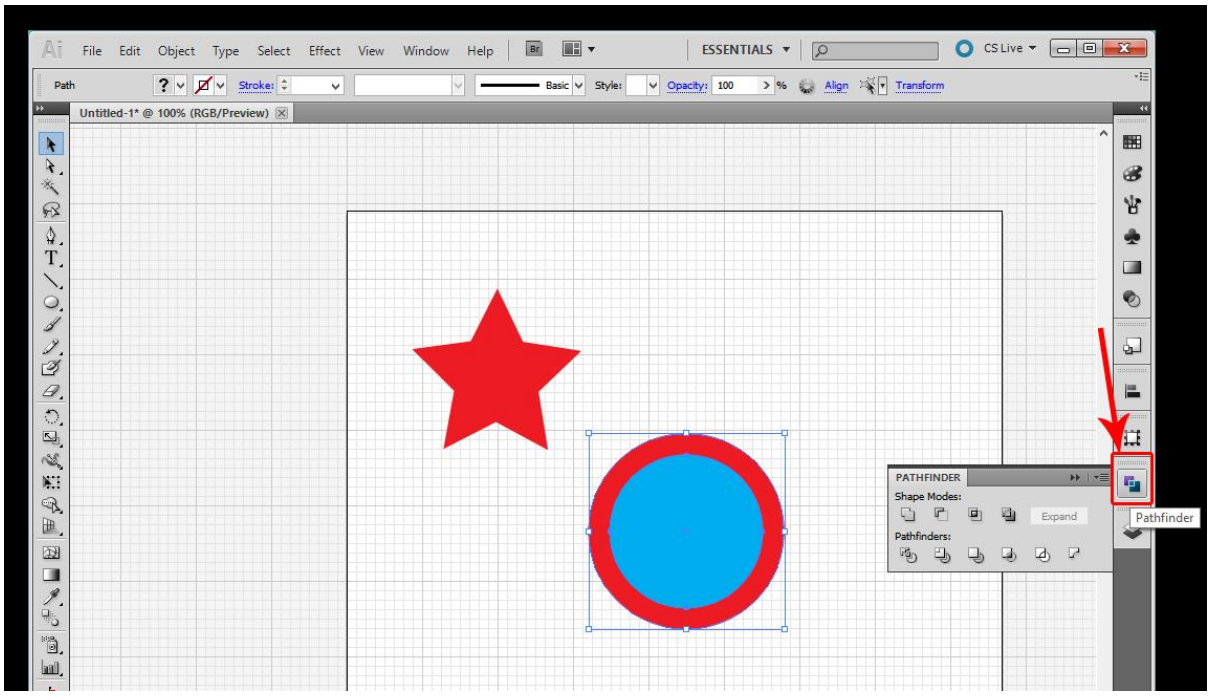
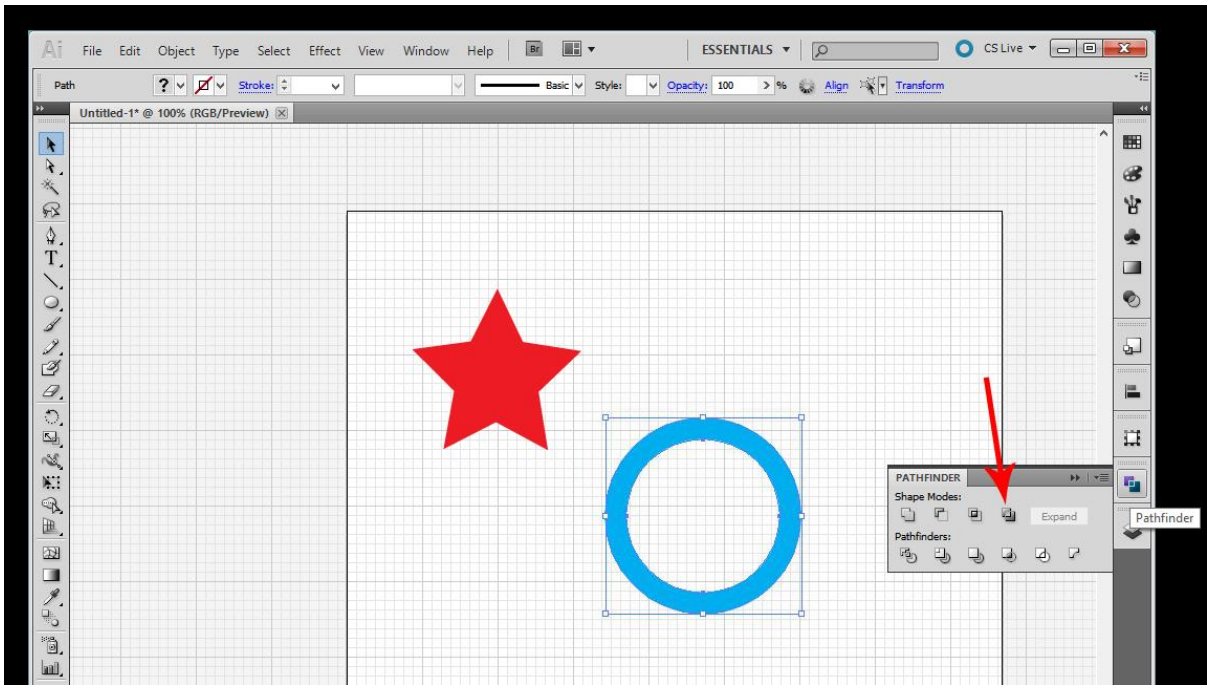
# Adobe Illustrator – Pathfinder Palette Tools

The **Pathfinder** palette gives you a variety of tools that let you manipulate your stacked shapes in different ways to create your designs.



