



## Guidelines for Writing Multiple-Choice Math Items

- 1. The item measures the knowledge, skills, and proficiencies characterized by the standards within the identified cluster.**
- 2. The focus of the problem or topic should be stated clearly and concisely.**

The stem should be meaningful and convey the central problem. A multiple-choice item functions most effectively when a student is required to compare specific alternatives related to the stem. It should not be necessary for the student to read all of the alternatives to understand an item. (*Hint: Cover the alternatives and read the stem on its own. Then ask yourself if the question includes the essential elements or if the essential elements are lost somewhere in the alternatives.*)
- 3. Include problems that come from a real-world context or problems that make use of multiple representations.**

When using real-world problems, use formulas and equations that are real-world (*e.g., the kinetic energy of an object with mass,  $m$ , and velocity,  $V$ , is  $k = \frac{1}{2} mv^2$* ). Use real-world statistics whenever possible.
- 4. The item should be written in clear and simple language, with vocabulary and sentence structure kept as simple as possible.**

Each multiple-choice item should be specific and clear. The important elements should generally appear early in the stem of an item, with qualifications and explanations following. Difficult and technical vocabulary should be avoided, unless essential for the purpose of the question.
- 5. The stem should be written as a direct question or an incomplete statement**

Direct questions are often more straightforward. However, an incomplete statement may be used to achieve simplicity, clarity, and effectiveness. Use whichever format seems more appropriate to present the item effectively.
- 6. The stem should not contain irrelevant or unnecessary detail.**

Be sure that sufficient information is provided to answer the question, but avoid excessive detail or “window dressing.”
- 7. The phrase *which of the following* should not be used to refer to the alternatives; instead, use *which* followed by a noun.**

In the stem, *which of the following* requires the student to read all of the alternatives before knowing what is being asked and assessed. Expressions such as *which statement*, *which expression*, *which equation*, and/or *which graph* are acceptable.

**8. The stem should include any words that must otherwise be repeated in each alternative.**

In general, the stem should contain everything the alternatives have in common or as much as possible of their common content. This practice makes an item concise. Exceptions include alternatives containing units and alternatives stated as complete sentences.

**9. The item should have one and only one correct answer.**

Items should not have two or more correct alternatives. *All of the above* and *none of the above* are not acceptable alternatives.

**10. The distractors should be plausible and attractive to students who lack the knowledge, understanding, or ability assessed by the item.**

Distractors should be designed to reflect common errors or misconceptions of students.

**11. The alternatives should be grammatically consistent with the stem.**

Use similar terminology, phrasing or sentence structure in the alternatives. Alternatives must use consistent language, including verb tense, nouns, singular/plurals, and declarative statements. Place a period at the end of an alternative *only* if the alternative by itself is a complete sentence.

**12. The alternatives should be parallel with one another in form.**

The length, complexity and specificity of the alternatives should be similar. For example, if the stem refers to a process, then all the alternatives must be processes. Avoid the use of absolutes such as *always* and *never* in phrasing alternatives.

**13. The alternatives should be arranged in logical order, when possible.**

When the alternatives consist of numbers and letters, they should ordinarily be arranged in ascending or descending order. An exception would be when the number of an alternative and the value of that alternative are the same. For example: (1) 1 (2) 2 (3) 0 (4) 4.

**14. The alternatives should be independent and mutually exclusive.**

Alternatives that are synonymous or overlap in meaning often assist the student in eliminating distractors.

**15. The item should not contain extraneous clues to the correct answer.**

Any aspect of the item that provides an unintended clue that can be used to select or eliminate an alternative should be avoided. For example, any term that appears in the stem should not appear in only one of the alternatives.

**16. Notation and symbols as presented on Common Core examinations should be used consistently.**

For example,  $AB$  means the length of line segment  $AB$ ,  $\overline{AB}$  means line segment  $AB$ ,  $m\angle A$  means the number of degrees in the measure of angle  $A$ , etc.