Answers to Even Exercises, Homework Set 13

Section 13.3 # 6 $f(x,y) = xe^y + K$ is a potential for $\vec{F}$

24 According to the picture is looks plausible that $\int_C \vec{F} \cdot d\vec{r} = 0$ for every closed curve, and since the region is open and connected, it is plausible that $\vec{F}$ is conservative.

30 (a) D is open, (b) D is not connected, (c) D is not simply connected

32 (a) D is not open because (b) D is not connected (c) D is not simply connected

Section 13.4 # 4 (a) 0, (b) same

22 By Green's Theorem,

$\frac{1}{2A}\int_C x^2\,dy = \frac{1}{2A}\int\int_D 2x\,dA = \frac{1}{A}\int\int_D x\,dA =$ average value of x $= \bar{x}$

similarily

$-\frac{1}{2A}\int_C y^2\,dx = -\frac{1}{2A}\int\int_D -2y\,dA = \frac{1}{A}\int\int_D y\,dA =$ average value of y $= \bar{y}$