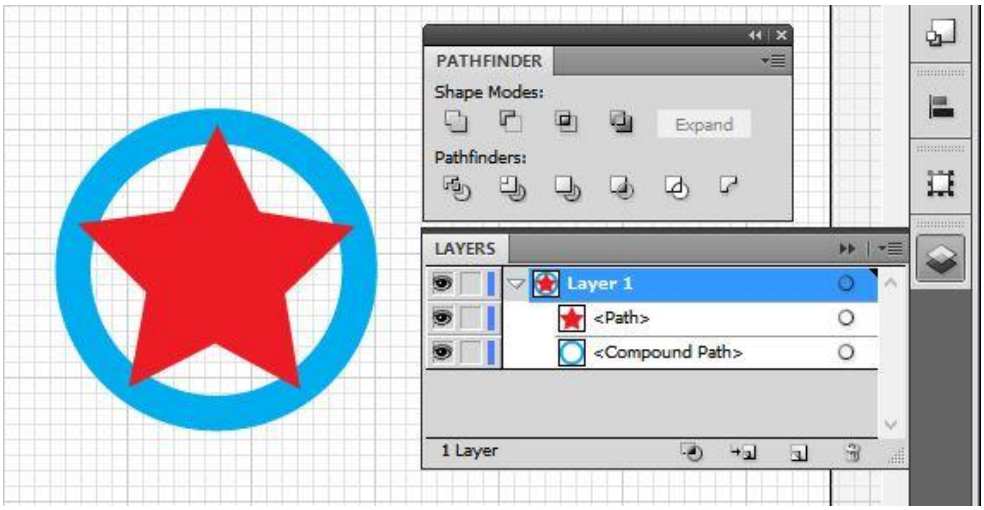




The palette is broken up into two sections, the **Shapes** tools are on the top row, and the **Path** tools are on the bottom row. Each tool works a little bit differently, so I'll show an example below for each on the next pages.

## Shapes Tools

These are used to manipulate shapes, and the "punching tools" are destroyed in the process. If you are planning to use the fills for engraving, use the **Shapes** tools, and use **no Stroke color** for best results.

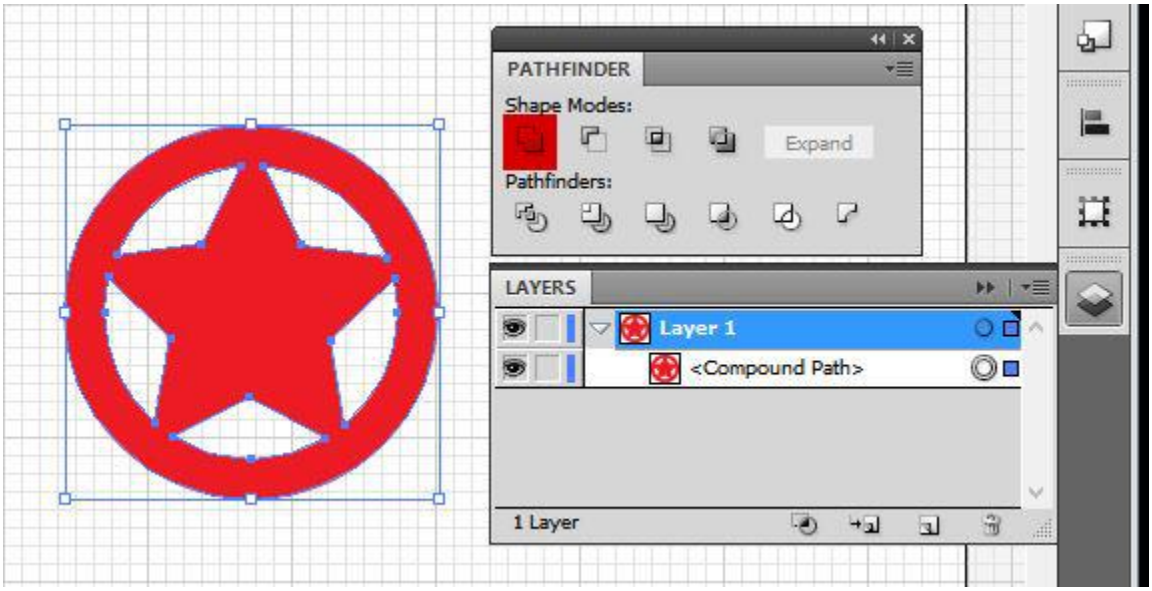
I'll use the compound path created above to demonstrate each of the functions below. I've placed a red star shape over the blue compound path in the Layers palette. The relative location of each part makes a difference in the result you get when you are using some of these tools, so this is one of those situations where it helps to have the Layers palette opened while you are working, so you can check the results.




In each case below, you would **select both shapes** on the artboard above and then click on the highlighted button shown in the **Pathfinder** palette below to perform the operation. The results of the operation are displayed next to the palettes.

