(a) A point $a \in G$ is an **interior point** of G if some open disk with center a is a subset of G.

(b) A point $b \in \mathbb{C}$ is a **boundary point** of G if every open disk centered at b contains a point in G and also a point that is not in G.

(c) A point $c \in \mathbb{C}$ is an **accumulation point** of G if every open disk centered at c contains a point of G different from c.

(d) A point $d \in G$ is an **isolated point** of G if some open disk centered at d contains no point of G other than d.

The idea is that if you don't move too far from an interior point of G then you remain in G; but at a boundary point you can make an arbitrarily small move and get to a point inside G and you can also make an arbitrarily small move and get to a point outside G.

Definition. A set is **open** if all its points are interior points. A set is **closed** if it contains all its boundary points.

Example 1.8. For $r > 0$ and $a \in \mathbb{C}$, the sets $\{z \in \mathbb{C} : |z-a| < r\} = D[a,r]$ and $\{z \in \mathbb{C} : |z-a| > r\}$ are open. The **closed disk**

$$\overline{D}[a,r] := \{z \in \mathbb{C} : |z-a| \le r\}$$

is an example of a closed set. □

A given set might be neither open nor closed. The complex plane $\mathbb{C}$ and the **empty set** $\varnothing$ are (the only sets that are) both open and closed.

Definition. The **boundary** ∂G of a set G is the set of all boundary points of G. The **interior** of G is the set of all interior points of G. The **closure** of G is the set $G \cup \partial G$.

Example 1.9. The closure of the open disk $D[a,r]$ is $\overline{D}[a,r]$. The boundary of $D[a,r]$ is the circle $C[a,r]$. □

Definition. The set G is **bounded** if $G \subseteq D[0,r]$ for some r.

One notion that is somewhat subtle in the complex domain is the idea of *connectedness*. Intuitively, a set is connected if it is "in one piece." In $\mathbb{R}$ a set is connected if and only if it is an interval, so there is little reason to discuss the matter. However, in the plane there is a vast variety of connected subsets.