Kentucky Alternate Assessment Instructional Support Document - Math

KAS: KY.6.EE.5

Standards for Mathematical Practice	
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics.	MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.

Standard

KY.6.EE.5
Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Alternate Assessment Target:
Limit to equations or inequalities involving integers and decimals from negative 20 to 20.

Clarifications

From a set of numbers, substitute values to choose which satisfy a given equation or inequality. An equation or inequality with no solutions from the list may be described as having no solutions or an empty set of solutions, given the set of possible values.

Another example with a tape diagram:

120			
n	*n*	*n*	*n*

$4n = 120$ What is the value of *n* that makes this equation true? n = 30

Alternate Assessment Clarification:
Given: 7 + y = 9. Which of the following is a solution for y: -3.6, 1.3, or 3.6? None
Given: 7 + y ≥ 9. Which of the following is a solution for y: -3.6, 1.3, or 3.6? 3.6

Connections to Math Practices

MP.1 Make sense of problems and persevere in solving them.
(Make sense of mathematics*)

MP.2 Reason abstractly and quantitatively.
(Add or remove context to solve problems*)
Students understand the meaning of a "solution" to an equation as a value of the variable that makes the equation true.

MP.7 Look for and make use of structure.
(Simplify problems by using their structure*)
Students may use tape diagrams, tables or graphs to determine a solution. These models create structure as students gain knowledge in writing expressions and equations.

MP.6 Attend to precision. (Communicate precisely.*)
Key Vocabulary: solution, equation, inequality, substitution
Precision with definition of the variable (e.g., they write "*n* equals Dalton's age in years" as opposed to "*n* is Dalton")

Click here to see more about what teachers and students do to build the math practices:
Engaging the Math Practices and Question Stems

Coherence/Foundational Understandings

Pre-requisite Skills

- Understanding of equality (balance)
- Understanding the meaning of each inequality symbol <, ≤, >, ≥, ≠
- Concepts of greater than and less than
- Substitution

KY.1.NBT.3
KY.2.NBT.4

Coherence KY.6.EE.5→KY.8.EE.8

Kentucky Academic Standards for Mathematics

*Clarification to the math practices by Robert Kaplinsky.

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Instructional Considerations

Possible Areas of Difficulties/Misconceptions

- Understanding that the "equal sign" does not mean "the answer is…"; it is about balance
- Many students have difficulty understanding that an inequality can have more than one solution.
- Be sure to show problems with variables on different sides of the equal sign, not just always on the left (e.g., $15 \leq 20 - x$)

Suggested Tools/Visual Aids -

- KY Alternate Assessment Resource Guide (General terms pps 6-11 ; Math terms pps 22-26)
- Use of balance beam for understanding equality; math balance
- Hands-On Equations
- Equation mats
- Counters or other objects (tiles, chips, blocks, weights, etc…)
- Virtual Algebra balance scales http://nlvm.usu.edu/en/nav/frames_asid_201_g_3_t_2.html
- Algebra Tiles

Other Considerations:

- Students should have concrete experiences with use of math balance, counters, etc.
- Show an equation mat with 8 counters on the left side and 17 on the other side. The equation is 8 + x = 17. How many counters need to be added to the left side for the mat to balance? 11
- Students should use manipulatives and pictures (e.g. tape like diagrams) to represent the equations and their solution strategies. https://www.youtube.com/watch?v=juANWOSvonA
- Provide students with real-world examples that are familiar to students.
  "Annie has $42 in her bank. For her birthday she received some more dollars and now has $100. How many dollars did she receive for her birthday?"
  "I have $25 and want to buy some notebooks. Each notebook is $4. How many notebooks could I buy?" (i.e. $4n \leq 25$)