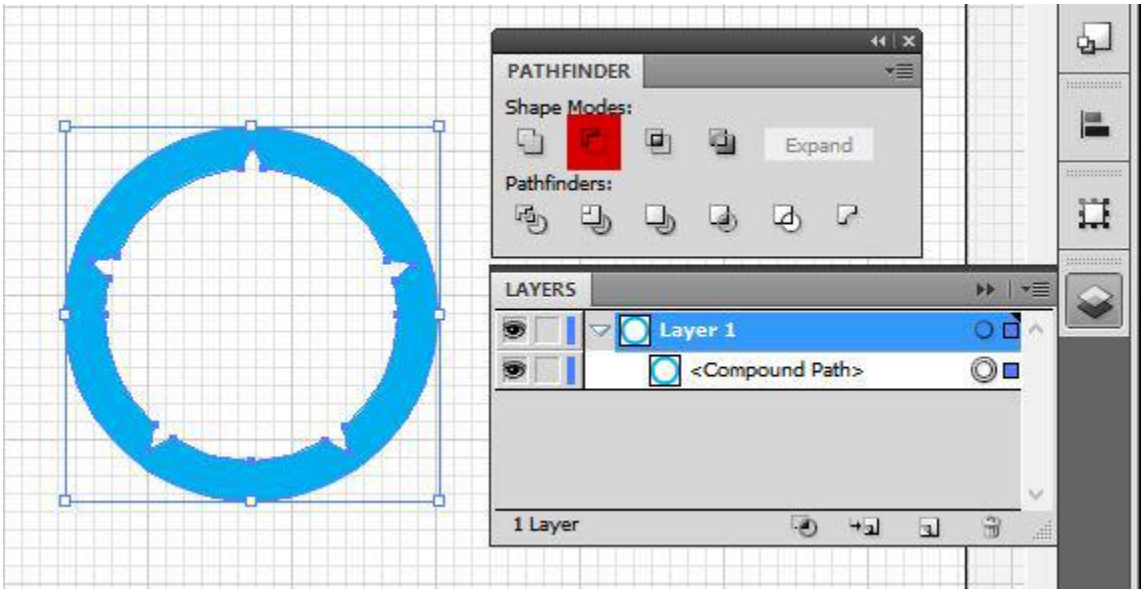
## Unite Tool

This tool unites the shapes into one shape or compound path, eliminating the two separate shapes shown before. It will pick up the fill color of the top layer shape. *(Note the changes to the Layers.)*



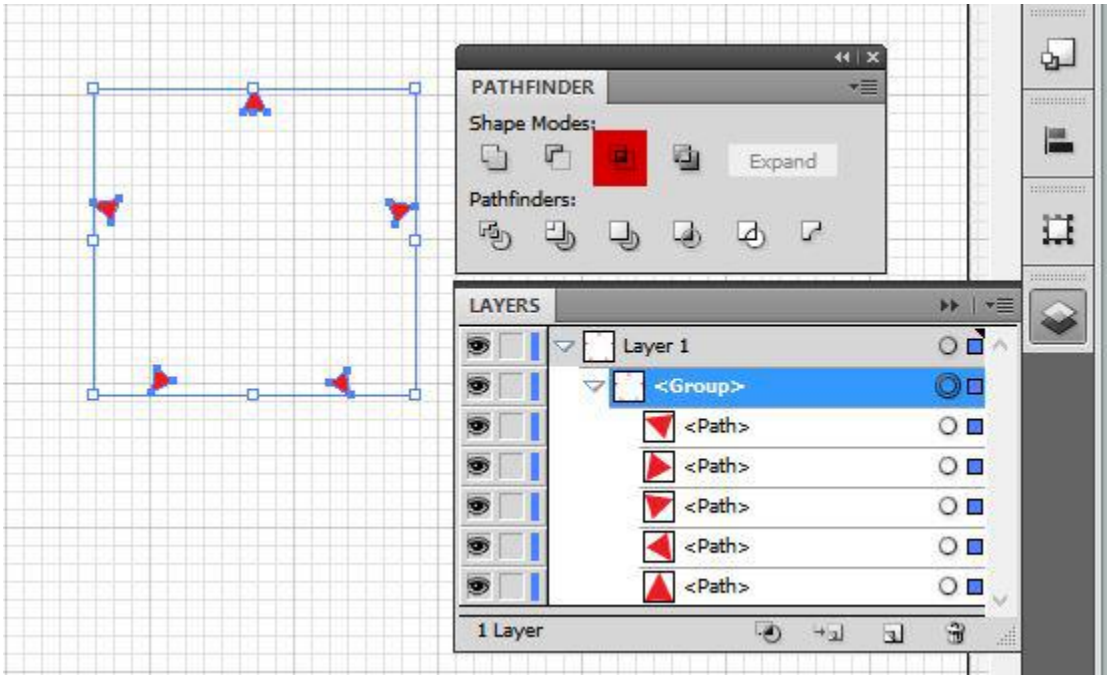
## Minus Front Tool

Just like it says, this tool punches the top shape down through the bottom shape, keeping the color of the bottom shape. *(It knocked the overlapping points of the star out of the blue compound path below.)*



