Bake Sale

Your class has decided to have a bake sale for a fund raiser. The students decided on the following prices for baked goods.

Flyers were made and distributed around the community with the following prices:

- 4 brownies for $1.25
- 5 cupcakes for $2.50
- 3 cookies for $1.00
- 1 cake for $4.50
- 1 pie for $5.00
- 2 popcorn balls for $.75

Part A

Two days before the bake sale, your math teacher said she would make 120 cookies if you give her a recipe listing the exact amount of each ingredient that she will need to use.
Provide her with that information.

Part B

One day before the bake sale, your class sets a goal to raise at least $150.00 for this fundraiser. What quantities of baked goods do you recommend having on hand to raise that amount at the sale?

Part C

The bake sale is finally here! The first person in line is your math teacher, and she wants 6 of each item. HELP! Your price list is for different quantities. You hear the words you have come to dread, "I want to see the math." The people are beginning to line up behind her. How much is her purchase so you can send your teacher on her way?

Alternative Versions of the Task

More Accessible Version

Your class has decided to have a bake sale for a fundraiser. Two days before the bake sale your math teacher said she would make 120 cookies if you list the correct amount of each ingredient she will need. Use the recipe below to make this determination.

Peanut Butter Cookies (makes 2 1/2 dozen cookies)

1/2 cup sugar

1/2 cup brown sugar

1/2 cup peanut butter

1/4 cup shortening

1/4 cup butter

1 egg

1 1/4 cups flour

3/4 teaspoon baking soda

1/2 teaspoon baking powder

1/4 teaspoon salt

More Challenging Version

Your class has decided to have a bake sale. Each student in the class has been asked to bring in an item to sell and is responsible for pricing the item s/he brought.

The teacher would like you to use the following method for setting a price:

- Cost to make entire recipe, plus a 50 percent profit, divided by the number of items you are selling.
- Get a recipe and determine the cost at which each cookie in your recipe will be sold. Be sure to include the recipe you used, how you determined the price of each ingredient, and how you determined the cost per cookie.

Planning Sheet

Context
This task was given to students while studying proportions and ratios using the seventh grade Mathscapes unit "Buyer Beware," published by Creative Publications.

What This Task Accomplishes
This task allows students to use their knowledge of equal ratios and cross products to solve proportions in a real-life situation. Students are also asked to select a recipe of their choice and increase it. Students are then required to make decisions on the number of each type of item that should be available at the bake sale. There is no one correct answer. The final task has students determining the total cost of a purchase using ratio. This task is a multistep problem for students to solve. Multistep problems are a part of the New Standards Reference Exam, and this task can provide much needed practice.

What the Student Will Do
Students will begin by finding a recipe that they would like to increase. Some students will recognize that a recipe that is a factor of 120 will be easier to calculate than others. They will set up proportions to solve the problem. Some will use calculators and fail to show their work.
Some students will attempt to determine how many items they need to sell at the bake sale. Some will realize that they have been given 120 cookies from their teacher and will add that into their calculations. Others will miss that connection. Some will miss this step in the problem altogether. The final part of the task asks students to determine the cost of 6 of each item. Many students will set up proportions to solve this part of the problem.

Time Required for Task
About 80 minutes. Some students needed additional time to write up their reasoning and organize their response. Students also take a while in selecting the recipe they will use.

Interdisciplinary Links
This tasks links with family consumer science and the increasing or decreasing of recipes. Fundraising is an activity that the students will be a part of sometime in the future.

Teaching Tips
Students were given an opportunity to use equal ratios and cross products to solve proportions in various real-life situations. For students with special needs, this task could be modified by providing students with a recipe appropriate to their level of computation mastery. The number of parts could also be limited for some students.

Suggested Materials
• Calculators
• Cookbooks

Possible Solutions

The recipe solutions will be based on the student's choice of recipe. The amount of baked goods needed to earn $150.00 should include the 120 cookies baked by the teacher, along with other reasonable combinations. The teacher's purchase totals $66.13.

