

## How to solve a Skewb

by Frank Tiex

Your first impression of this manual might be, that it is quite lengthy and solving a Skewb is a really complicated thing to do. But don't worry, you will finally find just two very short and easy to remember algorithms in it. I hope you like it.

### ***Solve the corners:***

To understand, how I solve the corners, you first have to get the idea of how a Skewb looks to me.

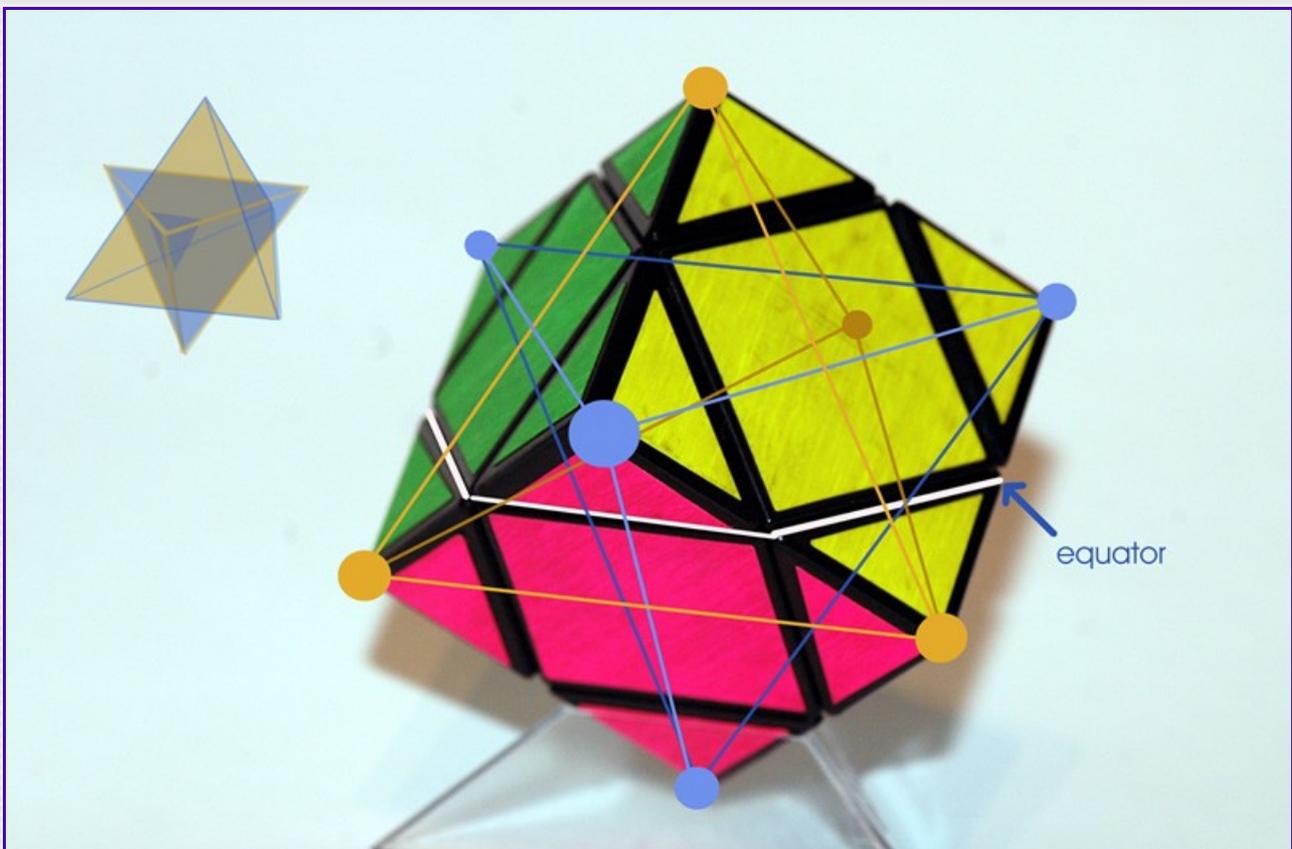
Hold the puzzle with two fingers at two opposite corners similar to the picture below. Let's call these two pieces the north pole and the south pole. Now rotate the Skewb around the north-south axis. You will see, that three of the other corners are located on the northern and three on the southern hemisphere (OK, sphere is not the right word, but I just want to give you an image), separated by the equator, which is one of the four cuts, where you can twist the puzzle.

