DRAW A TRIANGLE

This is a game for 2 or more groups of 3 players. Materials: ruler, protractor, tables

Instructions

Part A: Two Angles Specified

Step 1

Ask your teacher for a copy of the table shown below. Each member of your group should choose a different row of the table. You will use the table to draw $\triangle ABC$ with two angles specified.

Triangle Number	Angle A	Angle B	Angle C	Sum of Angle Measures
1	45°	50°		
2	30°	90°		
3	25°	100°		

Step 2

Using a ruler and protractor, draw and label angle A with your assigned angle measure on a sheet of paper or tracing paper.

Step 3

Step 5

Step 6

- Mark a separate point *B* on one side of angle *A*. Using a protractor, draw and label angle *B* with your assigned angle measure so that angles *A* and *B* form two angles of one triangle.
- **Step 4** Extend the sides of your angles as needed to complete the triangle at point C. Label the point.
 - Measure angle C inside the triangle to the nearest degree, and work with your group to complete the table.
 - Compare the triangles drawn by your group with the triangles drawn by other groups. Then answer the following questions on your own paper.
 - What does the sum of the angle measures appear to be for each triangle?

35°

80°

B

• Do two angles of a triangle determine a unique triangle? Explain.

Instructions

Part B: Two Angles and a Side Length Specified

Step 1

There is a second table in the handout from your teacher. Your group should select Triangle 1, 2, or 3 from the table below and record the information in the second table in the handout.

Triangle Number	Angle A	Angle B	Side Length
1	50 °	45°	5 cm
2	75°	40 °	5 cm
3	100°	35°	5 cm

Step 2

Each of you will draw a triangle with these angle measures and one side that is 5 cm long. Make sure that \overline{AB} is 5 cm long in one triangle, \overline{AC} is 5 cm long in another, and \overline{BC} is 5 cm long in the third.

Step 3

Use a protractor and ruler to draw and label your $\triangle ABC$ using the assigned angle measures and ensuring that the appropriate side is 5 cm in length.

It might help to draw a copy of angle *B* on a separate piece of tracing paper to help guide you, as shown in blue in the example, where \overline{AC} is 5 cm long.

- 1) Draw angle A.
- 2) Draw point C.
- 3) Overlay a copy of angle *B* aligned with angle *A* and passing through point *C* as shown to locate point *B*.



Step 4 Compare your group's triangles. What do you observe? Did the measures you were given produce a unique triangle?

Step 5

Find another group that was assigned the same triangle number as your group. Compare your triangles. Did your groups draw six unique triangles?

Step 6

Discuss your results as a class. If you are given the measures of two specific angles of a triangle and the length of one specific side, does this determine a unique triangle?

Part A

Triangle Number	Angle A	Angle <i>B</i>	Angle C	Sum of Angle Measures
1	45°	50°		
2	30°	90°		
3	25°	100°		

Part B

Triangle Number	Angle A	Angle <i>B</i>	Side Length
			5 cm

Answer Key

Part A

Step 1

Triangle Number	Angle A	Angle <i>B</i>	Angle C	Sum of Angle Measures
1	45°	50°	85°	180°
2	30°	90°	60°	180°
3	25°	100°	55°	180°

Step 6

- The sum of the angle measures appears to always be 180°.
- No; the triangles with the same two angles specified all have the same shape, but they may not have the same size.

Part B

Triangle Number	Angle A	Angle <i>B</i>	Side Length
			5 cm

Step 4

They all have the same shape but are different sizes; no.

Step 5

No; triangles whose matching sides were the same length were the same size and shape as one another.

Step 6

Yes; it appears that if you are given the measures of two particular angles and the length of a particular side, you can draw only one triangle.