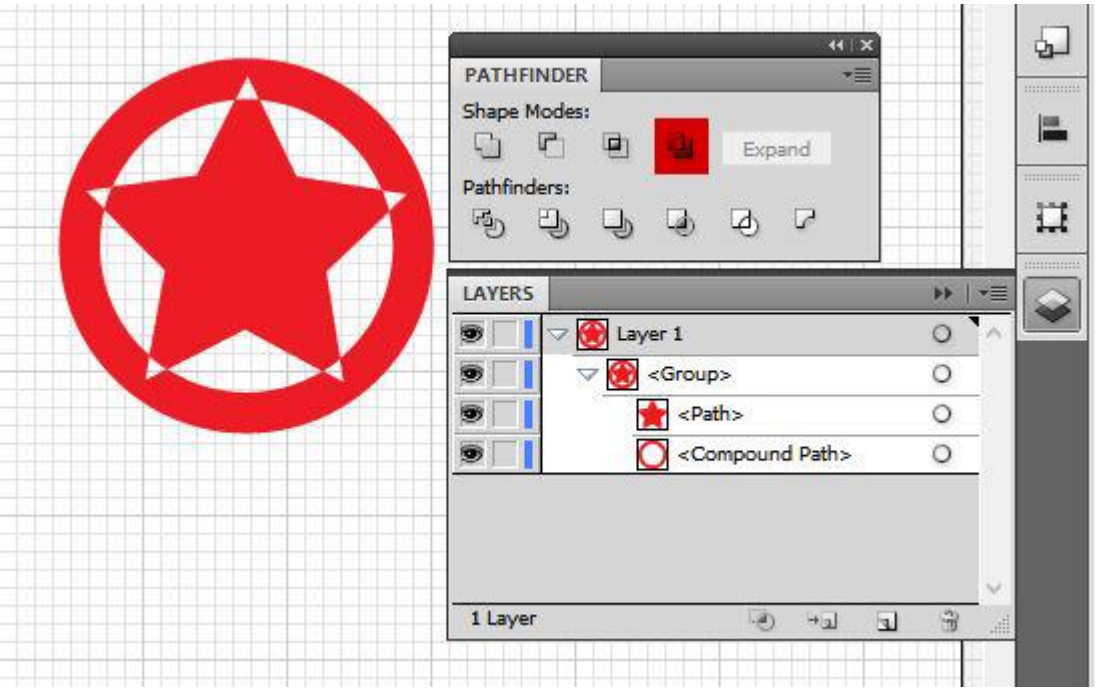

## Intersect Tool

This tool knocks out everything **except** the parts that overlap, and it applies the top color to the Grouped remainders. *(It knocked out everything **but** the overlapping star point tips.)*



## Exclude Tool

This tool excludes overlapping parts from **both** shapes, and it assigns the top layer color to the parts that are left. *(In this case a compound path with some notches knocked out of it and a star shape with truncated tips.)*



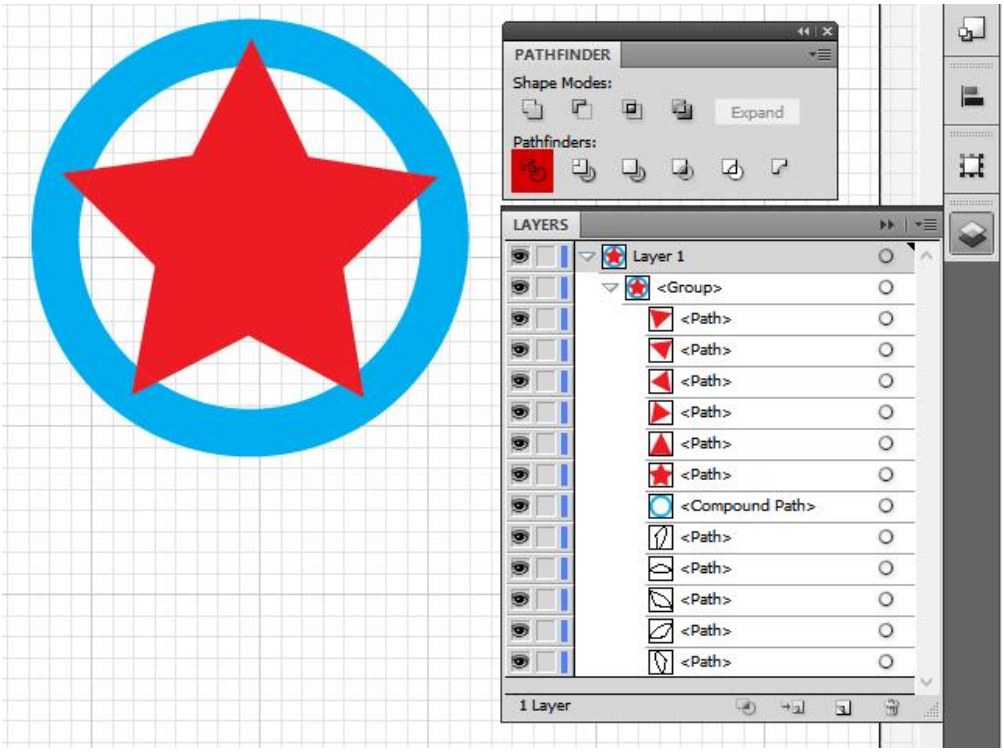

## Pathfinder Tools

These tools are used to manipulate the paths as well as any fills, in as non-destructive a way as possible. Illustrator assumes that you might want to do something with the empty spaces as well, and preserves them in hidden paths. The results can be quite complex, particularly when working with compound paths, so using the layers can be very helpful to show what happened.

