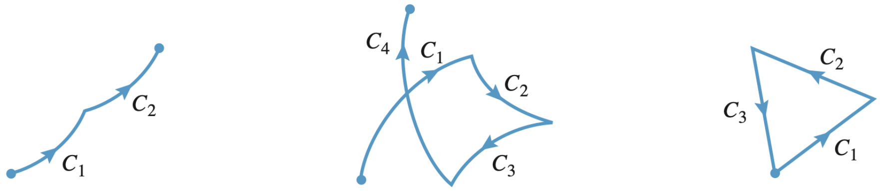
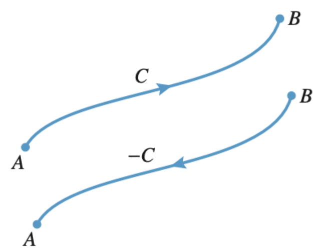
A curve C is said to be **piecewise-smooth** if it is made up of finitely many smooth curves, $C_1, C_2, \ldots, C_n$, joined end to end. We write $C = C_1 \cup C_2 \cup \cdots \cup C_n$.

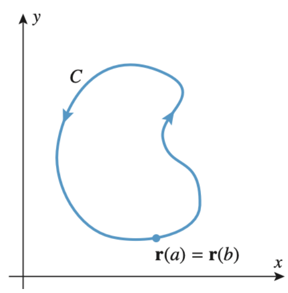


An **oriented curve** C has an initial point A and a terminal point B. We let $-C$ denote the curve with the opposite orientation (going from B to A).

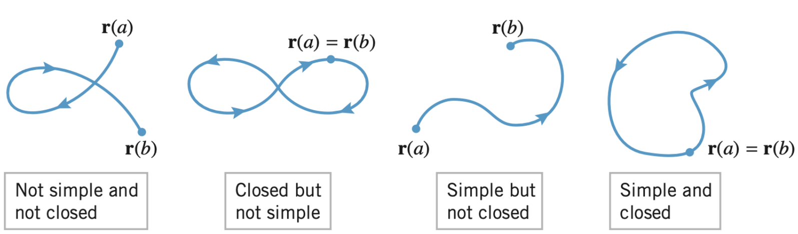
Parametrizing a curve automatically induces an orientation.



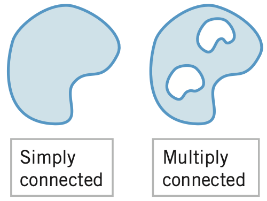
A curve is said to be **closed** if its initial point coincides with its terminal point (i.e. if it forms a loop). If C is parametrized by $\mathbf{r}(t)$ where $a \leq t \leq b$, then C is closed if $\mathbf{r}(a) = \mathbf{r}(b)$.



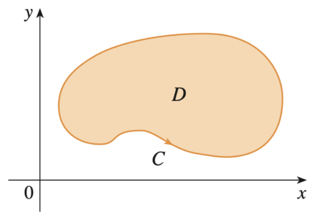
A curve is called **simple** if it doesn't intersect itself (except possibly at the endpoints in the case of a closed curve). If C is parametrized by $\mathbf{r}(t)$ for $a \leq t \leq b$, then C is simple if for any t_1 and t_2 in the interval (a, b) with $t_1 \neq t_2$, we have that $\mathbf{r}(t_1) \neq \mathbf{r}(t_2)$.



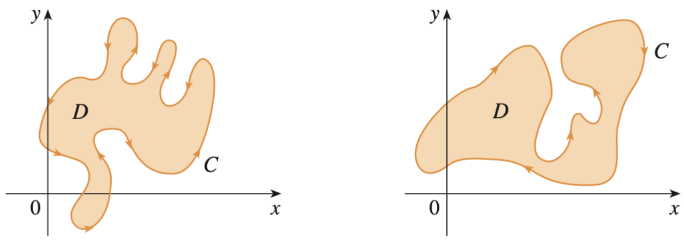
A region D in the plane is said to be **simply connected** if it has no holes. More formally, a region D is simply connected if no simple closed curve in D encloses points that are not in D. A connected set with one or more holes is said to be **multiply connected**.



Orientation of simple closed curves in Green's Theorem: Green's Theorem has to do with the connection between a line integral around a simple closed curve C and a double integral over the region D that is enclosed by C.



When using this theorem, we use the convention that the positive orientation C is counterclockwise.



(a) Positive orientation (b) Negative orientation