The eight corners build two groups, which belong together:

- the north pole and the three southern corners
- the south pole and the three northern corners

The corners can only change positions within their own group, that's important.

In my imagination the four pieces of a group are the end peaks of a tetrahedron, so there are two tetrahedrons which are lying within each other.



### (a) Correct corner position

The first task is now to bring all eight corners to their correct positions. Don't worry about their orientation right now.

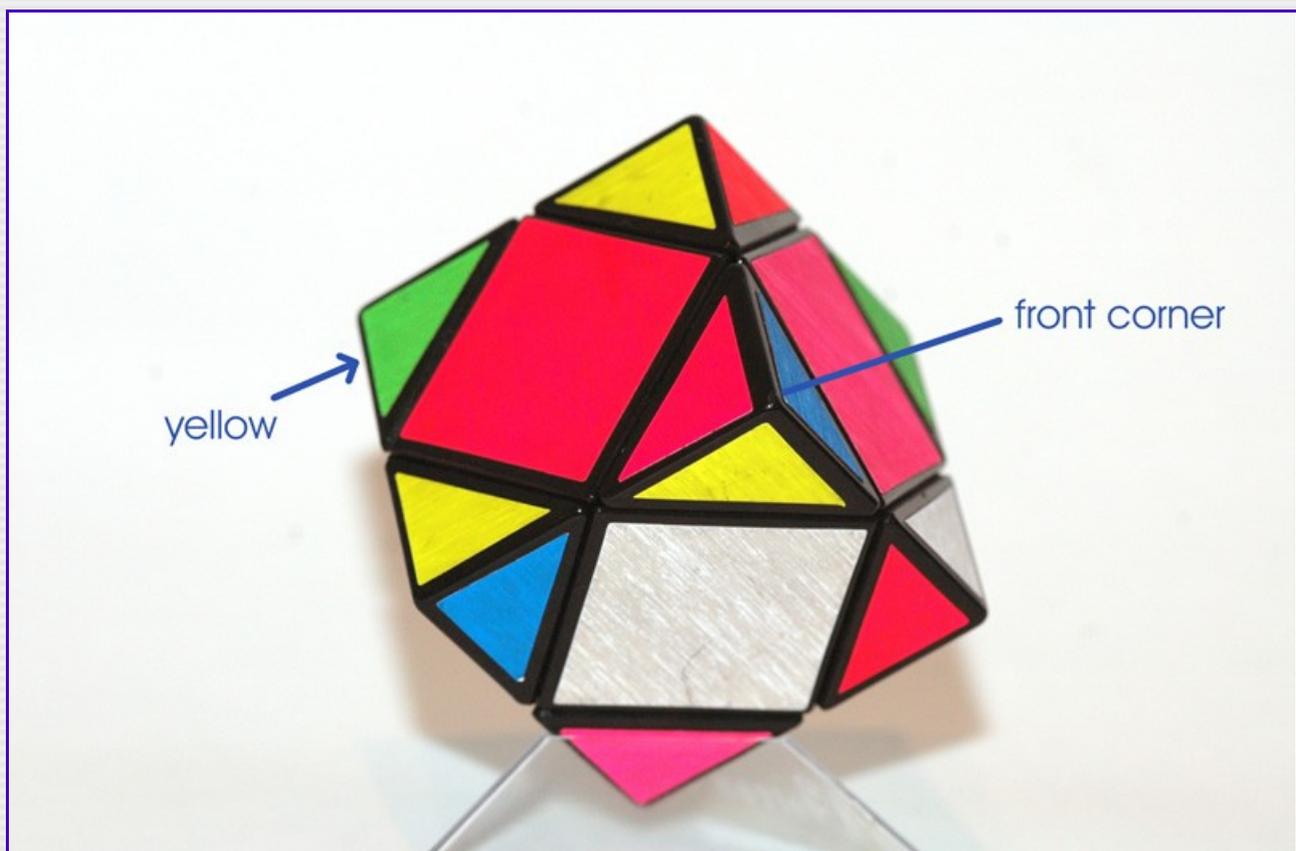
- Choose one corner of your Skewb as your actual north pole. This corner has three of the six Skewb colours.
- Now search for the corner, which will be the south pole. It must have the three other colours. Remember, that this piece can only be located either on the northern hemisphere or it is already at the correct position at the south pole. If youve found it, make a first twist – if necessary – to bring it to the south pole.
- Now we have to bring the other six corners to their correct position. Choose one of the three colours of the north pole, e.g. yellow. You will see (forget about the orientation!!!), that two of the three northern corners of the northern hemisphere also have a yellow sticker on them. Search the corner on the southern hemisphere, which has the fourth yellow sticker. When you find it twist the southern hemisphere around the equator, so that this corner is located adjacent to the two northern ones.

