## Rotation Results by axis

|        |    |        | Axis: Z |       |    |       |    |    |    |   | Axis: X |       |     |       |    |        |   |       |    | Axis: Y |       |    |    |   |    |    |   |    |
|--------|----|--------|---------|-------|----|-------|----|----|----|---|---------|-------|-----|-------|----|--------|---|-------|----|---------|-------|----|----|---|----|----|---|----|
| POINTS |    | S      | 1       |       | 2  |       | 3  |    |    | 4 |         |       | 5   |       | 6  |        | 7 |       | 8  |         | 9     |    |    |   |    |    |   |    |
|        |    | z = -1 |         | z = 0 |    | z = 1 |    |    |    |   | х       | x = 0 |     | x = 1 |    | y = -1 |   | y = 0 |    | у       | y = 1 |    |    |   |    |    |   |    |
| -1     | -1 | -1     | -1 1 -  | 1     |    |       |    |    |    |   | -1      |       | 1 - | 1     |    |        |   |       |    | -1      | -1    | -1 |    |   |    |    |   |    |
| -1     | -1 | 0      |         |       | -1 | 1     | -1 |    |    |   | -1      | (     | ) - | 1     |    |        |   |       |    | 0       | -1    | 1  |    |   |    |    |   |    |
| -1     | -1 | 1      |         |       |    |       |    | -1 | 1  | 1 | -1      | -     | 1 - | 1     |    |        |   |       |    | 1       | -1    | 1  |    |   |    |    |   |    |
| -1     | 0  | -1     | 0 1 -   | 1     |    |       |    |    |    |   | -1      |       | 1 ( | )     |    |        |   |       |    |         |       |    | -1 | 0 | 1  |    |   |    |
| -1     | 0  | 0      |         |       | 0  | 1     | 0  |    |    |   | -1      | (     | ) ( | )     |    |        |   |       |    |         |       |    | 0  | 0 | 1  |    |   |    |
| -1     | 0  | 1      |         |       |    |       |    | 0  | 1  | 1 | -1      | -     | 1 ( | )     |    |        |   |       |    |         |       |    | 1  | 0 | 1  |    |   |    |
| -1     | 1  | -1     | 1 1 -   | 1     |    |       |    |    |    |   | -1      |       | 1 : |       |    |        |   |       |    |         |       |    |    |   |    | -1 | 1 | 1  |
| -1     | 1  | 0      |         |       | 1  | 1     | 0  |    |    |   | -1      | (     | ) [ | l l   |    |        |   |       |    |         |       |    |    |   |    | 0  | 1 | 1  |
| -1     | 1  | 1      |         |       |    |       |    | 1  | 1  | 1 | -1      | _     | 1 : | l l   |    |        |   |       |    |         |       |    |    |   |    | 1  | 1 | 1  |
| 0      | -1 | -1     | -1 0 -  | 1     |    |       |    |    |    |   |         |       |     | 0     | 1  | -1     |   |       |    | -1      | -1    | 0  |    |   |    |    |   |    |
| 0      | -1 | 0      |         |       | -1 | 0     | 0  |    |    |   |         |       |     | 0     | 0  | -1     |   |       |    | 0       | -1    | 0  |    |   |    |    |   |    |
| 0      | -1 | 1      |         |       |    |       |    | -1 | 0  | 1 |         |       |     | 0     | -1 | -1     |   |       |    | 1       | -1    | 0  |    |   |    |    |   |    |
| 0      | 0  | -1     | 0 0 -   | 1     |    |       |    |    |    |   |         |       |     | 0     | 1  | 0      |   |       |    |         |       |    | -1 | 0 | 0  |    |   |    |
| 0      | 0  | 0      |         |       | 0  | 0     | 0  |    |    |   |         |       |     | 0     | 0  | 0      |   |       |    |         |       |    | 0  | 0 | 0  |    |   |    |
| 0      | 0  | 1      |         |       |    |       |    | 0  | 0  | 1 |         |       |     | 0     | -1 | 0      |   |       |    |         |       |    | 1  | 0 | 0  |    |   |    |
| 0      | 1  | -1     | -1 0 -  | 1     |    |       |    |    |    |   |         |       |     | 0     | 1  | 1      |   |       |    |         |       |    |    |   |    |    | 1 | 0  |
| 0      | 1  | 0      |         |       | 1  | 0     | 0  |    |    |   |         |       |     | 0     | 0  | 1      |   |       |    |         |       |    |    |   |    |    | 1 | 0  |
| 0      | 1  | 1      |         |       |    |       |    | 1  | 0  | 1 |         |       |     | 0     | -1 | 1      |   |       |    |         |       |    |    |   |    | 1  | 1 | 0  |
| 1      | -1 | -1     | -1 -1 - | -     |    |       |    |    |    |   |         |       |     |       |    |        | 1 |       | -1 |         |       |    |    |   |    |    |   |    |
| 1      | -1 | 0      |         |       | -1 | -1    | 0  |    |    |   |         |       |     |       |    |        | 1 |       | -1 |         | -1    |    |    |   |    |    |   |    |
| 1      | -1 | 1      |         |       |    |       |    | -1 | -1 | 1 |         |       |     |       |    |        | 1 |       | -1 | 1       | -1    | -1 |    |   |    |    |   |    |
| 1      | 0  | -1     | 0 -1 -  | 1     |    |       |    |    |    |   |         |       |     |       |    |        | 1 |       | 0  |         |       |    | -1 | 0 | -1 |    |   |    |
| 1      | 0  | 0      |         |       | 0  | -1    | 0  |    |    |   |         |       |     | _     |    |        | 1 |       | 0  |         |       |    | 0  | 0 | -1 |    |   |    |
| 1      | 0  | 1      |         |       |    |       |    | 0  | -1 | 1 |         |       |     |       |    |        | 1 |       | 0  |         |       |    | 1  | 0 | -1 |    |   |    |
| 1      | 1  | -1     | 1 -1 -  | +     |    |       |    |    |    |   |         |       |     |       |    |        | 1 | 1     | 1  |         |       |    |    |   |    | -1 | 1 | -1 |
| 1      | 1  | 0      |         |       | 1  | -1    | 0  |    |    |   |         |       |     | _     |    |        | 1 | 0     | 1  |         |       |    |    |   |    | 0  | 1 |    |
| 1      | 1  | 1      |         |       |    |       |    | 1  | -1 | 1 |         |       |     |       |    |        | 1 | -1    | 1  |         |       |    |    |   |    | 1  | 1 | -1 |

<sup>\*</sup> Counterclockwise (rotate() convention)

z axis: y  $\leftrightarrow$  x, y  $\leftarrow$  -x (Counterclockwise), y  $\leftrightarrow$  x, x  $\leftarrow$  -y (Clockwise)

x axis: y  $\leftrightarrow$  z, y  $\leftarrow$  -z (Counterclockwise), y  $\leftrightarrow$  z, z  $\leftarrow$  -y (Clockwise)

y axis:  $z \leftrightarrow x$ ,  $z \leftarrow -x$  (Counterclockwise),  $z \leftrightarrow x$ ,  $x \leftarrow -z$  (Clockwise)

 $<sup>\</sup>rightarrow$  for each specified rotation, specify which coordinate(s) to be swapped to update the position of the vertex