Math 191 Fundamentals of Mathematics II
Section 10.1: Visualization
January 13, 2014

Definitions

Point:

Line:

Plane:

Line segment:

Ray:

Visualizing Lines and Planes

1. Visualize two lines in a plane. How many disjoint pieces do the lines cut the plane into? How does your answer depend on the relationship between the lines? Draw a simple picture illustrating your answer and explain.

2. Visualize three lines in a place. How many disjoint pieces do the lines cut the plane into? Visualize the distinct configurations, then sketch them here.

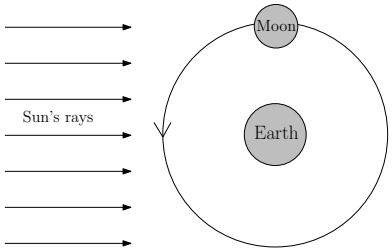
3. Visualize two planes in space. How many disjoint regions do the planes divide space into? Explain.

4. Visualize three planes in space. Describe some of the possible configurations and state the number of disjoint regions into which space is divided for each of your configurations.

Phases of the Moon

The moon revolves (travels around) the earth in a more-or-less circular path. The moon gives off no light itself, and we see it only because it reflects the light of the sun. Depending on how the moon, the earth, and the sun are positioned in relation to each other, we (on the earth) see a different portion of the moon being lit up. This is the cause of the phases of the moon.

5. Imagine viewing the earth and the moon from space, looking down at the north pole.



What does the moon look like to people on earth (who can see the moon) when the sun, moon, and earth are positioned like this? Explain by indicating what portion of the moon is lit and what portion is visible from the earth.

6. Over the course of a day, the earth makes one rotation on its axis. What does the moon look like to an observer on earth over the course of a full day (day and night)? (Note: the moon will barely move in this time. You may assume that the moon stays still.)

7. What are the relative positions of the earth, moon and sun when the moon is full? Use a diagram to explain.

8. Over the course of a month, as the moon orbits the earth, how does the moon's appearance change from the perspective of an observer on earth? Draw a diagram indicating what the moon looks like for each position of the moon in its orbit around the earth.