

6.NS Baking Cookies

Alignments to Content Standards: 6.NS.A.1

Task

Alice, Raul, and Maria are baking cookies together. They need $\frac{3}{4}$ cup of flour and $\frac{1}{3}$ cup of butter to make a dozen cookies. They each brought the ingredients they had at home.

Alice brought 2 cups of flour and $\frac{1}{4}$ cup of butter, Raul brought 1 cup of flour and $\frac{1}{2}$ cup of butter, and Maria brought $1\frac{1}{4}$ cups of flour and $\frac{3}{4}$ cup of butter. If the students have plenty of the other ingredients they need (sugar, salt, baking soda, etc.), how many whole batches of a dozen cookies can they make?

IM Commentary

This task serves several purposes that, taken together, strengthen and develop the students' ability to perform a variety of increasingly complex arithmetic operations involving fractions. This task requires students to complete a series of steps in order to find a solution, and because they need to analyze constraints, it addresses some aspects of mathematical modeling (MP.4). Students must first add fractions with familiar but unlike denominators, which is a skill developed in the 5th grade. Then students need to divide fractions by fractions (6.NS.A.1, Interpret and compute quotients of fractions).

This task would be appropriate to assign to students in groups because it is a non-routine problem. The solution shows a strictly computational approach because it assumes that students are already proficient at adding and dividing fractions. In most cases, we want to give students modeling problems that require them to use securely

held knowledge so that they can focus their attention on the best solution path rather than the mechanics.

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Solution

The children brought $2 + 1 + 1\frac{1}{4} = 4\frac{1}{4}$ cups of flour and $\frac{1}{4} + \frac{1}{2} + \frac{3}{4} = 1\frac{1}{2}$ cups of butter.

They have enough flour for

$$\begin{aligned} 4\frac{1}{4} \div \frac{3}{4} &= \frac{17}{4} \times \frac{4}{3} \\ &= \frac{17}{3} \\ &= 5\frac{2}{3} \end{aligned}$$

batches and they have enough butter for

$$\begin{aligned} 1\frac{1}{2} \div \frac{1}{3} &= \frac{3}{2} \times \frac{3}{1} \\ &= \frac{9}{2} \\ &= 4\frac{1}{2} \end{aligned}$$

batches, so the butter is the limiting factor. Thus, they can make 4 whole batches of a dozen cookies each.



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