More Accessible Version Solution:

2.5 dozen cookies x 12 = 30 cookies per batch
120 cookies ÷ 30 cookies per batch = 4 batches

1/2 cup/teaspoons ingredients require 2 cups/teaspoons each
1/4 cup/teaspoons ingredients require 1 cup/teaspoons each

4 eggs
5 cups of flour needed
3 teaspoons baking soda needed

More Challenging Version Solution:

The solution will vary depending on the recipe the student chooses and the cost of each item. Assess correctness of student solutions by considering the accuracy of mathematical computations.

Task Assessment Notes

Novice
The Novice will have no apparent approach. The recipe used by the student will not be included, so it will be impossible to see if the calculations are correct. Not all parts of the problem will be solved, and it will not be clear where the numbers came from for the solution that is present. There will be no explanation of the solution, little or no use of math language, and no math representations.

Apprentice
The Apprentice will have a partially correct solution. The Apprentice will have a workable solution for increasing the recipe to 120 cookies. The Apprentice will have no justification for the number of items to be sold at the bake sale to reach the goal of $150.00. The calculation of the teacher's purchase will be incorrect. There may be math representation, and some math language present in the solution.

Practitioner
The Practitioner will have a strategy to solve all parts of the task. The answers will be correct. The student will use accurate and appropriate math language and math representation. The student will explain the approach and the reasoning used, and all the work will be present.

Expert
The Expert will have a strategy that leads to correct answers to all parts of the task. The Expert will use appropriate math language and math representation. The Expert will verify a part of the solution using another mathematical process or will make other mathematically relevant comments or observations about the solution.

10p kg brownies = $12.50
15 set cupcakes = $68.75
2 Set Cookies = $2.00
5 pans Pie = $25.00
8 pans Cakes = $36.00
9 Set popcorn = $6.75

$151.00

COCOA'S COOKES resapeas

1½ Cups Cake flour
4 Table Spoon Of unsweetend cocoa
3/4 Teaspoon of Bakeing Soacla
1/4 Teaspoon Salt
1/2 Pound unsalted Butter
3/4 Cups granulated Sugar
4 large Eggs
1 Table Spoons pure Vanilla Extrack

It is unclear where these calculations came from.

Documentation of the approach is lacking.

Part three is not addressed.

This solution cannot be verified, since the student didn't provide the original recipe.

Apprentice

Brown sugar

1. $\dfrac{1}{48}$ $\dfrac{n}{120}$ 30

$\dfrac{48n}{48}$ $\dfrac{120}{48}$

$n = 30$

Vanilla

3. $\dfrac{1}{48}$ $\dfrac{n}{120}$

$\dfrac{48n}{48}$ $\dfrac{120}{48}$

$n = 30$

all purpose flour

5. $\dfrac{2.23}{48}$ $\dfrac{n}{120}$

$\dfrac{48n}{48}$ $\dfrac{270}{48}$

$n = 5.625$

Butter

2. $\dfrac{1.25}{48}$ $\dfrac{n=}{120}$

$\dfrac{48n}{48}$ $\dfrac{150}{48}$

$n = 3125$

egg yolk

4. $\dfrac{1}{48}$ $\dfrac{n}{120}$

$\dfrac{48n}{48}$ $\dfrac{120}{48}$

$n = 30$

> This part of the solution works for increasing the recipe, but it could be better labeled. Much of the work is incorrect.

ingredients	old recipe	New recipe
firmly packed Brown sugar	1 cup	30 cups
Butter softened	1¼ cup	3.125 cups
Vanilla	1 teaspoon	30 teaspoons
egg yolk	1 Egg yolk	30 egg yolkes
all-Purpose floor	2¼ cups	5.625 cups
# of cookies	48 cookies	120 cookies

> Accurate math language is used.

