

GRAB BAGS

Performance Standards (8B/8C).G

Represent graphically and symbolically the range in values possible for merchandise placed in grab bags.

- *Mathematical knowledge:* Represent inequalities graphically and symbolically, and determine average values.
- *Strategic knowledge:* Solve problem using a systematically process
- *Explanation:* Explain completely what was done and why it was done.

Procedures

1. Provide students with sufficient learning opportunities to develop the following in order to (8B) interpret and describe numerical relationships using tables, graphs and symbols, and (8C) solve problems using systems of numbers and their properties:
 - Graph two inequalities with a single variable, including the intersection or union of these inequalities on a number line.
 - Solve arithmetic and linear equations using the properties of equality and inequality.
2. Provide students with the task and make sure they understand what is being asked for in each part. Students should work individually, without teacher intervention. Calculators should not be needed on this task.
3. Use the standard scoring rubric. Give each student a score in each of the three categories. A score of 4 should indicate completely correct solutions to all parts of the problem, with complete and correct justification of their reasoning. A three should represent correct or nearly correct solutions to all parts, with only minor computational errors making their solutions inaccurate, their rationale should be sound, but may not be completely explained. A two would indicate that students have some idea about how to answer the questions, but make major errors in computation and/or reasoning that effect their answers. A one may have a correct answer for one part, but generally shows little understanding in their rationale for their procedures and processes. A score of zero generally reflects no correct responses and no logical rationale for their procedures and processes.
4. Minor errors in computation include making errors in the actual addition or multiplication, rounding incorrectly. Major errors include using the wrong operations or formulas to relate terms.
5. Part A should be used to judge standard 8B bullet 2, while part B can be used to judge Standard 8C bullet one. Part A students should show a number line with the a solid dot on the ten and a solid dot on the 20, with the region between the two shaded, thus showing the graph of the inequality:
 $10 \leq x \leq 20$. In Part B students should recognize the fact that the least average value of the items in the bag will occur when you have the most items worth the least amount, so 6 items worth \$20 for an average price of about \$3.67 each. The greatest average price is determined when the smallest number of items cost the greatest possible amount; so 4 items worth \$30 would yield an average price of \$7.50. Thus the average price of the items would range from $3.67 < x < 7.50$.

Examples of Student Work follow

Resources

- Pencil
- Copies of the “Grab Bags” task sheet
- Mathematics Rubric

Time Requirements

- Students should take no more than 15-20 minutes to solve the problem

ASSESSMENT (8B/8C).G

NAME _____ DATE _____

GRAB BAGS

Student Task Sheet

Part A.

A store is having a “grab bag” sale. The bags will be sold for \$5, and the store advertises that the bags contain at least \$10 worth of merchandise. The manager tells the workers who are filling the bags to make sure the total value of what they put into each bag does not exceed \$20.

1. Write an inequality that represents the possible regular price of the items in the grab bags.
2. Graph this inequality on a number line.

Part B.

The manager later decides to offer a second larger grab bag, to help sell miscellaneous old merchandise. This time she wants to be able to advertise that the bags contain at least four items that have a total value more than \$20. She tells her workers to make sure they do not place more than 6 items in any bag, and to keep the total value under \$30.

1. What is the range of values possible for the average price of items in any bag? Express your answer as an inequality, rounding all amounts to the nearest whole cent. Clearly explain how you determined the range of values possible.