

"QUIZ" for Lecture 18

NAME: (print!) \_\_\_\_\_ Section: \_\_\_\_\_

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  $\int_C xy \, ds$ .

$$\begin{aligned}
 \mathbf{r}(t) &= (1-t)\langle 0, 1 \rangle + t\langle 2, 3 \rangle \\
 \mathbf{r}(t) &= \langle 0, 1-t \rangle + \langle 2t, 3t \rangle \\
 \mathbf{r}(t) &= \langle 2t, 1+2t \rangle \\
 x &= 2t, \quad y = 1+2t \quad t \in [0, 1] \\
 \mathbf{r}'(t) &= \langle 2, 2 \rangle \\
 |\mathbf{r}'(t)| &= \sqrt{8}
 \end{aligned}$$

$$\begin{aligned}
 &\int_0^1 (2t)(1+2t)(\sqrt{8}) \, dt \\
 &= \left[ \frac{\sqrt{2^5} t^2 (2t+3)}{3} \right]_0^1 \\
 &= \boxed{\frac{5\sqrt{2^5}}{3}}
 \end{aligned}$$

2. Evaluate

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

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

$$dx = 2t \, dt, \quad dy = 3t^2 \, dt$$

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

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

$$\int_0^1 5t^9 \, dt = \left[ \frac{t^{10}}{2} \right]_0^1$$

$$\frac{1}{2} - \frac{0}{2} = \boxed{\frac{1}{2}}$$