Have a look on your Skewb now:

Now the four corners with yellow stickers (north pole, the northern pair and the southern one) are all on one Skewb side. And – no magic – if you check the other colours, you will find, that this is now the case for all six colours. With a maximum of two twists you have already brought all corners to their correct locations.

### (b) Correct corner orientation

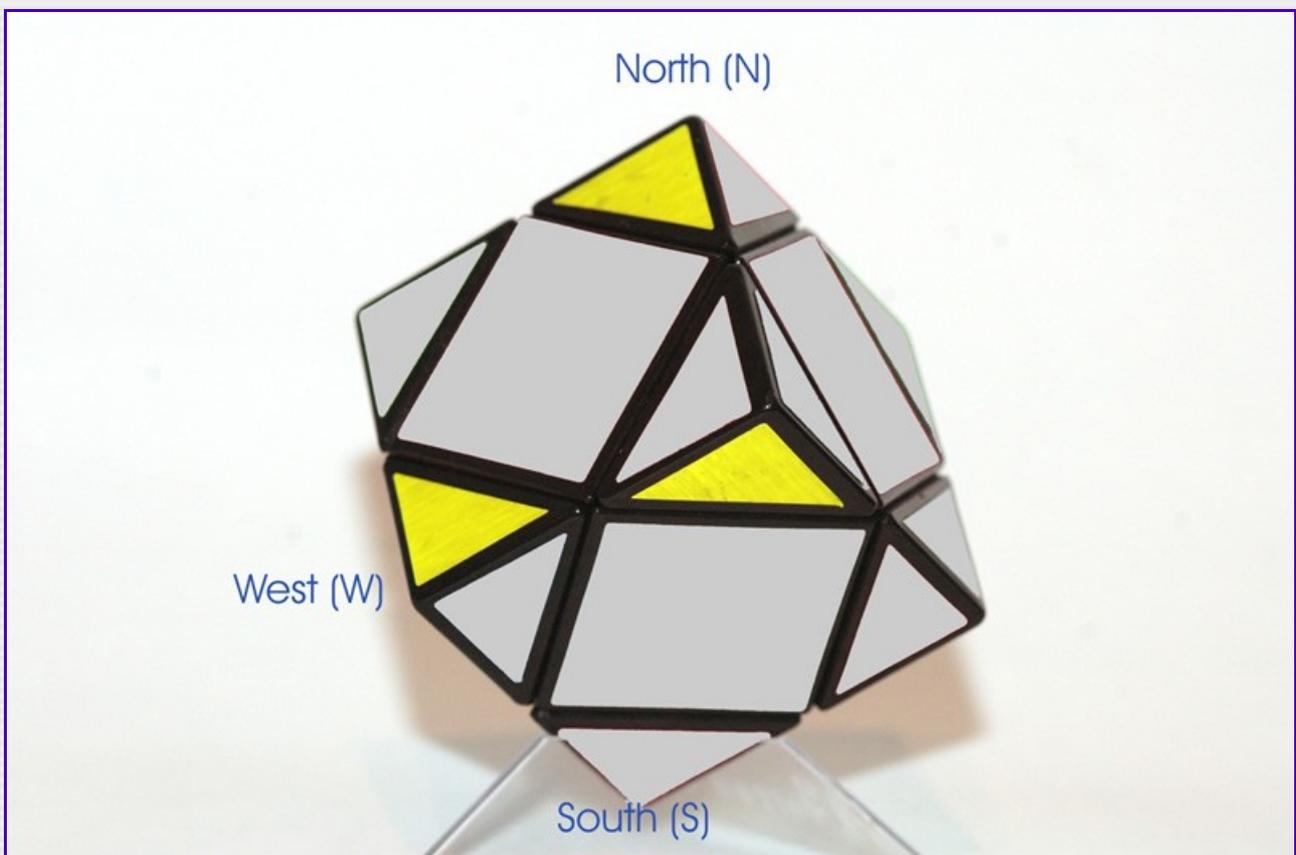
Your Skewb might look like this now:



To give the corners their correct orientation, each corner either must be turned  $120^\circ$  clockwise or anti-clockwise (if it is not already oriented correctly). As you might know from the  $3 \times 3 \times 3$  cube, the sum of the turns of all corners belonging to a group is zero. This means, that for each corner, we turn to the left, we also have to turn (at least) a second one. In the picture above the corner at the back left needs an anti-clockwise turn, the front corner must be turned clockwise.

Choose two corners of the northern hemisphere, which are not correctly oriented. Rotate the Skewb around the north-south axis until the corners are in the position as on the picture. If you cannot find any, then choose two other corners as your north and south pole.

For an easier notation I marked three of the corners with names. They represent the twisting axes of the Skewb we will need.



The idea is, to bring the corner we want to turn to a "neutral" position, where it doesn't destroy anything, when we correct the orientation. This position is the south pole.

So do the following:

- Bring the back left corner to the front position by an anti-clockwise twist of the North.
- From here the corner is moved to the south pole by a clockwise twist West
- Now you can correct the orientation with a clockwise twist of the South
- Back it goes from the south pole to the northern hemisphere with an anti-clockwise twist West
- And finally back home with clockwise North

N'

W

S

W'

N

Now we take the front corner and correct its orientation:

- From here the corner is moved to the south pole by a clockwise twist West
- Correct the orientation with an anti-clockwise twist of the South.
- Back it goes from the south pole to the northern hemisphere with an anti-clockwise twist West

W

S'

