

$$\int (\alpha x^2 + \beta)^\mu x dx$$

$(\mu \neq -1)$

$$\begin{aligned} \int (\alpha x^2 + b)^u x dx &= \int (\alpha x^2 + b)^u d(x^2/2) = \\ &= \frac{1}{2} \int (\alpha x^2 + b)^u d(x^2) = \frac{1}{2} \int (\alpha x^2 + b)^u \frac{1}{a} d(\alpha x^2 + b) = \\ &= \frac{1}{2a} \int (\alpha x^2 + b)^u dt = \frac{1}{2a} \frac{t^{u+1}}{u+1} + C = \\ &= \frac{(\alpha x^2 + b)^{u+1}}{2a(u+1)} + C \end{aligned}$$