> This chart is organized but contains incorrect work.

Apprentice

I think that you should have 20 of each thing Because I thing you sell a lote of Homemade Baked goods.

1. 6 Brownies for $1.57

2. 6 cupcakes for $3.00

3. 6 cookies for $2.00

4. 6 Pies for $30.00

5. 6 Cakes for $27.00

6. 6 Popcorn Balls for $2.25

This part of the solution lacks mathematical reasoning.

No work is present for this part of the problem.

In this portfoil piece I was asked to solve three diffrent prolbems. The frist one was to find the Ingredients in 120 sugar cookies. The way I did this was by useing cross multiplication. Then I made a chart with the regular recip and the 120 cookies.

The secound problem was to determine the quantities of bake goods for $150.00. I solved this problem by determining witch items would sell better. The ones that would sell better I would make more of and the ones that wooldent sell as good I wooldent make as much. My teacher also said that she would make 120 cookies so I dident have to determine the quantities of the Cookies.

The third problem was to find the price of six of each item. I did this buy takeing each item and multplying it by six. If the item wasent

The student explains the approach and reasoning used.

Parts of the student's solution are correct. The last statement is incorrect.

Practitioner

singel I would devied it
then multply it. The amount
for six item for each thing
was $66.13.

2½ cups of margarin or butter softend

$$\frac{N}{1} \times \frac{120}{48}$$

$$\frac{48n}{48} \div \frac{120}{48}$$

$$1 \qquad 2\frac{1}{2}$$

2½ Cups of firmly packed

$$\frac{N}{1} \times \frac{120}{48}$$

$$\frac{48n}{48} \div \frac{120}{48}$$

2½ Teaspoons of Vanilla

$$\frac{48n}{48} \div \frac{120}{48}$$

$$1 \qquad 2\frac{1}{2}$$

2to3 Eggs

$$\frac{N}{1} \times \frac{120}{48}$$

$$\frac{48n}{48} \div \frac{120}{48}$$

$$1 \qquad 2\frac{1}{2}$$

6¼ Cups of all purpose flour

$$\frac{N}{2\frac{1}{2}} \times \frac{120}{48}$$

$$\frac{48n}{48} \div \frac{300}{8}$$

$$6\frac{1}{4}$$

¾ Teaspoon's of baking Soda

$$\frac{N}{\times 2} \quad \frac{120}{48}$$

$$\frac{48n}{48} \div \frac{60}{48}$$

$$1 \qquad 1\frac{1}{4}$$

Correct answers are achieved.

All work is shown. Math language is used throughout.

Practitioner

Sugar Cookies

Ingredients	48 cookies	120 cookies
Margarin or Butter	1 cup	2½ cups
Brown Sugar	1 cup	2½ cups
Vanilla	1 Tea	2½ Teas
Eggs	1	2
flour	2½	6¼ Cups
baking Soda	½ tea	1¼ Teas

amount	Item	Price
20	brownies	$6.25
10	Pies	$50.00
7	Cakes	$32.50
26	Popcorn balls	$4.75
120	Cookies	$40.00
45	Cupcakes	$22.50
		160.00

The representation is organized and labeled.

All parts of the problem are addressed.

$$
\begin{array}{r}
125 \\
+\ 63 \\
\hline
188
\end{array}
$$

6 Brownies for $1.88

$$
=
\begin{array}{r}
1.25 \\
2 \\
\hline
63
\end{array}
$$

6 cupcakes for $ 3.00

50¢ per cookie

$$
\begin{array}{r}
\times\ \ \ 6 \\
\hline
300
\end{array}
$$

6 cookies for $ 2.00

$$
\begin{array}{r}
1.00 \\
\times\ \ \ 2 \\
\hline
2.00
\end{array}
$$

6 Pies for $ 30.00

$$
\begin{array}{r}
6 \\
\times\ 5.00 \\
\hline
30.00
\end{array}
$$

6 cakes for $ 27.00

$$
\begin{array}{r}
4.50 \\
\times\ \ \ 6 \\
\hline
27.00
\end{array}
$$

6 Popcorn balls for $ 2.25

$ 66.13
for 6 items for each thing.

