\[ \int_0^1 t \, d(t^2) \quad \text{(substitute } t^2 = x) \]

\[ = \int_0^{\tau^2} x^{1/2} \, dx = \frac{2}{3} \tau^{3/2} \left[ \tau^2 \right]_0^\tau = \frac{2}{3} \tau^3 \]

\[ y = t \]
\[ x = t^2 \]

This area is the integral

Alternatively write \( d(t^2) = 2t \, dt \):

\[ \int_0^\tau 2t^2 \, dt = \frac{2}{3} \tau^3 \]