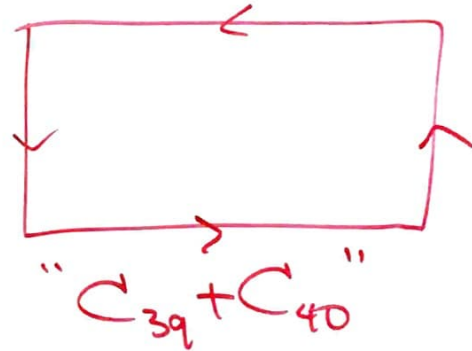
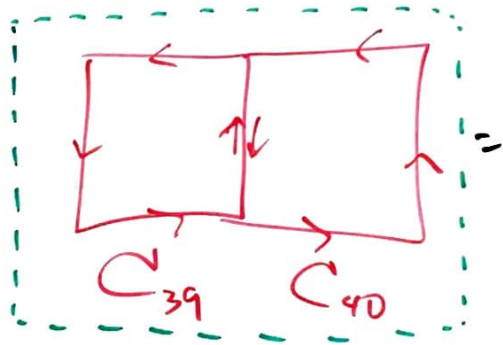
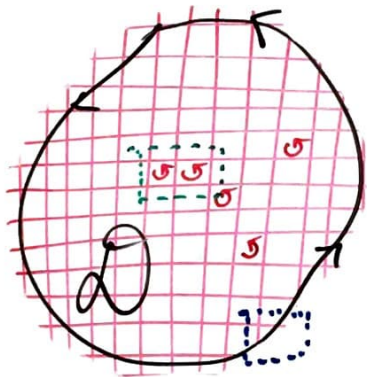
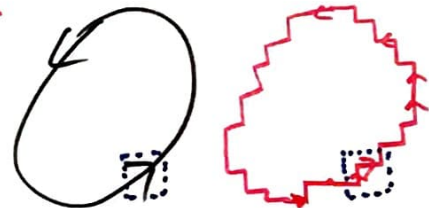


$$\oint_C \vec{F} \cdot d\vec{r} \approx \sum_{i=1}^N \oint_{C_i} \vec{F} \cdot d\vec{r} \approx \sum_{i=1}^N \left(\frac{\partial F_2}{\partial x} - \frac{\partial F_1}{\partial y} \right)_i \Delta x \Delta y = \iint_D \left(\frac{\partial F_2}{\partial x} - \frac{\partial F_1}{\partial y} \right) dx dy$$



$$C = \sum_{i=1}^N C_i$$



$$\oint_{C_{39}} \vec{F} \cdot d\vec{r} \approx \left(\frac{\partial F_2}{\partial x} - \frac{\partial F_1}{\partial y} \right)_{39} \Delta x \Delta y$$

evaluated at loop 39

A diagram showing a small square element with side lengths \$\Delta x\$ and \$\Delta y\$. The force components \$F_1\$ and \$F_2\$ are shown acting on the sides of the square. The boundary of the square is shown with arrows indicating a counter-clockwise direction.

$$\int_{C_{39}} \vec{F} \cdot d\vec{r} \approx \int_{C_{39}} \vec{F} \cdot d\vec{r} \approx F_1 \Delta x + F_2 \Delta y$$