! For an efficient use of these tables, first read `HowTo.pdf`.

T1.05. Integrand involving $a + b\,x^2 \equiv X_2$.

1. $$\int \frac{dx}{X_2} = \begin{cases} \dfrac{1}{\sqrt{ab}}\ \arctan\, x\sqrt{\dfrac{b}{a}}, & ab > 0, \\ \dfrac{1}{2\sqrt{-ab}}\ \ln \dfrac{a + x\sqrt{-ab}}{a - x\sqrt{-ab}}, & ab < 0, \\ \dfrac{1}{\sqrt{-ab}}\ \tanh^{-1} \dfrac{x\,\sqrt{-ab}}{a}, & ab < 0. \end{cases}$$

2. $$\int \frac{x\,dx}{X_2} = \frac{1}{2b}\ \ln\ X_2.$$

3. $$\int \frac{x^2\,dx}{X_2} = \frac{x}{b} - \frac{a}{b}\int \frac{dx}{X_2}.$$

4. $$\int \frac{x^2\,dx}{X_2^2} = \frac{x}{2a\,X_2} + \frac{1}{2a}\int \frac{dx}{X_2}.$$

5. $$\int \frac{x^2\,dx}{X_2^{m+1}} = \begin{cases} \dfrac{x}{2ma\,X_2^m} + \dfrac{2m-1}{2ma}\displaystyle\int \frac{dx}{X_2^m}, \\ \dfrac{(2m)!}{(m!)^2}\left[\dfrac{x}{2a}\displaystyle\sum_{k=1}^{m} \frac{k!\,(k-1)!}{(4a)^{m-k}\,(2k)!\,X_2^k} + \frac{1}{(4a)^m}\int \frac{dx}{X_2}\right]. \end{cases}$$

6. $$\int \frac{x\,dx}{X_2^{m+1}} = -\frac{1}{2bm\,X_2^m}, \quad m \neq 0.$$

7. $$\int \frac{x^2\,dx}{X_2^{m+1}} = -\frac{x}{2bm\,X_2^m} + \frac{1}{2mb}\int \frac{dx}{X_2^m}, \quad m \neq 0.$$

8. $$\int \frac{dx}{x\,X_2} = \frac{1}{2a}\ \ln\ \frac{x^2}{X_2}.$$

9. $$\int \frac{dx}{x^2\,X_2} = -\frac{1}{a\,x} - \frac{b}{a}\int \frac{dx}{X_2}.$$

10. $$\int \frac{dx}{x\,X_2^{m+1}} = \begin{cases} \dfrac{1}{2ma\,X_2^m} + \dfrac{1}{a}\displaystyle\int \frac{dx}{x\,X_2^m}, \\ \dfrac{1}{2a^{m+1}}\left[\displaystyle\sum_{k=1}^{m} \frac{a^k}{k\,X_2^k} + \ln\frac{x^2}{X_2}\right]. \end{cases}$$

11. $$\int \frac{dx}{x^2\,X_2^{m+1}} = \frac{1}{a}\int \frac{dx}{x^2\,X_2^m} - \frac{b}{a}\int \frac{dx}{X_2^{m+1}}.$$