

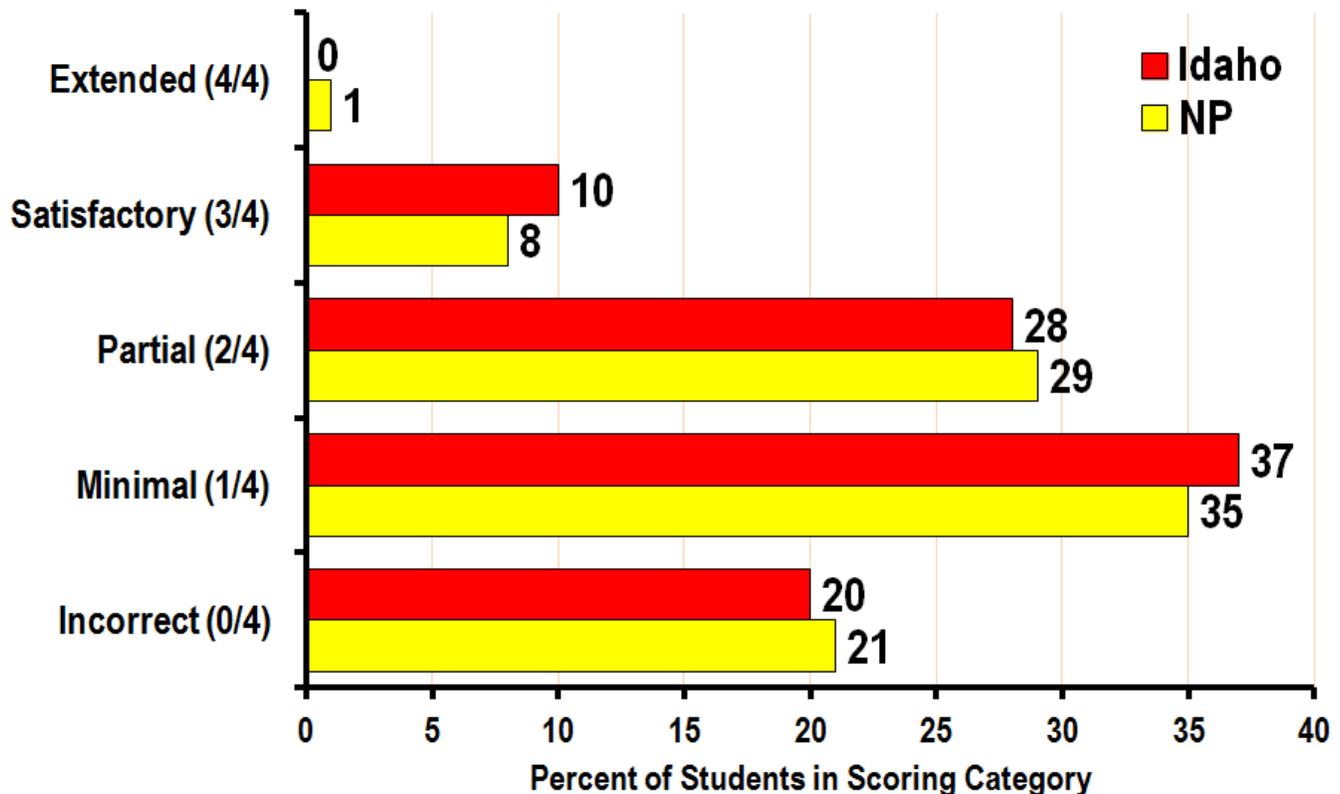
## NAEP 2013 Mathematics, Grade 8 Algebra Extended Constructed Response Item Idaho vs. Nation's Public Schools



December 6, 2013

NAEP uses a mixture of item types, including multiple-choice and constructed response. This snapshot looks at the performance of eighth-grade public school students in Idaho and across the nation on one extended constructed response item. This algebra item, which measures student knowledge about using a graph to answer questions, was released with NAEP 2013 mathematics results. A graphic display of the 2013 results, the four-question item and its scoring guide follow.

