

"QUIZ" for Lecture 18

NAME: (print!) Yeram Sarah Jung 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 $\int_C xy \, ds$.

$$[x(t), y(t)] = [0, 1] + t \cdot ([2, 3] - [0, 1]) = [0, 1] + t \cdot [2, 2] = [0, 1] + [2t, 2t] = [2t, 1+2t]$$

$$x(t) = 2t \quad y(t) = 1+2t$$

$$ds = \sqrt{x'(t)^2 + y'(t)^2} \, dt = \sqrt{2^2 + 2^2} \, dt = 2\sqrt{2} \, dt$$

$$xy = (2t)(1+2t) = (4t^2 + 2t)(2\sqrt{2}) = 8\sqrt{2}t^2 + 4\sqrt{2}t$$

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

2. Evaluate

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

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

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

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

$$= \int_0^1 2t^5 \, dt + 3t^7 \, dt = \int_0^1 (2t^5 + 3t^7) \, dt$$

$$= \left. \frac{2t^6}{6} + \frac{3t^8}{8} \right|_0^1 = \frac{2}{6} + \frac{3}{8} = \boxed{0.586}$$