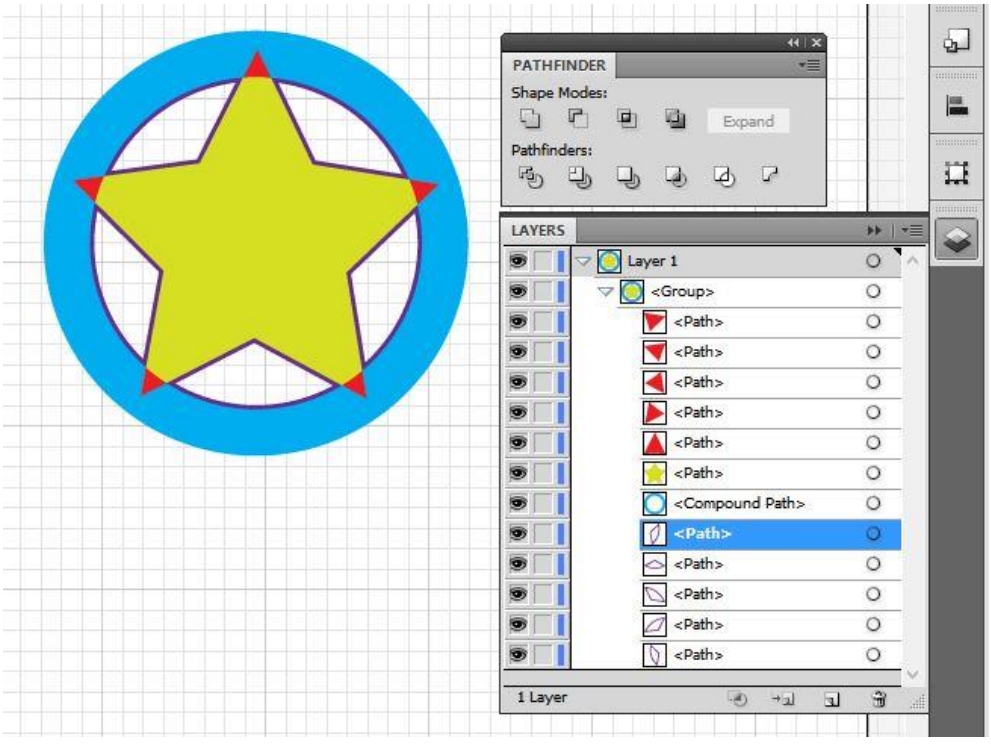
Hidden paths can frequently occur when using these tools in the results on complex compound paths….**paths with no fill and no stroke color**, that nonetheless exist in the Layers palette. Fortunately the Glowforge interface does not pick these up and try to interpret them as cuts, since there is not a Stroke color associated with them. They just make for a messy file. If you inadvertently assign a stroke color to them though, by not realizing they are there, you are going to make a huge mess to clean up when you try to process them through the Glowforge interface.

## Divide Tool

This tool cuts both shapes into parts wherever the paths cross. At first glance, the results of using this tool look exactly the same as the original star and ring shape, but if you look at the layer palette, you'll see a big change.

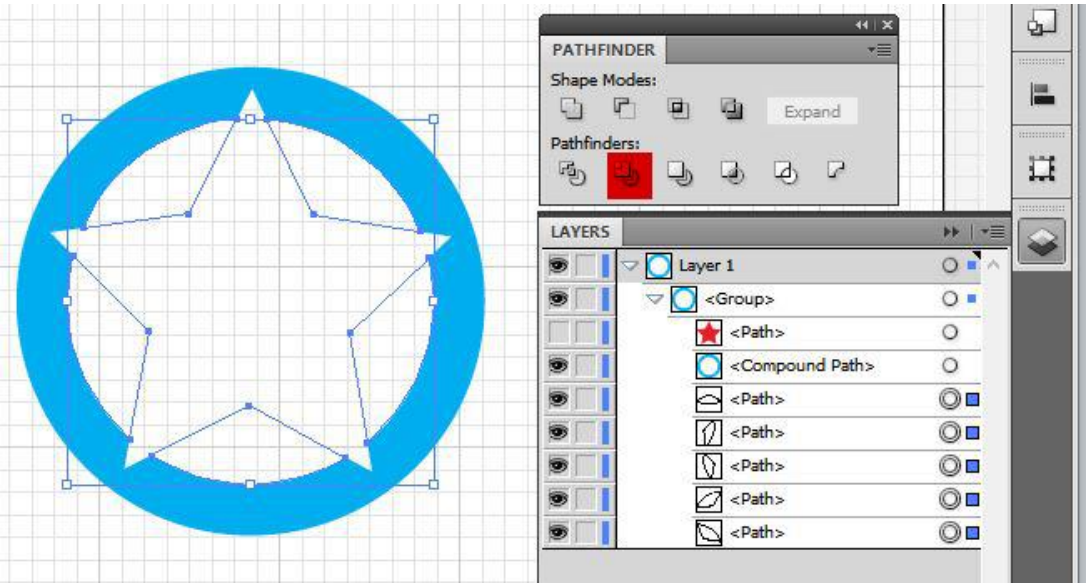



I've re-colored the parts below so you can see them a bit more clearly. The hidden paths now have a purple interior stroke assigned to them so you can see them.