### NAEP 2013 Mathematics, Grade 8 Algebra "Answer Questions Based on Graph" Extended Constructed Response Item



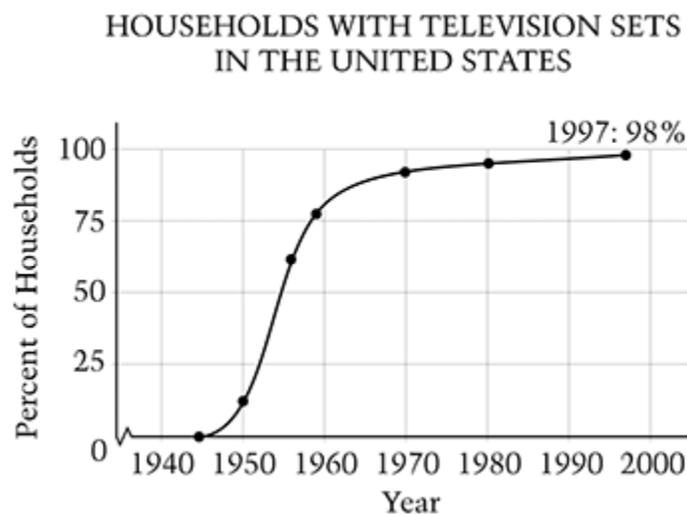
On Page 2/3: The complete four-part item about using a graph to answer questions as it was presented to students. This eighth-grade algebra extended constructed response item (Block M6 Question #16) was released to the public with the NAEP 2013 mathematics results.

On Page 3/3: The NAEP scoring guide for Block M6 Question #16, released 2013.

**Grade 8 Algebra (Block M6 Question #16): Extended Constructed Response  
Item Released with NAEP 2013 Mathematics Results**

## Answer questions based on graph

The graph below shows the percentages of all households in the United States in the years 1940 to 1997 that owned at least one television set.



- (a) In which year do you think that television sets were most likely first available for purchase in stores?
- (b) In which year did 50 percent of the households own at least one television set?
- (c) Write a sentence or two that compares the growth in the percentage of households with television sets across the three decades of the 1950's, 1960's, and 1970's.
- (d) The points (1950, 10) and (1970, 90) both lie on the graph above. Both points are also solutions of the equation  $Y = 4x - 7790$ . However, if the graph of  $Y = 4x - 7790$  were drawn for the years 1940 to 1997, it would not look like the graph shown. Explain why not.

## NAEP Scoring Guide for Block M6 Question #16, Released 2013

### Sample Correct Responses:

- Any year between 1943 and 1947, inclusive, is acceptable
- Any year between 1953 and 1957, inclusive, is acceptable.
- The greatest growth in the percentage of television sets occurred during the 1950s, with much slower growth during the 1960s, and slower yet (leveling off) during the 1970s

OR

Any response that accounts for a greater increase followed by a lesser increase over the 1950s - 1970s. The time does not need to be mentioned explicitly. (i.e., "the number increased a lot and then leveled off" would earn credit)

### Notes for part (c).

- The response is acceptable if the student cites three correct (year, percent) or (percent, year) pairs, one in each decade, at or near the beginning of the decade. (This is a comparison that implies upward growth.)
- The response is also acceptable if the student response demonstrates commonality across the three decades as a whole. E.g., It grew fast or a lot in the beginning but then did not grow as much OR the growth was most dramatic during the 50s. ("most dramatic" is a comparison)
- The overall focus of this part is on the shape of the curve; if students convey a sufficient understanding of this, then the response should earn credit.

The following are examples of responses that are NOT acceptable for part (c):

- It goes up; It increases (or gets bigger); It rose a lot.
- It gets more popular.
- Any response that talks about only one of the decades (without a comparison such as "most", for example).
- Any response that talks about prices or sales (not ownership) of televisions.

### Notes for part (d).

The given equation is the equation of a line; the given graph is not a line

OR

Gives an explanation that focuses on a point on the line that is not on the given graph; e.g., the point (0, -7790) that results in a negative coordinate.

\*Just stating one point was not on the curve was not sufficient for a correct response unless it had a negative coordinate.

OR

If response stated the equation had a constant (steady) slope and the graph did not, it was scored correct

### Item Score & Description

Extended	Complete response - all parts correct
Satisfactory	Three of four parts correct
Partial	Two of four parts correct
Minimal	One of four parts correct
Incorrect	Incorrect response