$$
\begin{array}{r}
3 \\
\times 75 \\
\hline
225
\end{array}
$$

Expert

Bake Sale
write-up

In this portfolio, we were asked to figure out the answers to three questions. The firs queston had us pick a recipe for cookies and change it so it would make 120 cookies. To do that I used proportions. Here is an example

Say butter was 1 cup: And the recipe made 30 cookies:

butter → how much you need to make

$$\frac{1}{30} \times \frac{n}{120} \Bigg/ \frac{30n}{120} \qquad \frac{30n}{30} = \frac{120}{30} = 4 \text{ cups}$$

how much old recipe made

Do ya see! How I did it?

The next problem asks you to recommend how many tems we should have at the bake sale so that we could raise $150.00

I made a chart that showed the Items, how many of each and what they would cost.

The total came out to $150.25 so the class had 25¢ left over

> The approach and reasoning are clearly explained.

Expert

The last question asked me to give my math teacher 6 of each Item. So to figure that out I did it two. ways. One way I divided the cost of each Item by how many they would be sold in then I multiplico it by 6 becaus. thats how many she wanted. Another way I did it was showing proportions.

> The student solves the task in more than one way to verify the solution.

Expert

original recipe

all-purpose

supreme chocolate mint

Bake Sale chip cookies

Cookies

flour 4 cups

1 cup unsweetened coco

1 teaspoon baking soda

½ teaspoon salt

1½ cups sugar

1 cup firmly packed brown sugar

1½ cups margarine bulter softened

3 eggs

1 10 oz pg. mint flavored ~~covered~~ chocolate chips

GLAZE

2 cups sugar

½ cup unsweet coco

½ margarine or butter

½ cup milk

1 teaspoon vanilla

makes 6 dozen cookies

> The original recipe is provided.

My Math to find New amounts for Recipe!

$$\frac{4}{72} \times \frac{N}{120} = 6.6 \text{ cups}$$

$$\frac{72n}{72} = \frac{400}{72}$$

$$\frac{1}{72} \times \frac{N}{120} = \quad = 1.6 \text{ cups}$$

$$\frac{72}{72} = \frac{120}{72} \quad 1.6$$

All work is shown. Accurate math language is used throughout.

$$\frac{1/2}{72} \times \frac{N}{120} = .83 \text{ tsp}$$

$$\frac{72n = 60}{72} \quad \frac{}{72} = .83$$

$$\frac{1 1/2}{72} \times \frac{N}{120} = 2.5 \text{ tsp}$$

$$\frac{72n}{72} = \frac{180}{72}$$

$$\frac{1}{72} \times \frac{N}{120} = 1.6 \text{ cups} \quad \frac{72n}{72} = \frac{120}{72}$$

$$\frac{1 1/2}{72} \times \frac{N}{120} = 2.5 \text{ cups} \quad \frac{72n}{72} = \frac{180}{72}$$

$$\frac{1 1/2}{72} \times \frac{N}{120} = 2.5 \text{ cups} \quad \frac{72n}{72} = \frac{180}{72}$$

$$\frac{3}{72} \times \frac{N}{120} = = 5 \text{ eggs} \quad \frac{72n}{72} = \frac{360}{72}$$

$$\frac{10}{72} \times \frac{N}{120} = 33.33 \text{ cups} \quad \frac{72n}{72} = \frac{1200}{72}$$

$$\frac{2}{72} = \frac{n}{120} = 3.33 \text{ cups}$$

$$\frac{72n = 240}{72} \quad \frac{}{72}$$

Expert

$$\frac{1/2}{72} \times \frac{N}{120} = .83 \text{ cups}$$
$$\frac{72n-60}{72} = \frac{60}{72}$$

