

$$\begin{aligned}\int_1^0 9u \sqrt{u^2 + 4} \, du &= -\int_0^1 9u \sqrt{u^2 + 4} \, du \\ &\text{[because we reversed the limits of integration]} \\ &= -\int_0^1 9x \sqrt{x^2 + 4} \, dx \\ &\text{[we can use any letter without changing the value} \\ &\text{of the integral]} \\ &= -(15\sqrt{5} - 24) \\ &\text{[given value]} \\ &= 24 - 15\sqrt{5}\end{aligned}$$