= -\frac{1}{n} \csc^n x, \quad n \neq 0 \\
83) \int \sec x \csc x dx &= \ln \tan x \\
84) \int x \cos x dx &= \cos x + x \sin x \\
85) \int x^2 \cos x dx &= 2x \cos x + (2 - x^2) \sin x \\
86) \int x^n \cos x dx &= -\frac{1}{2} (i)^{1+n} \left\{ \Gamma(1+n, -ix) + (-1)^n \Gamma(1+n, ix) \right\} \\
87) \int x^n \sin x dx &= -\frac{1}{2} (i)^n \left\{ \Gamma(n+1, -ix) - (-1)^n \Gamma(n+1, ix) \right\}
\end{aligned}$$

- $$88) \int e^x \sin x dx = \frac{1}{2} e^x [\sin x - \cos x]$$
- $$89) \int e^{bx} \sin(ax) dx = \frac{1}{b^2 + a^2} e^{bx} [b \sin ax - a \cos ax]$$
- $$90) \int x e^x \sin x dx = \frac{1}{2} e^x [\cos x - x \cos x + x \sin x]$$
- $$91) \int e^x \cos x dx = \frac{1}{2} e^x [\sin x + \cos x]$$
- $$92) \int e^{bx} \cos(ax) dx = \frac{1}{b^2 + a^2} e^{bx} [a \sin ax + b \cos ax]$$
- $$93) \int x e^x \cos x dx = \frac{1}{2} e^x [x \cos x - \sin x + x \sin x]$$
- $$94) \int \cosh x dx = \sinh x$$
- $$95) \int e^{ax} \cosh b x dx = \frac{e^{ax}}{a^2 - b^2} [a \cosh bx - b \sinh bx]$$
- $$96) \int \sinh x dx = \cosh x$$
- $$97) \int e^{ax} \sinh b x dx = \frac{e^{ax}}{a^2 - b^2} [-b \cosh bx + a \sinh bx]$$
- $$98) \int e^x \tanh x dx = e^x - 2 \tan^{-1}(e^x)$$
- $$99) \int \tanh ax dx = \frac{1}{a} \ln \cosh ax$$
- $$100) \int \cos ax \cosh b x dx = \frac{1}{a^2 + b^2} [a \sin ax \cosh bx + b \cos ax \sinh bx]$$
- $$101) \int \cos ax \sinh b x dx = \frac{1}{a^2 + b^2} [b \cos ax \cosh bx + a \sin ax \sinh bx]$$
- $$102) \int \sin ax \cosh b x dx = \frac{1}{a^2 + b^2} [-a \cos ax \cosh bx + b \sin ax \sinh bx]$$
- $$103) \int \sin ax \sinh b x dx = \frac{1}{a^2 + b^2} [b \cosh bx \sin ax - a \cos ax \sinh bx]$$
- $$104) \int \sinh ax \cosh ax dx = \frac{1}{4a} [-2ax + \sinh(2ax)]$$
- $$105) \int \sinh ax \cosh b x dx = \frac{1}{b^2 - a^2} [b \cosh bx \sinh ax - a \cosh ax \sinh bx]$$