STANDARD FOR MATHEMATICAL PRACTICE #3

CONSTRUCT VIABLE ARGUMENTS & CRITIQUE THE REASONING OF OTHERS

I'M USING THIS SMP WHEN...

- I look at a problem and use what I know about math to explain my thinking.
- I explain why my strategy and my answer makes sense using math words, pictures, diagrams and/or symbols.
- I make conjectures and consider how examples and counter-examples can be used to construct an argument.
- I listen carefully (critically) to others, ask questions, pose examples and counter-examples, to improve their explanation and/or thinking.
- I compare different solution approaches, consider how they are similar and how they are different, and make generalizations about when and how to use different approaches.

TEACHING ACTIONS TO ENGAGE STUDENTS IN THIS PRACTICE

- Prompt students to explain their reasoning clearly and justify each step in their solution.
- Provide opportunities for students to use different strategies and methods.
- Create opportunities for students to agree, disagree, and question each other's reasoning in a respectful, evidence-based manner.
- Present incorrect solutions or partially completed work for students to evaluate, correct, or complete.
- Model and support students in using appropriate mathematical vocabulary and symbols to articulate their explanation clearly.
- Ask students to reflect on and revise their thinking based on new insights or feedback.

SMP 3: Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases and can recognize and use counterexamples. They justify their conclusions, communicate them to others and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students also are able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed and —if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. . . . Students at all grades can listen or read the arguments of others, decide whether they make sense and ask useful questions to clarify or improve the arguments.

Kentucky Department of Education (2019, p. 13)

- How can I explain my thinking clearly to others?
- What evidence supports my solutions or reasoning?
- What questions can I ask to understand their perspective better?
- How can I connect their reasoning to my own ideas?

STUDENT ASK-YOURSELF QUESTIONS

SMP#3