Mixed Numbers
Check Your Understanding

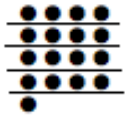
One indicator of how well a student understands mixed numbers is to compare a student's work and explanation for a problem with how other students have responded to the same problem. Students, parents, or teachers can use the following problem and sample responses to evaluate understanding.

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:

Kaitlyn has $3\frac{1}{4}$ dollars. Maddie has 13 quarters. Who has more money?

Level of Understanding	Sample Student Response	Comments
Deep Understanding	**Student 1:** "Four quarters is a dollar. So 12 quarters is \$3. So Maddie has \$3 and a quarter. That's the same as $3\frac{1}{4}$ dollars" 	This student grouped 4 quarters ($\frac{4}{4}$) and made dollars. Then added the extra quarter.
	Student 2: "To change $3\frac{1}{4}$ to an improper fraction, you multiply 4 x 3 and add 1. That's $\frac{13}{4}$. It makes sense because there are 12 fourths in 3 and then add 1 more. So they are the same." $3\frac{1}{4} = \frac{13}{4}$	This student used a familiar rule to change mixed numbers to improper fractions. That alone would not be enough to know if the student understood. But, since the student also said there are 12 fourths in 3 and there is one extra fourth, it is clear that the student understood.

Level of Understanding	Sample Student Response	Comments
Partial Understanding	**Student 3:** "Maddie and Kaitlyn have the same thing." 6 25 25 25 25 25 25 25 25 25 25 25 25 + 25 3.25	This student represented 13 quarters as cents and added the cents. This is an inefficient method and it is unclear whether or not this student understands fractions. Many students, who do not understand fractions, use decimals to avoid using fractions.
	Student 4: "Four times 3 is 12 and add 1 to get 13. That's $\frac{13}{4}$. So they are the same." $3\frac{1}{4} = \frac{13}{4}$	This student used a rule appropriately and got the correct answer, but may or may not understand. It is not clear if the student is just rotely using the rule.

Level of Understanding	Sample Student Response	Comments
Beginning Understanding	**Student 5:** "To change $3\frac{1}{4}$ to an improper fraction, you add 3 and 1 and multiply by 4, so it's $\frac{16}{4}$. Kaitlyn has more money." $3\frac{1}{4} = \frac{16}{4}$	This student is trying to remember a rule, rather than make sense. Since the student forgot whether to add or multiply first, the answer is incorrect and it is clear that the student does not understand.
	Student 6: "Three and a fourth is more. The other is just a fraction**."**	This student seems to know that 13 quarters is $\frac{13}{4}$. The student may think that all fractions are less than one, so $\frac{13}{4}$ must be less than one.