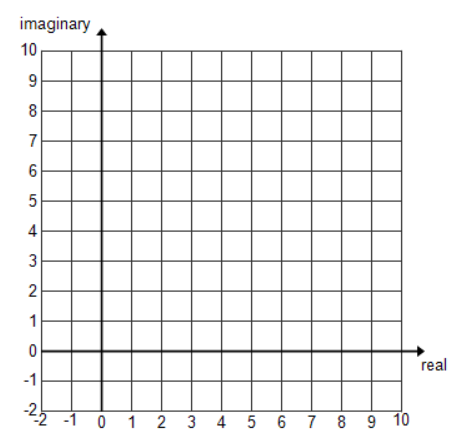
Lesson 11: Distance and Complex Numbers

Classwork

Opening Exercise

* 1. Plot the complex number on the complex plane. Plot the ordered pair on the coordinate plane.



* 1. In what way are complex numbers “points”?
  2. What point on the coordinate plane corresponds to the complex number?
  3. What complex number corresponds to the point located at coordinate?

**Exercises**

1. The endpoints of a are and . What is the midpoint of ?
   1. What is the midpoint of and ?
   2. Using and show that in general the midpoint of points and is , the arithmetic average of the two numbers.
2. The endpoints of are and . What is the length of ?
   1. What is the distance between and ?
   2. Show that, in general, the distance between and is the modulus of
3. Suppose and .
   1. Find the midpoint of and .
   2. Verify that .

Lesson Summary

* Complex numbers can be thought of as points in a plane, and points in a plane can be thought of as complex numbers.
* For two complex numbers and , the midpoint of points and is .
* The distance between two complex numbers and is equal to

Problem Set

1. Find the midpoint between the two given points in the rectangular coordinate plane.
   1. and
   2. and
   3. and
   4. and
   5. and
   6. and
2. Let , , and suppose that is the midpoint of and , and that is the midpoint of and .
   1. Find points and .
   2. Find the distance between and .
   3. Find the distance between and .
   4. Find the distance between and .
   5. Find the distance between and .
   6. Find a point one quarter of the way along the line segment connecting segment and , closer to than   
      to .
   7. Terrence thinks the distance from to is the same as the distance from to . Is he correct? Explain why or why not.
   8. Using your answer from part (g), if is the midpoint of and , can you find the distance from to ? Explain.
   9. Without doing any more work, can you find point ? Explain.