$$\frac{1/2}{72} \times \frac{N}{120} = .83 \text{ cups} \quad \frac{72n}{72} = \frac{60}{72}$$

$$\frac{1/2}{72} \times \frac{N}{120} = .83 \text{ cups} \quad \frac{72n}{72n} = \frac{60}{72}$$

$$\frac{1}{72} \times \frac{N}{120} = 1.6$$
$$\frac{72n}{72} = \frac{60}{72}$$

INGREDIENTS	RECIPE-72	HOW MUCH FOR 120 COOKIES
FLOUR	4 cups	6.67 cups
unsweet coco	1 cup	1.67 cups
baking soda	1 tsp	1.67 tsp
salt	1/2 tsp	.83 tsp
sugar	1 1/2 cups	2.5 cups
brown sugar	1 cup	1.67 cups
butter or Margarine	1 1/2 cups	2.5 cups
eggs	3 eggs	5 eggs
mint choc chips	10 oz	17 cups

GLAZE

sugar	2 cups	3.33 cups
unsweet coco	1/2 cup	.83 cups
margarine or butter	1/2 cup	.83 cups
milk	1/2 cup	.83 cups
vanilla	1 tsp	1.67 tsp

> This representation is accurate and labeled.

Bake Sale

#1

Recipe for 120 cookies

Supreme chocolate mint chip cookies:

COOKIES

all purpose flour 6.6 or 6 3/5 cups

unsweetened coco: 1.6 or 13/5 cups

Salt 83 or 4/5 teaspoon

Baking Soda: 1.6 or 13/5 teaspoons

sugar: 2.5 or 2½ cups

firmly packed brown sugar: 1.6 or 13/5 cups

melted margarine or butter: 2.5 or 2½ cups

eggs: 5

mint chocolate chips: 17 cups

GLAZE

sugar: 33.33 or 3 1/3 cups

unsweetened coco: .83 or 4/5 cups

margarine or butter: .83 or 4/5 cups

milk = 1.6 or 13/5 cups.

> The student shows a command of both fractions and decimals.

I've been vanilla: 1.6 or 13/5 teaspoons
to bake # 2
sales   Mrs. Ercole already made 120
before   cookies which would make
& people $40.00 if they were all bought.
buy lots   ITEMS   # of them | $ they will make
of pies   Pies: 7 | $ 35.00
that's why
I had so   Cakes: 6 | $ 27.00
many
pies.   Cup cakes: 40 | $ 20.00

              Brownies: 40 | $ 12.50

              Popcorn Balls: 42 | $ 15.75

you already   Cookies: 120 $ 40.00
said you would   TOTAL:
make cookies $ 150.25
so I just
found cost

How I figured out what they
would cost was like this.
Look at my example for Brownie:

$$40 \div 4 = 10, 10 \times \$1.25 = 12.50$$

I divided the # of them by
how much they were going to
be sold in groups. Then I
multiplied that answer by
the cost of them.

