Just In Time Quick Check

Standard of Learning (SOL) G.5d

Strand: Triangles

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The student, given information concerning the length of sides and/or measures of angles in triangles, will solve problems, including practical problems. This will include determining the range in which the length of the third side must lie.

Grade Level Skills:

- Given information about the lengths of sides and/or measures of angles in triangles, solve problems, including practical problems.
- Given the lengths of two sides of a triangle, determine the range in which the length of the third side must lie.

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Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - G.5a-d – How Many Triangles? (Word) / PDF Version
- VDOE Word Wall Cards: Geometry (Word) | (PDF)
  - Angle and Sides Relationships
  - Triangle Inequality Theorem
- Other VDOE Resources
  - Geometry, Module 4, Topic 3 – The Range of the Length of the Third Side [eMediaVA]

Supporting and Prerequisite SOL: N/A

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1. The lengths of two sides of a triangle are 30 inches and 50 inches. What is the range of possible lengths for the third side of this triangle? Explain your thinking.

2. Michele is creating a triangle by connecting three wooden rods. If the lengths of two of the wooden rods are 15 centimeters and 22 centimeters, what is the range of possible lengths of a third wooden rod that will create a triangle? Explain your thinking.

3. The measures of two sides of a triangle are 8 feet and 12 feet. Use values to fill in the blanks to create a true statement about the length of the third side of the triangle.

   The third side of the triangle must be a value larger than _____ but smaller than _____.

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Common Errors/Misconceptions and their Possible Indications

1. The lengths of two sides of a triangle are 30 inches and 50 inches. What is the range of possible lengths for the third side of this triangle? Explain your thinking.

   *A common misconception students may have is to determine that the possible lengths **are** 20 inches or 80 inches instead of a range of values **between** these two parameters. This may indicate that students correctly found the values of the upper and lower bounds of the range by finding the sum and difference of 50 inches and 30 inches but do not understand that there are an infinite number of values that can represent the length of the third side. Teachers are encouraged to emphasize with students that the length of each side must be **within the range** that is determined by the lengths of the other two sides. Teachers are encouraged to use concrete manipulatives such as pieces of string, straws, or other manipulatives to model or to illustrate the range of values that can be used to form triangles when two side lengths are given.*

2. Michele is creating a triangle by connecting three wooden rods. If the lengths of two of the wooden rods are 15 centimeters and 22 centimeters, what is the range of possible lengths of a third wooden rod that will create a triangle? Explain your thinking.

   A common error students may make is writing the compound inequality incorrectly to express the range of values. Some students may be able to explain this concept in words, but be unable to write the symbolic form for the compound inequality that represents the range of possible values. Teachers may want to ask students about lengths that would not fit the parameters of this example such as 0 centimeters or 99 centimeters, so that students may discover that another constraint is needed. Teachers are encouraged to show students how to write their solution as a compound inequality; and, then using the substitution property, substituting multiple values that would satisfy the compound inequality.

3. The measures of two sides of a triangle are 8 feet and 12 feet. Use values to fill in the blanks to create a true statement about the length of the third side of the triangle.

   The third side of the triangle must be a value larger than _____ but smaller than _____.

   A common error students may make is identifying the given side lengths as the constraints of the compound inequality ($8 < x < 12$). This may indicate that students do not understand that to determine the range of the measure of the third side, students must find the sum and difference of the given side lengths. Teachers are encouraged to use concrete manipulatives such as pieces of string, straws, or other manipulatives to model or to illustrate the range of values that can be used to form triangles when two side lengths are given. Teachers may also use dynamic software to model the range in which the length of the third side must lie.