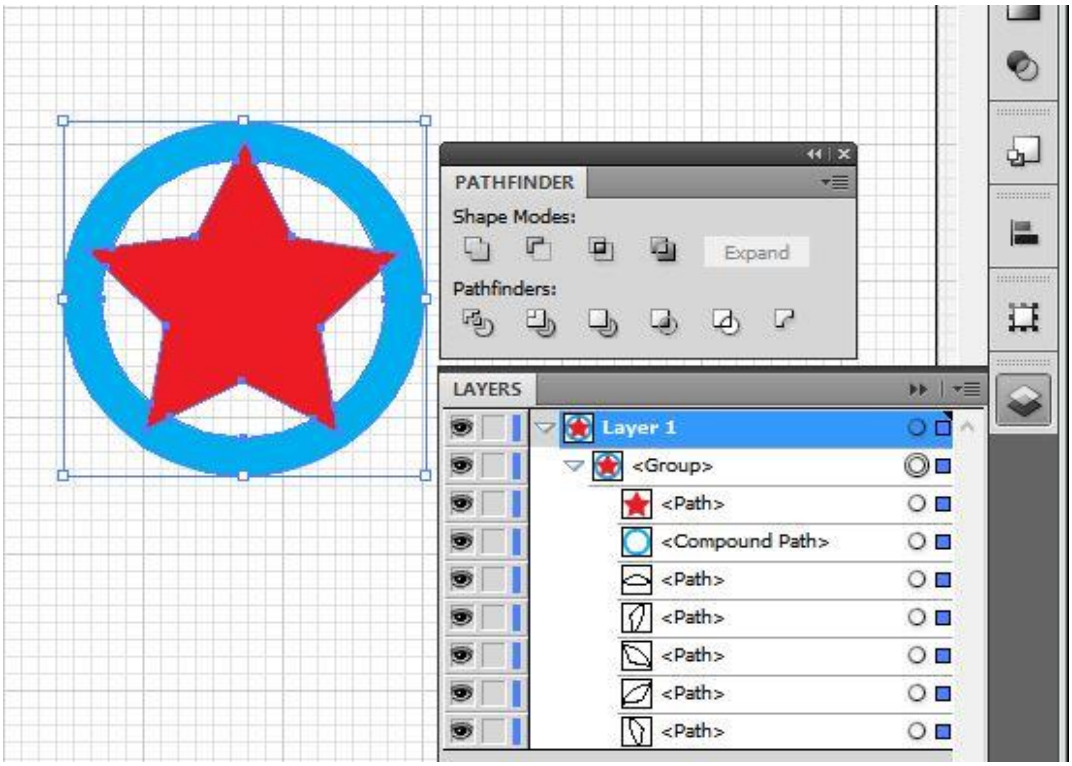
## Trim Tool

This tool trims away any overlapping areas from the bottom shape, but it also leaves the red star intact and creates hidden paths that define the center star shape. *(For the example below, the red star visibility is turned off so you can see the five hidden paths again when they are selected.)*

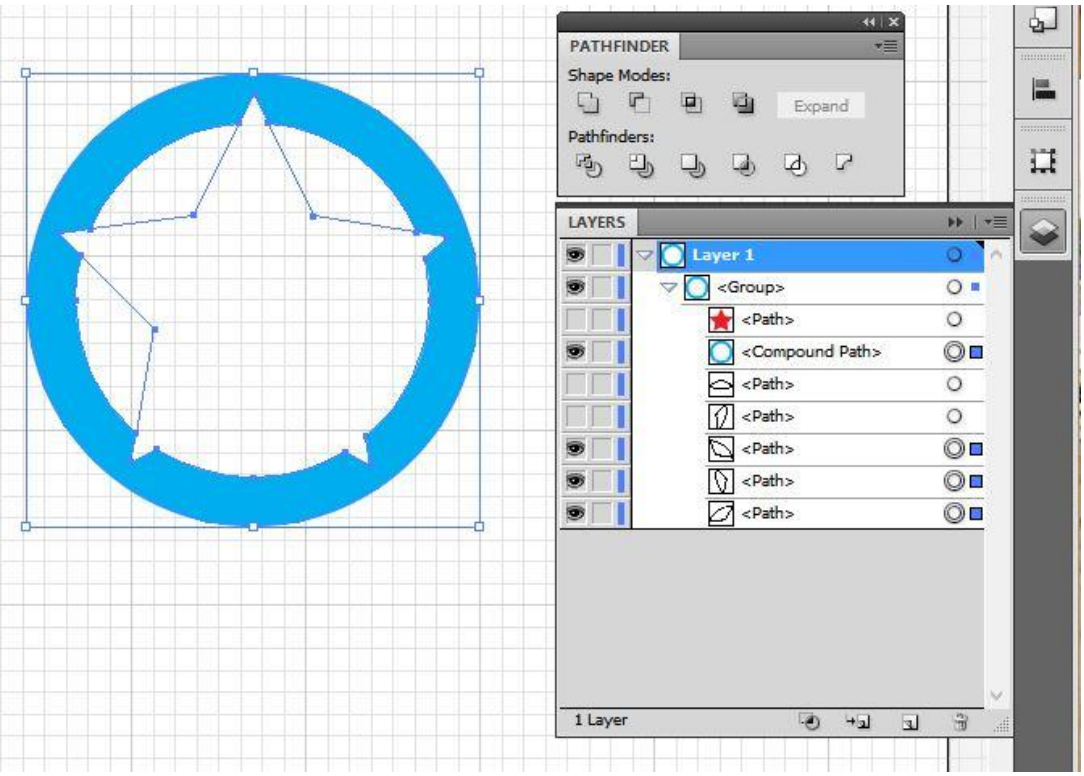



## Merge Tool

This tool will merge **identical Fill colors** into one unit. If the colors are different, it punches the top layer down through the bottom layer but does not destroy the punch or change the colors of the individual layers.

