

Quiz 18 lecture

$$\text{Q1. } \cancel{V(0,1) + t(2,3t)} \\ = \cancel{(2t, 1+3t)}$$

$$P + t \cdot (Q - P) = (0, 1) + t \cdot (2, 2) \\ = (2t, 2t + 1)$$

$$\sqrt{x'(t)^2 + y'(t)^2} = \cancel{\sqrt{4+9} = \sqrt{13}} \quad \sqrt{2^2 + 2^2} = 2\sqrt{2}$$

$$\int_0^1 \cancel{(2t)(1+3t) \cdot \sqrt{13}} dt \\ = \cancel{3\sqrt{13}}$$

$$\int_0^1 (2t) \cdot (2t+1) \cdot 2\sqrt{2} dt \\ = 2\sqrt{2} \cdot 2 \cdot \int_0^1 (2t^2 + t) dt \\ = 4\sqrt{2} \cdot \left(\frac{2}{3}t^3 + \frac{t^2}{2} \right) \Big|_0^1 \\ = 4\sqrt{2} \cdot \left(\frac{2}{3} + \frac{1}{2} \right) - 0 \\ = 4\sqrt{2} \cdot \frac{7}{6} \\ = \frac{14\sqrt{2}}{3}$$

$$\text{Q2. } \int_C xy^2 dx + x^2y dy$$

$$C: x = t^2 \quad y = t^3 \quad 0 \leq t \leq 1 \\ dx = 2t \quad dy = 3t^2$$

$$\int_0^1 (t^2)(t^3)^2 \cdot 2t dt + (t^2)^2 \cdot (t^3) \cdot 3(t^2) dt$$

$$= \int_0^1 t^8 \cdot 2t dt + 3t^9 dt$$

$$= \int_0^1 5t^9 dt$$

$$= \frac{1}{2} t^{10} \Big|_0^1$$

$$= \frac{1}{2}$$

