

COMPARING HEIGHTS

Performance Standard 8C.G

Judge the accuracy of various conclusions using clues about various students' heights and provide rationale for their correctness based on the properties of inequalities:

- *Mathematical knowledge*: Demonstrate knowledge of properties of symmetric and transitive properties of inequality and addition and subtraction properties of inequality;
- *Strategic knowledge*: Solve the problem using systematic process
- *Explanation*: Explain completely what was done and why it was done.

Procedures

1. Provide students with sufficient learning opportunities to develop the following in order to solve problems using systems of numbers and their properties:
 - Identify and provide examples and counter examples for the reflexive, symmetric and transitive properties of inequality.
2. Provide students with the assessment task sheet. Have students work individually. Make sure to stress the need to support their answers.

Using the following given information about the heights of several girls, decide on the correctness of each statement, and explain why each is correct or incorrect, based on the properties of inequality.

We know: Amy is taller than Sue
Sue is shorter than Jenny
Trish is taller than Amy

Determine if each of the following is correct or not, and justify your response.

- Sue is shorter than Trish
 - Jenny is taller than Amy
 - Jenny is taller than Sue
 - Trish is the tallest of the girls
 - Sue is the shortest of the girls.
 - If Amy and Sue each grew 2 inches in the past year, then last year Amy was taller than Sue.
3. Use the standard scoring rubric. A score of 4 should indicate completely correct solutions to all parts of the problem, with complete and correct justifications of their reasoning. A three should represent correct solutions to all parts with their rationale not completely explained with correct terminology. A two would indicate that students have some idea about how to answer the questions, but have little or no ability to justify their answers. A one may have a correct answer for one part, but generally shows little understanding in their rationale for their procedures and processes. A score of zero generally reflects no correct responses and no logical rationale for their procedures and processes.
 4. Major and minor errors in computation are not applicable in this problem.
 5. Students who receive a four for mathematical knowledge should have all responses correct, and be able to justify their responses using appropriate properties of inequality, such as the symmetric and transitive property, as well as properties of operations on inequalities. Some may be justified in a variety of ways, correct responses for each part include:
 - a. True. Transitive Property of Inequality
 - b. Not necessarily true, so false. Nothing is known about how Jenny & Amy compare.
 - c. True. Symmetric Property of Inequality
 - d. Not necessarily true, so false. Nothing is known about how Jenny and Trish compare.
 - e. True. Transitive Property of Inequality.
 - f. True. Addition (or subtraction) Property of Inequality.

Examples of Student Work follow**Time Requirements**

- One class period

Resources

- writing utensil
- Copies of the “Comparing Heights” task sheet
- Mathematics Rubric

NAME _____ DATE _____

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Student Task Sheet

Using the following given information about the heights of several girls, decide on the correctness of each statement, and explain why each is correct or incorrect, based on the properties of inequality.

We know:

Amy is taller than Sue
Sue is shorter than Jenny
Trish is taller than Amy

Determine if each of the following is correct or not, and justify your response.

1. Sue is shorter than Trish
2. Jenny is taller than Amy
3. Jenny is taller than Sue
4. Trish is the tallest of the girls
5. Sue is the shortest of the girls.
6. If Amy and Sue each grew 2 inches in the past year, then last year Amy was taller than Sue.

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Student Task Sheet

Using the following given information about the heights of several girls, decide on the correctness of each statement, and explain why each is correct or incorrect, based on the properties of inequality.

We know:

Amy is taller than Sue
 Sue is shorter than Jenny
 Trish is taller than Amy

Determine if each of the following is correct or not, and justify your response.

- Sue is shorter than Trish - correct. Trish is taller than Amy, but Sue is shorter than Amy.
- Jenny is taller than Amy - we don't know enough.
- Jenny is taller than Sue - correct. We knew Sue was shorter than Jenny, so Jenny is taller than Sue.
- Trish is the tallest of the girls - we don't know. It doesn't say enough about Jenny.
- Sue is the shortest of the girls. - correct - Sue is shorter than Amy and Jenny. Trish is taller than Amy, so Trish is taller than Sue also.
- If Amy and Sue each grew 2 inches in the past year, then last year Amy was taller than Sue. - correct - if $a > s$ $a+n=x$ $s+n=y$, then $x > y$. Amy was taller than Sue. If they grew the same amount Amy is still taller this year.

Trish

Amy

Jenny

Sue

or

Trish

Sue

Amy

Sue

or

Jenny

Trish

Amy

Sue