

# Steps for Analyzing Line Integrals

You wish to evaluate an integral of the form:

$$\int_C \mathbf{A}(\bar{\mathbf{r}}) \cdot d\bar{\ell}$$

To successfully accomplish this, simply follow these steps:

**Step 1:** Determine the proper  $d\bar{\ell}$  for the **contour**  $C$ .

**Step 2:** Evaluate the **dot product**  $\mathbf{A}(\bar{\mathbf{r}}) \cdot d\bar{\ell}$ .

**Step 3:** Transform all coordinates of the resulting **scalar** field to the **same** system as  $C$ .

**Step 4:** Evaluate the scalar field using the **two** coordinate **equalities** that describe contour  $C$ .

**Step 5:** Determine the **limits of integration** from the **inequality** that describes contour  $C$  (*be careful of order!*).

**Step 6:** Integrate the remaining function of **one** coordinate variable.