

Rubik 3x3x3 Fourth Dimension



*Rubik 3x3x3 with graphics on the middle squares, produced in 1988.
(plastic, 2.2 inches)*

Many promotional versions of the standard *Rubik's 3x3x3* cube have graphics printed on the faces that require the middle square to be properly oriented. Rubik's 3x3x3 Fourth dimension adds minimal graphics for this purpose. Here are the directions from from the box lid:

This is an authentic Rubik's Cube[®] produced to my original design standard but with a 'Fourth Dimension' added. You can still solve it by having all six sides in single colour but for a perfect solution the four central symbols have now also to be aligned with each other. This increases the possible combinations to the fourth power ($43,252,003,274,489,856,000 \times 4^4$) and makes my cube even more challenging.

Some Rubik's solutions, such as *Marshall's Page*, employ transformations that preserve center orientations. For others the centers can be fixed at the end with simple moving around and rotating of the middles that does not affect the remainder of the puzzle. The *Dry Erase Board Page* gives the following idea:

0. *Optional*: Rotate an outside layer (or more than one if you want).
1. Rotate a middle layer.
2. Rotate a different middle layer.
3. Reverse step 1.
4. Reverse step 2.
5. Reverse step 0.

Jaap's Page gives specific transformations.

Further reading:

Jaap's Page, from: <http://www.geocities.com/jaapsch/puzzles/cube3.htm>

Dry Erase Board Page, from: <http://www.thedryeraseboard.com/mechpuz/333/centersolve>

Marshall's Page, from: <http://helm.lu/cube/MarshallPhilipp/Rubikfourth.htm>