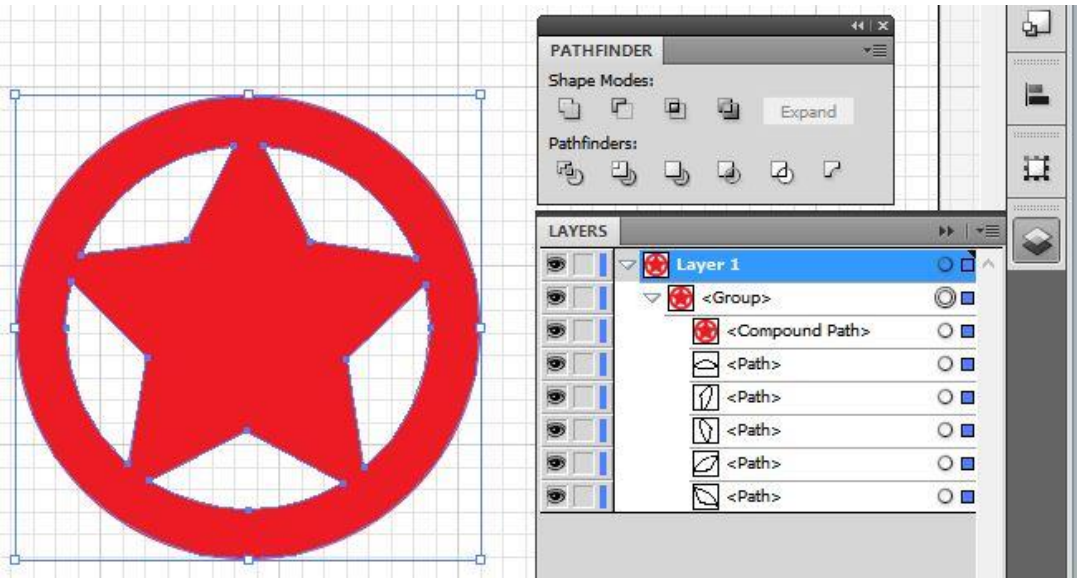



With Different Colors the star and the ring are not merged. *(Hidden paths are created.)*




If you turn off visibility on the star and a couple of the hidden paths, you can see that the star tips were subtracted from the ring.

The Merge tool can be used to join parts together or subtract them.

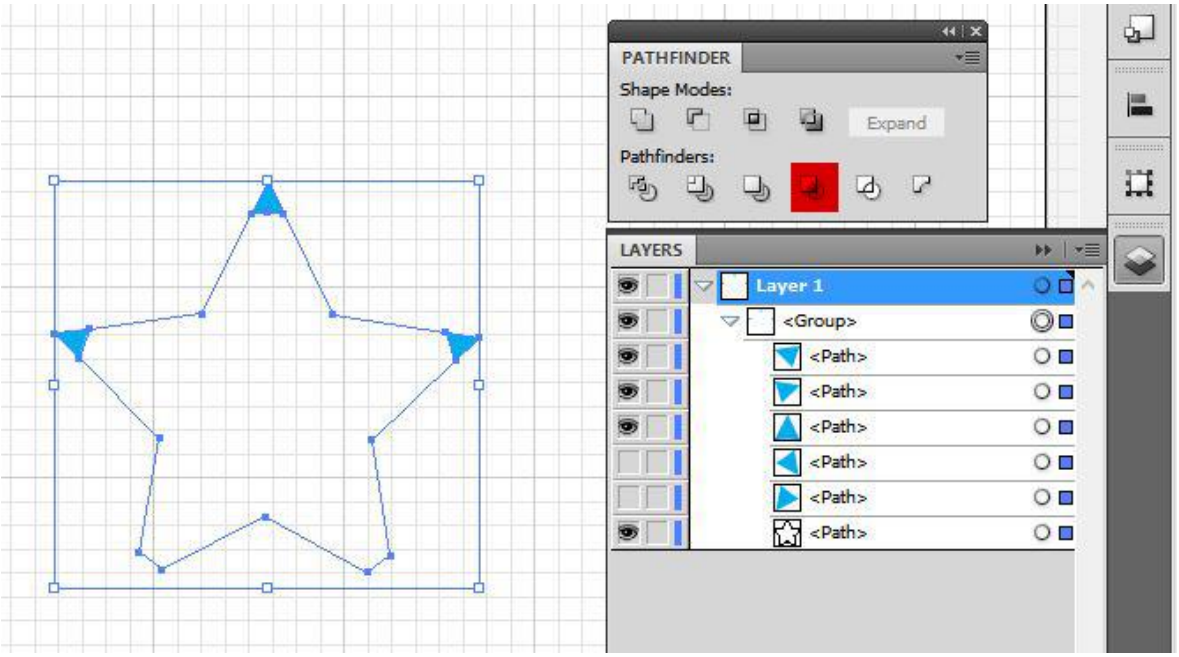



If you **change the ring color to red**, and then merge the shapes, you will wind up with one red filled compound path….and a bunch of hidden paths.

The **Pathfinder** tools try to be non-destructive, in case you want to define your “spaces” as something else later.

