**What do you notice about the measures of the sides or the measures of the angles that form triangles?**

Dennis has a sailboat. The sail on his boat is in the shape of a triangle with the side lengths of 6 feet, 8 feet, and 10 feet. These dimensions work to form a triangle, but not just any three lengths form a triangle. Complete the activity below to determine which side lengths form triangles.

1. Measure and cut several plastic straws into lengths that equal 3, 4, 4, 5, 8, 8, 8, 13, 15, 15, 15 and 15 centimeters.
2. Arrange three of the pieces that each measure 15 centimeters to see if you can form a triangle.

 Can you form a triangle? \_\_\_\_\_\_\_\_\_\_\_\_

1. Continue using pieces of straw to try to form triangles using the different combinations of side lengths given. Determine whether or not the lengths form a triangle. Complete the table.

|  |  |  |  |
| --- | --- | --- | --- |
| Side 1 | Side 2 | Side 3 | Do the sides form a triangle? |
| 15 cm | 15 cm | 15 cm |  |
| 3 cm | 4 cm | 5 cm |  |
| 8 cm | 8 cm | 13 cm |  |
| 3 cm | 4 cm | 8 cm |  |
| 4 cm | 4 cm | 5 cm |  |
| 8 cm | 3 cm | 15 cm |  |
| 4 cm | 8 cm | 15 cm |  |

Investigate

**Work with a partner. Try to create triangles using the given side lengths. Circle yes if you can make a triangle or no if you cannot.**

1. 5 cm, 8 cm, 15 cm **2.** 13 cm, 8 cm, 15 cm **3.** 13 cm, 4 cm, 4 cm

 Yes or No Yes or No Yes or No

Analyze and Reflect

**Work with a partner.**

1. The table below contains the dimensions you used in Step 3 of the Activity. Transfer your results from the investigation into the fourth column and then complete the fifth column.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Side 1 | Side 2 | Side 3 | Do the sides form a triangle? | Is Side 1 + Side 2 greater than or less than Side 3 |
| 15 cm | 15 cm | 15 cm |  |  |
| 3 cm | 4 cm | 5 cm |  |  |
| 8 cm | 8 cm | 13 cm |  |  |
| 3 cm | 4 cm | 8 cm |  |  |
| 4 cm | 4 cm | 5 cm |  |  |
| 8 cm | 3 cm | 15 cm |  |  |
| 4 cm | 8 cm | 15 cm |  |  |

1. What do you notice about the figures with a Side 1 and Side 2 sum that is less than the length of side 3?

CREATE

1. Can you create a triangle that has the same shape as the triangle in the Investigation, but

 different side lengths? Explain.

1. Could you form a triangle using the side lengths of 7, 8, and 25 centimeters? Explain.

**ANSWERS**

**What do you notice about the measures of the sides or the measures of the angles that form triangles?**

Dennis has a sailboat. The sail on his boat is in the shape of a triangle with the side lengths of 6 feet, 8 feet, and 10 feet. These dimensions work to form a triangle, but not just any three lengths form a triangle. Complete the activity below to determine which side lengths form triangles.

1. Measure and cut several plastic straws into lengths that equal 3, 4, 4, 5, 8, 8, 8, 13, 15, 15, 15 and 15 centimeters.
2. Arrange three of the pieces that each measure 15 centimeters to see if you can form a triangle.

 Can you form a triangle? \_\_\_\_yes\_\_\_\_\_\_\_\_

1. Continue using pieces of straw to try to form triangles using the different combinations of side lengths given. Determine whether or not the lengths form a triangle. Complete the table.

|  |  |  |  |
| --- | --- | --- | --- |
| Side 1 | Side 2 | Side 3 | Do the sides form a triangle? |
| 15 cm | 15 cm | 15 cm | yes |
| 3 cm | 4 cm | 5 cm | Yes |
| 8 cm | 8 cm | 13 cm | yes |
| 3 cm | 4 cm | 8 cm | No |
| 4 cm | 4 cm | 5 cm | Yes |
| 8 cm | 3 cm | 15 cm | No |
| 4 cm | 8 cm | 15 cm | no |

Investigate

**Work with a partner. Try to create triangles using the given side lengths. Circle yes if you can make a triangle or no if you cannot.**

1. 5 cm, 8 cm, 15 cm **2.** 13 cm, 8 cm, 15 cm **3.** 13 cm, 4 cm, 4 cm

 Yes or No Yes or No Yes or No

Analyze and Reflect

**Work with a partner.**

1. The table below contains the dimensions you used in Step 3 of the Activity. Transfer your results from the investigation into the fourth column and then complete the fifth column.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Side 1 | Side 2 | Side 3 | Do the sides form a triangle? | Is Side 1 + Side 2 greater than or less than Side 3 |
| 15 cm | 15 cm | 15 cm | yes | Greater than |
| 3 cm | 4 cm | 5 cm | Yes | Greater than |
| 8 cm | 8 cm | 13 cm | yes | Greater than |
| 3 cm | 4 cm | 8 cm | No | Less than |
| 4 cm | 4 cm | 5 cm | Yes | Greater than |
| 8 cm | 3 cm | 15 cm | No | Less than |
| 4 cm | 8 cm | 15 cm | no | Less than |

1. What do you notice about the figures with a Side 1 and Side 2 sum that is less than the length of side 3? Sample answer: They do not form triangles.

CREATE

1. Can you create a triangle that has the same shape as the triangle in the Investigation, but

 different side lengths? Explain. Yes – 8cm, 8cm, 8cm

1. Could you form a triangle using the side lengths of 7, 8, and 25 centimeters? Explain.

No; Sample answer: To form a triangle, the sum of any two sides must be greater than the length of the third side. 7 + 8 is not greater than 25.