

"QUIZ" for Lecture 18

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Section: 23

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q18FirstLast.pdf) ASAP BUT NO LATER THAN Nov. 9, 8:00pm

1. Let C be the line segment from $(0, 1)$ to $(2, 3)$, find $\int_C xy \, ds$.

$$r(t) = (1-t)\langle 0, 1 \rangle + t\langle 2, 3 \rangle = \langle 0, 1-t \rangle + \langle 2t, 3t \rangle = \langle 2t, 1+2t \rangle$$

$$0 \leq t \leq 1, \quad x = 2t, \quad y = 1+2t$$

$$|r'(t)| = \sqrt{8}, \quad ds = \sqrt{8} \, dt$$

$$\int_0^1 2t(1+2t)\sqrt{8} \, dt = \sqrt{8} \int_0^1 (2t)(1+2t) \, dt =$$

$$\sqrt{8} \int_0^1 (2t + 4t^2) \, dt = \sqrt{8} \left(t^2 + \frac{4}{3}t^3 \right) \Big|_0^1 = \boxed{\sqrt{2} \frac{14}{3}}$$

2. Evaluate

$$\int_C xy^2 \, dx + x^2y \, dy,$$

where C is $x = t^2, y = t^3, 0 \leq t \leq 1$.

$$dx = (t^2)' dt = 2t \, dt, \quad dy = (t^3)' dt = 3t^2 \, dt$$

$$\int_0^1 (t^2)(t^3)^2 (2t) \, dt + (t^2)^2 (t^3) (3t^2) \, dt = \int_0^1 2t^9 \, dt + 3t^9 \, dt = \int_0^1 5t^9 \, dt = \frac{t^{10}}{2} \Big|_0^1 = \boxed{\frac{1}{2}}$$