Exercise 3

Prove the following:

$$\int_0^x \int_0^{x_1} (x-t)u(x_1)\,dt\,dx_1 + \int_0^x \int_0^{x_1} (x-t)^2 u(x_1)\,dt\,dx_1 = \frac{1}{6}\int_0^x (x-t)^2(3+2(x-t))u(t)\,dt$$

[TYPO: The integrands should be $(x_1-t)u(t)$ and $(x_1-t)^2u(t)$, respectively.]