9.7 Reduction Formulas

1018. $\int x^n e^{mx} dx = \dfrac{1}{m} x^n e^{mx} - \dfrac{n}{m} \int x^{n-1} e^{mx} dx$

1019. $\int \dfrac{e^{mx}}{x^n} dx = -\dfrac{e^{mx}}{(n-1)x^{n-1}} + \dfrac{m}{n-1} \int \dfrac{e^{mx}}{x^{n-1}} dx$, $n \neq 1$.

1020. $\int \sinh^n x\, dx = \dfrac{1}{n} \sinh^{n-1} x \cosh x - \dfrac{n-1}{n} \int \sinh^{n-2} x\, dx$

1021. $\int \dfrac{dx}{\sinh^n x} = -\dfrac{\cosh x}{(n-1)\sinh^{n-1} x} - \dfrac{n-2}{n-1} \int \dfrac{dx}{\sinh^{n-2} x}$, $n \neq 1$.

1022. $\int \cosh^n x\, dx = \dfrac{1}{n} \sinh x \cosh^{n-1} x \cosh x + \dfrac{n-1}{n} \int \cosh^{n-2} x\, dx$

1023. $\int \dfrac{dx}{\cosh^n x} = -\dfrac{\sinh x}{(n-1)\cosh^{n-1} x} + \dfrac{n-2}{n-1} \int \dfrac{dx}{\cosh^{n-2} x}$, $n \neq 1$.

1024. $\int \sinh^n x \cosh^m x\, dx = \dfrac{\sinh^{n+1} x \cosh^{m-1} x}{n+m}$

$\qquad + \dfrac{m-1}{n+m} \int \sinh^n x \cosh^{m-2} x\, dx$

1025. $\int \sinh^n x \cosh^m x\, dx = \dfrac{\sinh^{n-1} x \cosh^{m+1} x}{n+m}$

$\qquad - \dfrac{n-1}{n+m} \int \sinh^{n-2} x \cosh^m x\, dx$

1026. $\int \tanh^n x\, dx = -\dfrac{1}{n-1} \tanh^{n-1} x + \int \tanh^{n-2} x\, dx$, $n \neq 1$.

1027. $\int \coth^n x\, dx = -\dfrac{1}{n-1}\coth^{n-1}x + \int \coth^{n-2}x\, dx$, $n \neq 1$.

1028. $\int \operatorname{sech}^n x\, dx = \dfrac{\operatorname{sech}^{n-2}x \tanh x}{n-1} + \dfrac{n-2}{n-1}\int \operatorname{sech}^{n-2}x\, dx$, $n \neq 1$.

1029. $\int \sin^n x\, dx = -\dfrac{1}{n}\sin^{n-1}x \cos x + \dfrac{n-1}{n}\int \sin^{n-2}x\, dx$

1030. $\int \dfrac{dx}{\sin^n x} = -\dfrac{\cos x}{(n-1)\sin^{n-1}x} + \dfrac{n-2}{n-1}\int \dfrac{dx}{\sin^{n-2}x}$, $n \neq 1$.

1031. $\int \cos^n x\, dx = \dfrac{1}{n}\sin x \cos^{n-1}x + \dfrac{n-1}{n}\int \cos^{n-2}x\, dx$

1032. $\int \dfrac{dx}{\cos^n x} = \dfrac{\sin x}{(n-1)\cos^{n-1}x} + \dfrac{n-2}{n-1}\int \dfrac{dx}{\cos^{n-2}x}$, $n \neq 1$.

1033. $\int \sin^n x \cos^m x\, dx = \dfrac{\sin^{n+1}x \cos^{m-1}x}{n+m}$

$\qquad + \dfrac{m-1}{n+m}\int \sin^n x \cos^{m-2}x\, dx$

1034. $\int \sin^n x \cos^m x\, dx = -\dfrac{\sin^{n-1}x \cos^{m+1}x}{n+m}$

$\qquad + \dfrac{n-1}{n+m}\int \sin^{n-2}x \cos^m x\, dx$

1035. $\int \tan^n x\, dx = \dfrac{1}{n-1}\tan^{n-1}x - \int \tan^{n-2}x\, dx$, $n \neq 1$.

