Lesson 9: Conditions for a Unique Triangle―Three Sides and Two Sides and the Included Angle

Problem Set

1. A triangle with side lengths , , and exists. Use your compass and ruler to draw a triangle with the same side lengths. Leave all construction marks as evidence of your work, and label all side and angle measurements.

Under what condition is the triangle drawn? Compare the triangle you drew to two of your peers’ triangles. Are the triangles identical? Did the condition determine a unique triangle? Use your construction to explain why.

1. Draw triangles under the conditions described below.
   1. A triangle has side lengths and . Draw two nonidentical triangles that satisfy these conditions. Explain why your triangles are not identical.
   2. A triangle has a side length of opposite a angle. Draw two nonidentical triangles that satisfy these conditions. Explain why your triangles are not identical.
2. Diagonal is drawn in square . Describe what condition(s) can be used to justify that is identical to . What can you say about the measures of and ? Support your answers with a diagram and explanation of the correspondence(s) that exists.
3. Diagonals and are drawn in square . Show that is identical to , and then use this information to show that the diagonals are equal in length.
4. Diagonal is drawn in rhombus . Describe the condition(s) that can be used to justify that is identical to . Can you conclude that the measures of and are the same? Support your answer with a diagram and explanation of the correspondence(s) that exists.
5. Diagonals and are drawn in rhombus and meet at point . Describe the condition(s) that can be used to justify that is identical to . Can you conclude that the line segments and are perpendicular to each other? Support your answers with a diagram and explanation of the correspondence(s) that exists.