

"QUIZ" for Lecture 18

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Section: 24

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 $\int_C xy \, ds$.

$$\int_a^b f(x(t), y(t)) \sqrt{x'(t)^2 + y'(t)^2} \, dt$$

$$x(t) = (1-t)(0) + 2t = 2t$$

$$y(t) = (1-t)(1) + 3t = 1+2t$$

$$0 \leq t \leq 1$$

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

$$\sqrt{(2)^2 + (2)^2} = \sqrt{8} = 2\sqrt{2}$$

$$= 2\sqrt{2} \int_0^1 (2t + 4t^2) \, dt$$

$$= 2\sqrt{2} \left(t^2 + \frac{4}{3}t^3 \right) \Big|_0^1 = 2\sqrt{2} \left(1 + \frac{4}{3} \right) = (2\sqrt{2}) \frac{7}{3} = \boxed{\frac{14}{3}\sqrt{2}}$$

2. Evaluate

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

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

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

$$= \int_0^1 (t^2)(t^6)(2t) \, dt + (t^4)(t^3)(3t^2) \, dt$$

$$= \int_0^1 (2t^9 + 3t^9) \, dt$$

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