2 Dimensions-interesting

definitions & theorems from Origametry by Daniel Heath.

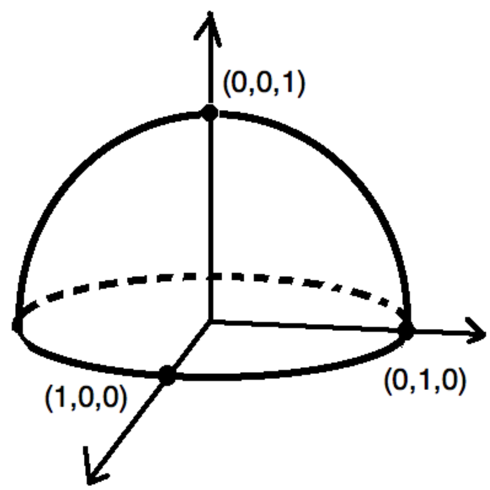
While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

Let us redefine "point" to mean what you would usually call a line through the origin in $\mathbb{R}^3$.

One way we can make this easier to think about is to consider a one-to-one correspondence of "points" with points on the upper half of a unit sphere in $\mathbb{R}^3$.

1. The boundary of the hemisphere will have to be drawn carefully to maintain the one-to-one relationship with the "points" defined above. Indicate which edges of the hemisphere you would like to keep on the right.



2. Note that the original geometry has no boundaries where as the hemisphere does. Determine what needs to be done with the unit circle in the xy plane to reflect the original geometry of lines in $\mathbb{R}^3$.

Use either the hemisphere construction for this geometry or the original description to answer the following:

3. Find a way to define a distance between two "points".

4. Test if your definition of distance agrees with your intuition by finding the distance between $y = x, z = 0$ and $x = z = 0$.

5. Find a pair of "points" that are as far away from each other as possible.

6. How would "lines" be defined in this space?

7. Does the above definitions of "points" and "lines" satisfy Postulate 1? (Any two points determine a unique line.)

8. Does the above definitions of "points" and "lines" satisfy the Parallel Postulate?