Guide for Probe: Does the Expression Match the Word Problem?

Understandings and Successful Approaches
Correct Answers: a) No   b) Yes   c) Yes   d) Yes   e) No   f) Yes

Students who choose each of these correct answers and have explanations that support their choices are applying one or more successful strategies including:
- Making sense of the actions within a problem context to determine whether addition or subtraction will result in a correct response to the situation.
- Modeling the situation with a number sentence or expression that matches the situation.
- Explaining why the given expression matches or does not match the situation

Potential Common Misunderstandings/Misconceptions to Look For
A mixture of correct and incorrect choices may reveal a misunderstanding related to area model representations of fractions. Note that students with misconceptions may get the correct answer for incorrect reasons. Correct answers are underlined below.

1. "**Overgeneralize about Key Words**" Misconception
 Answer Pattern: **a) Yes; b) <u>Yes</u>; c) <u>Yes</u>; d) No; e) Yes; f) No**

Students with this misconception overgeneralize about key words by assuming that these words always indicate the need for a specific operation. For example, they may incorrectly assume that problems with the words "more" or "altogether" should always be solved with addition. These students choose the operation based on a key word rather than trying to make sense of the full problem situation/context to determine the operation.

In this example, the student seems to interpret both *more* and *more than* as signals to add the numbers.

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2. "**Distinguishing Between Subtraction and Division Situations**" Difficulty
Answer Pattern: **e) Yes**

Students with this difficulty view problems that describe giving or sharing situations as always solved with subtraction. They do not consider that the problem might involve other operations, such as division.

In this example, the student correctly explains division as repeated subtraction. However, he incorrectly thinks that this process of repeated subtraction can represented by the expression $4\frac{1}{2} - 1\frac{1}{8}$

e) Jack has $4\frac{1}{2}$ cups of peanuts ~~need~~ to share with his friends. He wanted to give each friends $1\frac{1}{8}$ cups of peanuts. How many friends can he share with?

(Yes) No

Explain your thinking:

You can keep subtracting $1\frac{1}{8}$ from $4\frac{1}{2}$ till you can't anymore and the amount of time you subtract is your answer