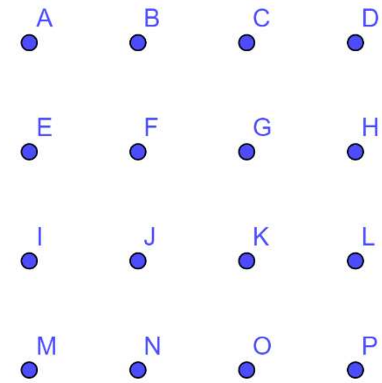
Some other questions I could ask about transformations (each problem may have several right answers)



1. Is this a correct use of Axiom 3?

By Axiom 3, there is an isometry, f , such that $f(J)=G$ and $f(G)=D$

No, you can specify the image of J, but then you have to describe the image of G with a ray.

2. Which (if any) are correct ways to use axiom 3?

By Axiom 3, there is an isometry, f , such that $f(J)=G$

a. $f(G)\in\overrightarrow{JD}$ b. $f(G)\in\overrightarrow{GD}$ c. $f(G)\in\overrightarrow{DG}$

Only b is an allowed use of axiom 3, because the ray you specify for the image of G has to start at whatever point J mapped to. Once you say: $f(J)=G$ then the next point has to map to a ray $\overrightarrow{G\_\_}$

Note that it's OK to omit the last condition in using axiom 3 (and in that case you can say the isometry exists, but you do not know that it is unique—there may be more than one)

3. Which (if any) of these are correct ways to use axiom 3?

By Axiom 3, there is an isometry, f , such that $f(J)=K$ and $f(I)\in\overrightarrow{KG}$ and

a. $f(L)$ is on the side of $\overleftrightarrow{KG}$ that includes H

The points you use to define a function by axiom 3 have to be *non-collinear*. J, I and L are on the same line, so you can't use that set of points with Axiom 3. You can use patty paper to try to move I, J and L, and you'll find that it doesn't work.

b. $f(O)$ is on the side of $\overleftrightarrow{KG}$ that includes J

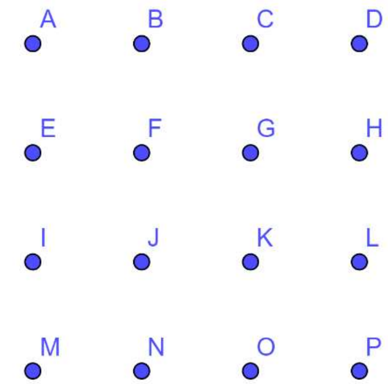
This works fine: J, I and O are not collinear, the ray $f(I)\in\overrightarrow{KG}$ starts at the right point. The line $\overleftrightarrow{KG}$ is the correct line to use, and H is not on the line.

c. $f(O)$ is on the side of $\overleftrightarrow{KG}$ that includes L

This also works fine: J, I and O are not collinear, the ray $f(I)\in\overrightarrow{KG}$ starts at the right point. The line $\overleftrightarrow{KG}$ is the correct line to use, and L is not on the line $\overleftrightarrow{KG}$.

Note that c is a reflected version of b: both are possible ways an isometry could happen. This would be a great problem to trace J, I and O onto, and see if you can slide the patty paper around to match the conditions in b and c.

4. Which (if any) of these are correct ways to use axiom 3?



By Axiom 3, there is an isometry, f , such that $f(J) = K$ and $f(I) \in \overrightarrow{KA}$ and

a. $f(O)$ is on the side of $\overleftrightarrow{KA}$ that includes D.

b. $f(O)$ is on the side of $\overleftrightarrow{KA}$ that includes C.

Both of these are fine: J, I and O are not on the same line, the ray $f(I) \in \overrightarrow{KA}$ starts at the correct point, $\overleftrightarrow{KA}$ is the corresponding line, and neither D nor C are on the same line.

These two descriptions actually give the exact same function: C and D identify the same side of the line. Often there are multiple ways of naming the same line or the same side of a line.

5. I am trying to specify a rotation. Which of these is a correct way to complete using Axiom 3. circle all that work

By Axiom 3, there is an isometry, f , such that $f(J) = J$ and $f(I) \in \overrightarrow{JF}$ and $f(O)$ is on the side of $\overleftrightarrow{JF}$ that

a. includes H b. includes M c. includes I

Both b and c are correct. In the rotation O would map to M, but M and I are on the same side of $\overleftrightarrow{JF}$, so both are correct. H would have O mapped to the wrong side of the line (so it would be an isometry, but the isometry wouldn't be a rotation)

6. Does this specify a rotation?

By Axiom 3, there is an isometry, f , such that $f(J) = J$ and $f(I) \in \overrightarrow{JB}$ and $f(O)$ is on the side of $\overleftrightarrow{JB}$ that includes I

Yes, this is exactly the same rotation as the one in #5, the only difference is that I have named the ray $\overrightarrow{JB}$ instead of $\overrightarrow{JF}$, but those are two names for the same ray, so it doesn't change the function.