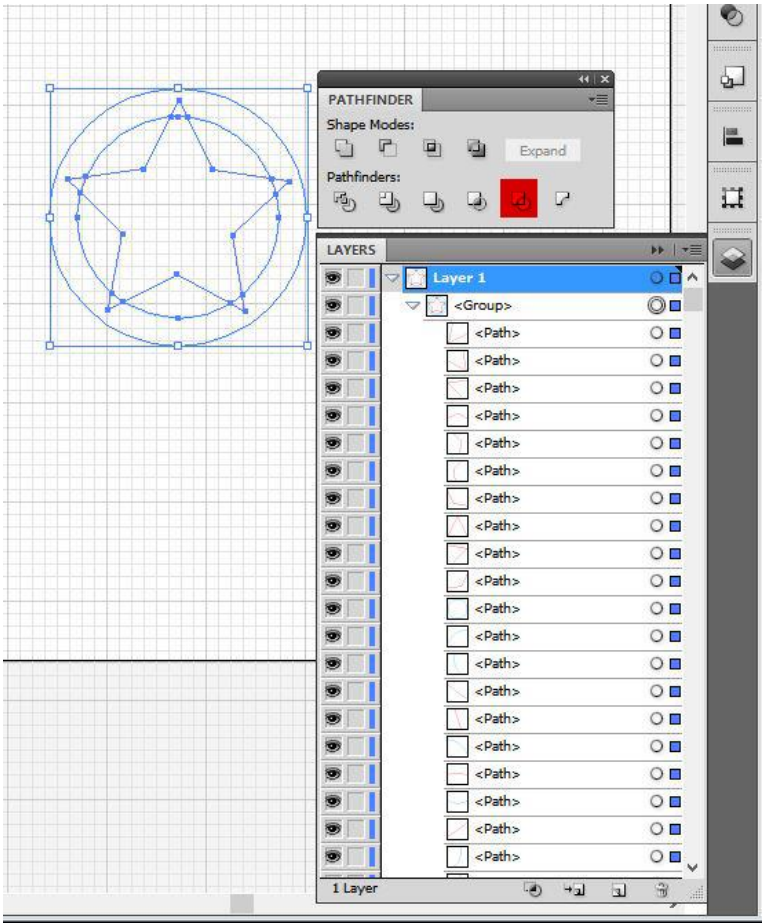
## Crop Tool

This tool will crop away everything **except overlap areas** from the bottom shape, and turn the non-overlapping top shape into a hidden path.




If you turn off visibility for a couple of the triangles, you will see the hidden truncated star left behind by the operation.

## Outline Tool

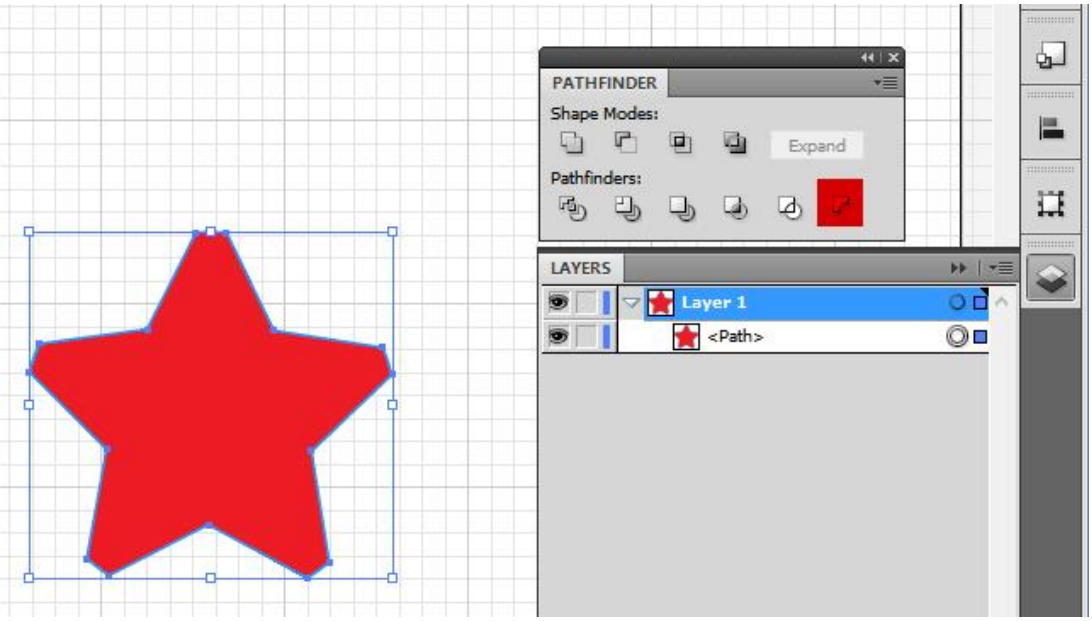



The **Outline Tool** will turn your shapes into outlines. It eliminates fill completely and assigns the fill color to the strokes. Unfortunately, each path is cut wherever it crosses another path. Look at the layers on this one. *(That isn't all of the layers, you would need to scroll down to see them all.)*

This can be useful if you need to remove part of one shape though, without removing the entire shape.

## Minus Back

This tool will subtract the bottom shape from the top shape. *(So it effectively punches up instead of punching down.)*




The ring took off the tips of the star.

The **Pathfinder** tools are going to be tools you use a lot when designing … playing with them to get comfortable is a good idea. Everything can be undone easily with **CTRL+Z**.

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