#### Indicators of Standards for Mathematical Practice (SMPs) in Summative Assessment Items

## Indicators of SMP.1: Make sense of problems<sup>1</sup> and persevere in solving them.

1a. The item requires<sup>2</sup> a level of interpretation beyond the use of key words, key phrases or images signaling which operations to use.

#### Indicators of SMP.2: Reason abstractly and quantitatively.

2a. The item requires students to attend to the meaning of quantities, not just how to compute them.

2b. The item requires the student to consider the units involved.

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

3a. The item requires an understanding of or use of stated assumptions, definitions, and/or previously established results in the context of constructing mathematical arguments.

3b. The item requires students to build a logical progression of statements to explore the truth of one or more conjectures.

3c. The item requires the student to break a situation into cases or to give counterexample(s).

3d. The item requires the student to compare the effectiveness of two plausible arguments, or distinguish correct logic or reasoning from that which is flawed.

3e. The item requires students to identify and/or correct the flaw in an argument.

3f. The item requires the student to determine the domains to which an argument applies.

#### Indicators of SMP.4: Model with mathematics.

4a. The item requires the student to create<sup>3</sup> an equation to model a situation that is plausible in everyday life, society, or workplace.

4b. The item requires the student to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas

<sup>&</sup>lt;sup>1</sup> Items that reflect SMP.1 must require the student to make meaning of the problem and to determine an entry point to its solution.

<sup>&</sup>lt;sup>2</sup> The term "requires" should be treated literally throughout this document.

<sup>&</sup>lt;sup>3</sup> The word "create" should be treated literally in selecting this indicator. Selecting an equation from a list of possible options (i.e., multiple choice) does not provide evidence for this indicator.

4c. The item requires students to interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

4d. The item requires students to define symbols, quantities, or variables used.

# Indicators of SMP.5: Use appropriate tools strategically.

5a. The item is designed to give an obvious advantage to students who select and use a mathematical tool<sup>4</sup> without a specific direction to do so.

## Indicators of SMP.6: Attend to precision.

6a. The item targets the use of clear mathematical definitions.

6b. The item requires students to attend to precision in the symbols, quantities, or variables<sup>5</sup> used.

6c. The item requires students to compute or report with a degree of precision appropriate to the problem without a specific direction to do so.

# Indicators of SMP.7: Look for and make use of structure.

7a. The item requires students to use structure to classify objects (including expressions and equations).

7b. The item allows students who see structure in objects (including expressions and equations) to work through the problem more efficiently.

## Indicators of SMP.8: Look for and express regularity in repeated reasoning.

8a. The item requires students to formulate a generalization based on repeated reasoning.

8b. The item illustrates a sequence of repeated reasoning that would allow students to perform a computation more easily than had the sequence not been provided.

<sup>&</sup>lt;sup>4</sup> This does not include selecting a calculator to perform routine computations and does not include items where specialized tools appear or are given only on select items.

<sup>&</sup>lt;sup>5</sup> For example, correcting the precision with which a variable has been defined consistent with the problem's context.

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