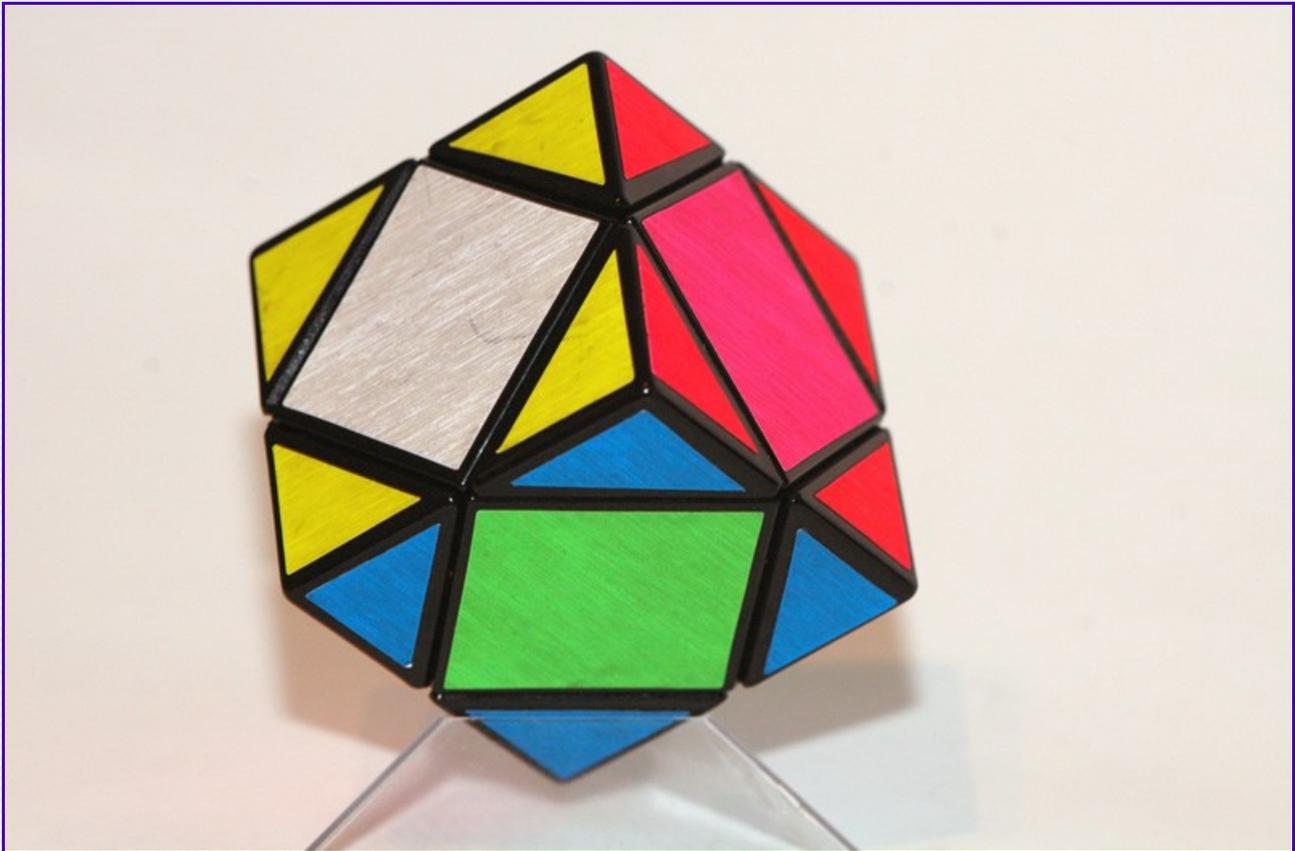
W'

The Skewb now looks like this:



Note that some center pieces have changed their place, but all other corners are as before. Understand this short sequence as a pattern to orient all the other corners as well. As mentioned above you might have to choose different corner pairs as north and south poles.

After completion of the corner orientation process, the Skewb looks like this:



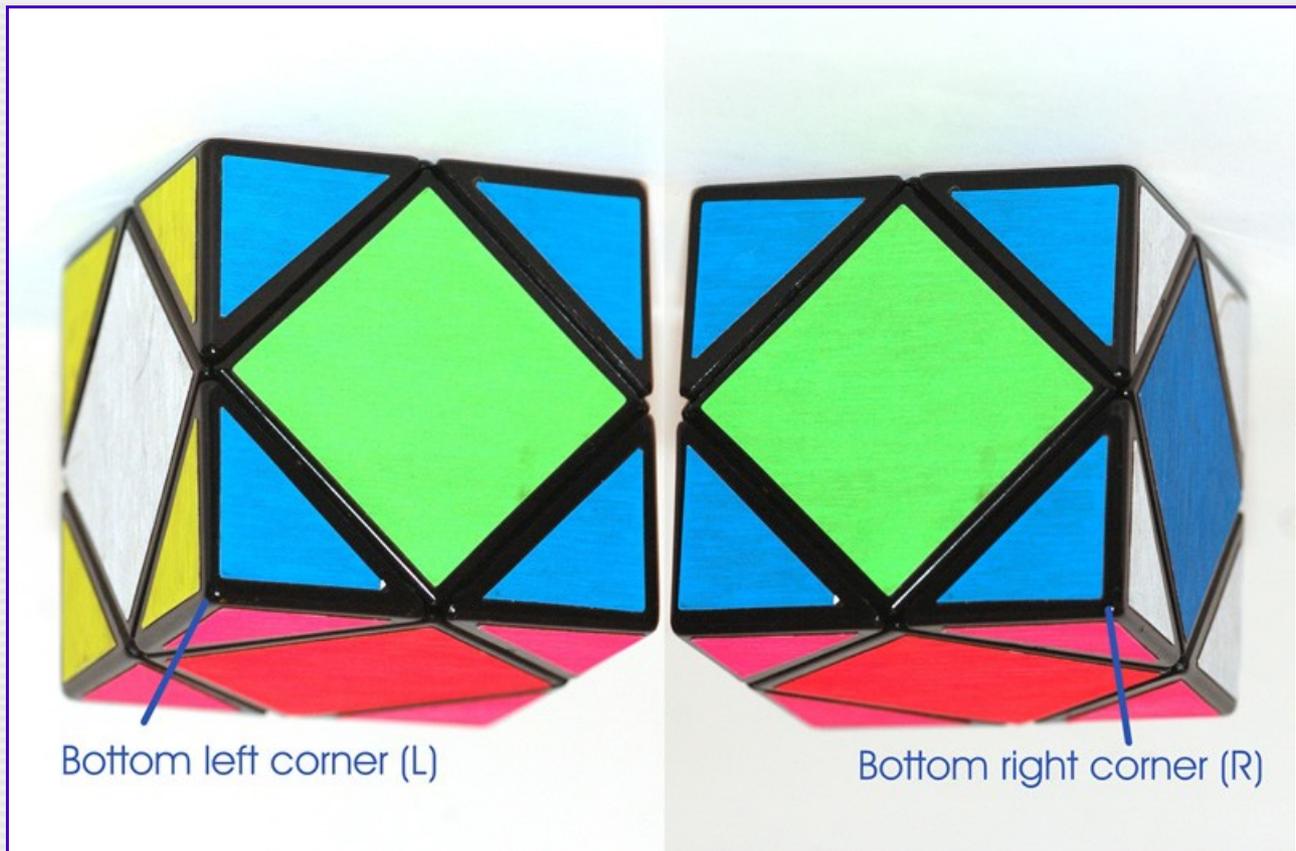
### ***Solve the centers***

Now we need some algorithms to exchange centers without touching the corners. Forget all the stuff about north and south pole etc. Just hold the puzzle in the common way as a normal cube. The only two corners we need to know are the two bottom front corners.

#### **(a) Correct the center positions**

Let's have a more detailed look at the position of the centers. The picture shows the Skewb in two perspectives from the bottom with the right and left side.

The position cannot really be called a lucky solve, but you can see, that the white center is on the left and belongs just on the opposite side.



Try this sequence:

**(L R' L' R) \* 3** = 12 moves

This means, first both corners make a downward twist, and then both upwards again. After two more repeats, the corners are again at their solved position. The left and the right center have been exchanged and the front and bottom one.

**(L R') \* 9** = 18 moves

These are only downward twists. The left and the bottom center have been exchanged and the front and right one. If you start on the right side instead, it exchanges right with bottom center as well as the left with the front center.

With these admittedly boring but really simple sequences it is possible to exchange the centers in a way to eventually solve the Skewb.

### **(b) Correct the center orientation**

A lot of Skewb mods have center pieces with an orientation. After correct positioning it still might occur, that an even number of center pieces are offset by 180°.

To solve this you can again use the (L R' L' R) \* 3 algorithm.

Executing it twice will exchange centers and then exchange back again to the original positions. In parallel it also turns around all the four affected centers by 180°.

That's it. With these few patterns it is possible to solve any Skewb based puzzle including the Golden Cube (here the big issue is to distinguish corners and edges and not to loose orientation). Comments to: [puzzles@tiex.de](mailto:puzzles@tiex.de).