1036. $\int \cot^n x\, dx = -\dfrac{1}{n-1}\cot^{n-1}x - \int \cot^{n-2}x\, dx$, $n \neq 1$.

1037. $\int \sec^n x\, dx = \dfrac{\sec^{n-2} x \tan x}{n-1} + \dfrac{n-2}{n-1} \int \sec^{n-2} x\, dx$, $n \neq 1$.

1038. $\int \csc^n x\, dx = -\dfrac{\csc^{n-2} x \cot x}{n-1} + \dfrac{n-2}{n-1} \int \csc^{n-2} x\, dx$, $n \neq 1$.

1039. $\int x^n \ln^m x\, dx = \dfrac{x^{n+1} \ln^m x}{n+1} - \dfrac{m}{n+1} \int x^n \ln^{m-1} x\, dx$

1040. $\int \dfrac{\ln^m x}{x^n}\, dx = -\dfrac{\ln^m x}{(n-1)x^{n-1}} + \dfrac{m}{n-1} \int \dfrac{\ln^{m-1} x}{x^n}\, dx$, $n \neq 1$.

1041. $\int \ln^n x\, dx = x \ln^n x - n \int \ln^{n-1} x\, dx$

1042. $\int x^n \sinh x\, dx = x^n \cosh x - n \int x^{n-1} \cosh x\, dx$

1043. $\int x^n \cosh x\, dx = x^n \sinh x - n \int x^{n-1} \sinh x\, dx$

1044. $\int x^n \sin x\, dx = -x^n \cos x + n \int x^{n-1} \cos x\, dx$

1045. $\int x^n \cos x\, dx = x^n \sin x - n \int x^{n-1} \sin x\, dx$

1046. $\int x^n \sin^{-1} x\, dx = \dfrac{x^{n+1}}{n+1} \sin^{-1} x - \dfrac{1}{n+1} \int \dfrac{x^{n+1}}{\sqrt{1-x^2}}\, dx$

1047. $\int x^n \cos^{-1} x\, dx = \dfrac{x^{n+1}}{n+1} \cos^{-1} x + \dfrac{1}{n+1} \int \dfrac{x^{n+1}}{\sqrt{1-x^2}}\, dx$

1048. $\int x^n \tan^{-1} x\, dx = \dfrac{x^{n+1}}{n+1} \tan^{-1} x - \dfrac{1}{n+1} \int \dfrac{x^{n+1}}{1+x^2}\, dx$

1049. $\int \dfrac{x^n dx}{ax^n + b} = \dfrac{x}{a} - \dfrac{b}{a} \int \dfrac{dx}{ax^n + b}$

1050. $\int \dfrac{dx}{(ax^2 + bx + c)^n} = \dfrac{-2ax - b}{(n-1)(b^2 - 4ac)(ax^2 + bx + c)^{n-1}}$

$\qquad - \dfrac{2(2n-3)a}{(n-1)(b^2 - 4ac)} \int \dfrac{dx}{(ax^2 + bx + c)^{n-1}}$, $n \neq 1$.

1051. $\int \dfrac{dx}{(x^2 + a^2)^n} = \dfrac{x}{2(n-1)a^2(x^2 + a^2)^{n-1}} + \dfrac{2n-3}{2(n-1)a^2} \int \dfrac{dx}{(x^2 + a^2)^{n-1}}$,

$n \neq 1$.

1052. $\int \dfrac{dx}{(x^2 - a^2)^n} = - \dfrac{x}{2(n-1)a^2(x^2 - a^2)^{n-1}}$

$\qquad - \dfrac{2n-3}{2(n-1)a^2} \int \dfrac{dx}{(x^2 - a^2)^{n-1}}$, $n \neq 1$.