Division with Fractions
Check Your Understanding

One indicator of how well a student understands division with fractions is to compare a student's work and explanation for a problem with how other students have responded to the same problem. Students, parents, or teachers can use the following problem and sample responses to evaluate understanding.

Directions for the Student:

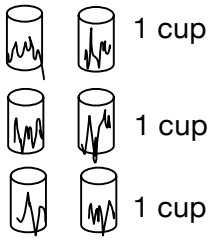
1) Solve the following problem and explain your work and answer.
2) Compare your work to the sample responses in order to determine if your work indicates deep, partial, or beginning understanding.

Problem:

Mrs. Johnson was making cakes for a bake sale. It takes $\frac{3}{4}$ cup of milk to make a cake. She had 3 cups of milk. How many cakes can she make without going to the store for more milk?

Level of Understanding	Sample Student Response	Comments
Deep Understanding	**Student 1:** "I drew the 3 cups of milk. Then I took $\frac{1}{4}$ cup from each of the 3 cups. That leaves $\frac{3}{4}$ cup in each cup. That's enough for 3 cakes. There are 3 one-fourths extra for another cake. So she can make 4 cakes." 	This student's diagram shows that there are 12 fourths in three. The student divided the 12 fourths into four groups of three fourths. The 3 fourths that were removed, and the 3 fourths that is left in each of the three measuring cups.
	Student 2: "Two cakes take $1\frac{1}{2}$ cups of milk. Two more cakes take another $1\frac{1}{2}$ cups of milk. She can make 4 cakes." $\frac{3}{4}+\frac{3}{4}=1\frac{1}{2}$ $1\frac{1}{2}+1\frac{1}{2}=3$	This student added $\frac{3}{4}$ and $\frac{3}{4}$ to get $1\frac{1}{2}$ cups for 2 cakes. Then the student doubled $1\frac{1}{2}$ to get 3 cups and doubled 2 cakes to get 4 cakes. Since $\frac{3}{4}$ cup was used 4 times, Mrs. Johnson can make 4 cakes.

Level of Understanding	Sample Student Response	Comments
Partial Understanding	**Student 3:** "There are 4 fourths in 1. So there are 12 fourths in 3. So she can make 12 cakes."	This student correctly found the total number of fourths in 3 cups, but forgot that it takes $\frac{3}{4}$ cup of milk to make each cake.
	Student 4: "Three fourths is 0.75. So I added .75 until I got 3. I added 0.75 four times, so she can make 4 cakes." .75 + .75 1.50 + .75 2.25 + .75 3.00	This student knows to repeatedly add 0.75 until it totals 3. It is unclear whether or not this student understands how to divide fractions. Many students, who do not understand fractions, avoid using fractions.

Level of Understanding	Sample Student Response	Comments
Beginning Understanding	**Student 5:** 3.4 x 3 10.2 10.2 cakes	This student does not understand how to convert $\frac{3}{4}$ to a decimal and the student does not seem to recognize that this is a division problem.
	Student 6: "I drew $\frac{3}{4}$ and $\frac{3}{4}$ to make 1 cup. Then the same for another. And again for another cup. So she can make 6 cakes."  1 cup 1 cup 1 cup	This student does not understand that $\frac{3}{4}$ means one cup is split into 4 equal parts. To this student $\frac{3}{4}$ is just part of a cup. Three-fourths and $\frac{3}{4}$ makes more than 1 cup.