

$$13. \int_C (2x + 5y^2) dy$$

$$\int_{y=0}^{y=5} (2 \cdot \frac{3}{5}y + 5y^2) dy$$

$$= \int_{y=0}^{y=5} (\frac{6}{5}y + 5y^2) dy$$

$$= \left[\frac{6}{5} \cdot \frac{1}{2} y^2 + \frac{5}{3} y^3 \right]_0^5$$

$$= \left[\frac{3}{5} y^2 + \frac{5}{3} y^3 \right]_0^5$$

$$= \frac{3}{5} \cdot 5^2 + \frac{5}{3} \cdot 5^3$$

$$= 15 + \frac{625}{3}$$

$$= \frac{45}{3} + \frac{625}{3}$$

$$= \frac{670}{3}$$

$$\begin{aligned} x &= 3t & y &= 5t & 0 \leq t \leq 1 \\ x &= 3\left(\frac{y}{5}\right) & \frac{y}{5} &= t & \\ x &= \frac{3}{5}y & & & y = 5t \end{aligned}$$