At The Supermarket *M013 scoring rubric*

Math Domain

- ☑ Number/Quantity
- ☑ Shape/Space
- ☐ Function/Pattern
- ☐ Chance/Data
- ☐ Arrangement

Math Actions (possible weights: 0 through 4)

- 1 Modeling/Formulating
- 2 Manipulating/Transforming
- 2 Inferring/Drawing Conclusions
- 2 Communicating

Math Big Ideas

- ☑ Scale
- ☐ Reference Frame
- ☐ Representation
- ☐ Continuity
- ☐ Boundedness
- ☐ Invariance/Symmetry
- ☐ Equivalence
- ☐ General/Particular
- ☐ Contradiction
- ☐ Use of Limits
- ☐ Approximation
- ☐ Other

1. **a.** At *Gourmet Grocery*, one can of corn costs 3/7 of a dollar, or about $0.43. At *Shop and Run*, one can costs 2/5 of a dollar, or about $0.40. Thus, *Shop and Run* has the lower price.

b. Any fraction between 2/5 and 3/7 can be used to produce an answer. One good choice is 5/12, which gives the answer "12 for $5."

Here is one way to explain why this price is in between: if you were to buy 7 cans for $3 at one store and then 5 cans for $2 at the other store, in total you would be buying 12 cans for $5, and the average price per can would have to be in between two stores' prices.

Another way to think about this is to choose a number of cans halfway between 5 and 7, namely 6, and a price halfway between $2 and $3, or $2.50. But 6 cans for $2.50 does not satisfy the whole number requirements. However, doubling this ratio leads to 12 cans for $5.00.

Still another possibility is to simply multiply .41 or .42, the "inbetween" unit prices, by 100, resulting in 100 cans for $41 or $42.

2. The area of the pan in the recipe is (6 in.)·(9 in.) = 54 sq. in., while the area of the commercial-size pan is (18 in.)·(24 in.) = 432 sq. in. Thus the area of the commercial-size pan is 8 times the area of the recipe pan.

This ratio of areas can also be seen without actually computing the areas. Note that 18 in. = 2·(9 in.), while 24 in. = 4·(6 in.). An enlargement by a factor of 2 in one dimension and a factor of 4 in the other dimension would change the area by a factor of 8.

Now, all the quantities in the recipe must be multiplied by 8:

4 cups butter
12 ounces unsweetened chocolate
8 cups sugar
16 eggs
8 teaspoons vanilla
6 cups all-purpose flour
8/3 cups chopped nuts

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	partial level (1 or 2)	full level (3)
Modeling/ Formulating (weight: 1)		Student is able to formulate a way to determine the ratio of areas without actually computing each one.
Transforming/ Manipulating (weight: 2)	There are some computational errors in questions **1** or **2**.	All calculations are consistent and correct.
Inferring/ Drawing Conclusions (weight: 2)	Solutions display a fragile sense of proportional reasoning.	All solutions are reasonable, and make use of appropriate ratios.
Communicating (weight: 2)	The explanation for questions **1 a** and/or **l b** are vague or incomplete.	Explanations are clear, complete, and utilize appropriate vocabulary.

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