PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

Adding Fractions
Check Your Understanding

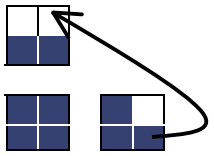
One indicator of how well a student understands adding fractions is to compare a student's work and explanation for a problem with how other students have responded to the same problem. Students, parents, or teachers can use the following problem and sample responses to evaluate understanding.

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:

Mr. Gannon was making pancakes for breakfast. He used $1\frac{1}{2}$ cups of milk to make the pancake batter. His family was extra hungry so he used another $\frac{3}{4}$ cup of milk to make more. How much milk did he use in all?

Level of Understanding	Sample Student Response	Comments
Deep Understanding	**Student 1:** "If you add $\frac{1}{2}$ cup to $1\frac{1}{2}$, that's 2 cups. Then you just have to add the other $\frac{1}{4}$ cup. So it's $2\frac{1}{4}$ cups." 	This student is using a number sense approach rather than finding a common denominator. Add, so the sum equals the next whole number. Then add the rest of the $\frac{3}{4}$ cup. Since $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$, we just need to add $\frac{1}{4}$ cup more.
	Student 2: "If you change $\frac{1}{2}$ to fourths, it is $\frac{2}{4}$. $\frac{2}{4} + \frac{3}{4}$ is $\frac{5}{4}$. So, $1\frac{2}{4} + \frac{3}{4}$ is $1\frac{5}{4}$, or $2\frac{1}{4}$."	By changing the fractions to a common denominator, you can add the numerators. Then change $\frac{5}{4}$ to $1\frac{1}{4}$ and add the extra 1.

MakingSense

Level of Understanding	Sample Student Response	Comments
Partial Understanding	**Student 3:** "First, I changed $1\frac{1}{2}$ to fourths. That's $\frac{6}{4}$. Then I added $\frac{3}{4}$, that's $\frac{9}{4}$. So, it's $2\frac{1}{2}$."	This student changed both the whole numbers and the fractions into fourths. That's okay, but an error was made changing $\frac{9}{4}$ back to a mixed number.
	Student 4: $1.50 + .25 + .25 = 2.00$ $2.00 + .25 = 2.25$ $2.25 = 2\frac{1}{4}$	This student changed the fractions to decimals, added the decimals, and changed the answer back into a fraction. It is unclear whether or not this student understands how to add fractions. Many students, who do not understand fractions, avoid using fractions.

Level of Understanding	Sample Student Response	Comments
Beginning Understanding	**Student 5:** "$\frac{1}{2} + \frac{3}{4} = \frac{4}{6}$, so the answer is $1\frac{4}{6}$."	This student is adding fractions by adding the numerators and adding the denominators. The student needs to make sense of equivalent fractions and use models to represent the addition.
	Student 6: "I added $\frac{1}{2}$ and $\frac{3}{4}$ and got $\frac{3}{8}$, so it's $1\frac{3}{8}$."	This student is adding fractions by multiplying the numerators and multiplying the denominators. The student needs to use models to develop an understanding of fractions. It doesn't make sense to add two fractions and get a fraction that is smaller than both of them.