Expert

#3

Brownies: $1.25 ÷ 4 = $.31 × 6 = $1.88

Cookies: $1.00 ÷ 3 = 33¢ × 6 = $2.00

cupcakes: $2.50 ÷ 5 = 50¢ × 6 = $3.00

cakes: $4.50 ÷ 1 = $4.50 × 6 = $27.00

Popcorn balls: $.75 ÷ 2 = $.38 × 6 = $2.28

pies: $5.00 ÷ 1 = $5.00 × 6 = $30.00

$$\underline{TOTAL}$$
$$\$66.13$$

$\dfrac{4}{1.25} \times \dfrac{6}{n} \quad \dfrac{7.50}{4} \quad n=1.88$

$\dfrac{3}{1.00} \times \dfrac{6}{n} \quad \dfrac{6}{3} = \$2.00 \quad n=$

$\dfrac{5}{2.50} \times \dfrac{6}{n} \quad \dfrac{15}{3} = \$3.00 \quad n=$

$\dfrac{1}{4.50} \times \dfrac{6}{n} \quad \dfrac{27}{1} = \$27.00 \quad n=$

$\dfrac{2}{.75} \times \dfrac{6}{n} \quad \dfrac{4.50}{2} \quad n=2.25$

Standards-Based Math Rubric 6-12

	Problem Solving	Reasoning and Proof	Communication	Connections	Representation
Novice	No strategy is chosen, or a strategy is chosen that will not lead to a solution. Little or no evidence of engagement in the task is present.	Arguments are made with no mathematical basis. No correct reasoning nor justification for reasoning is present.	No awareness of audience or purpose is communicated. No formal mathematical terms or symbolic notations are evident.	No connections are made or connections are mathematically or contextually irrelevant.	No attempt is made to construct a mathematical representation.
Apprentice	A partially correct strategy is chosen, or a correct strategy for only solving part of the task is chosen. Evidence of drawing on some relevant previous knowledge is present, showing some relevant engagement in the task.	Arguments are made with some mathematical basis. Some correct reasoning or justification for reasoning is present.	Some awareness of audience or purpose is communicated. Argument(s) may lack clarity and/or are incomplete. Some interpretation is required. Some communication of an approach is evident through verbal/written accounts and explanations. An attempt is made to use formal math language. Minimal formal math language or appropriate use of symbolic notation is evident.	A mathematical connection is attempted but is partially incorrect or lacks contextual relevance.	An attempt is made to construct a mathematical representation to record and communicate problem solving but is not accurate.

Standards-Based Math Rubric 6-12 (Cont.)

	Problem Solving	Reasoning and Proof	Communication	Connections	Representation
Practitioner	A correct strategy is chosen based on the mathematical situation in the task. Planning or monitoring of strategy is evident. Evidence of solidifying prior knowledge and applying it to the problem-solving situation is present. *Note: The Practitioner must achieve a correct answer.*	Arguments are constructed with adequate mathematical basis. A systematic approach and/or justification of correct reasoning is present.	A sense of audience or purpose is communicated. Communication is clear and complete. No interpretation is required. An approach is evident through a methodical, organized, coherent, sequenced and labeled response. Formal math language is used to share and clarify ideas. Adequate and appropriate formal mathematics language and/or symbolic notation are evident.	A mathematical connection is made. Proper contexts are identified that link both the mathematics and the situation in the task. Some examples may include one or more of the following: • clarification of the mathematical or situational context of the task • exploration of mathematical phenomenon in the context of the broader topic in which the task is situated • noting patterns, structures and regularities	Appropriate and accurate mathematical representation(s) are constructed and refined to solve problems or portray solutions.
Expert	An efficient strategy is chosen and progress towards a solution is evaluated. Adjustments in strategy, if necessary, are made along the way, and/or alternative strategies are considered. Evidence of analyzing the situation in mathematical terms and extending prior knowledge is present. *Note: The Expert must achieve a correct answer.*	Rigorous arguments are used to justify decisions and may result in formal proofs. Evidence is used to justify and support decisions made and conclusions reached.	Communication at the Practitioner level is achieved, and communication of argument is supported by mathematical properties. Formal math language and symbolic notation is used to consolidate math thinking and to communicate ideas. Mathematical language and symbolic notations are used rigorously and coherently throughout the work. Insight is communicated about the quality and efficiency of work/reasoning/method/strategy.	Mathematical connections are used to extend the solution to other mathematics or to a deeper understanding of the mathematics in the task. Some examples may include one or more of the following: • testing and accepting or rejecting of a hypothesis or conjecture • explanation of phenomenon • generalizing and extending the solution to other cases	Appropriate mathematical representation(s) are constructed to analyze relationships, extend thinking and clarify or interpret phenomenon.