Fraction Operations: Adding, Subtracting, and Multiplying Fractions

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■ Concept Explanation

In grade 4, we learn about different operations we can perform with fractions. A fraction is a way to show part of a whole. It has two parts: the numerator (the top number) and the denominator (the bottom number). To add or subtract fractions, they must have the same denominator, which is called having like denominators. When we multiply a fraction by a whole number, we are finding a part of a whole multiple times. Let's explore these operations in detail.

✏■ Worked Examples

Example 1

Problem: Add 1/8 + 3/8

Solution:
Since these fractions have the same denominator (8), we add the numerators: 1 + 3 = 4. So, 1/8 + 3/8 = 4/8. We can simplify 4/8 by dividing both the numerator and the denominator by their greatest common divisor, which is 4, giving us 1/2.

Example 2

Problem: Subtract 2/10 - 1/10

Solution:
These fractions have the same denominator (10), so we subtract the numerators: 2 - 1 = 1. Thus, 2/10 - 1/10 = 1/10. This fraction can be simplified by dividing both the numerator and the denominator by their greatest common divisor, which is 1, so it remains 1/10.

Example 3

Problem: Multiply 2/5 by 4

Solution:
To multiply a fraction by a whole number, we multiply the numerator by that number: 2 * 4 = 8. The denominator remains the same, so 2/5 * 4 = 8/5. This result is an improper fraction because the

numerator is larger than the denominator. We can convert it to a mixed number: 8 divided by 5 is 1 with a remainder of 3, so 8/5 = 1 3/5.

■ Practice Questions

1. Add 3/12 + 2/12 [EASY]

2. Subtract 5/6 - 2/6 [EASY]

3. Multiply 3/4 by 2 [MEDIUM]

4. Add 2/8 + 1/8 and then multiply the result by 3 [MEDIUM]

5. Subtract 3/10 - 2/10 and then multiply the result by 5 [HARD]

6. A recipe calls for 3/4 cup of sugar. If you want to make half the recipe, how much sugar will you need? [HARD]

7. A bookshelf has 5 shelves, and each shelf can hold 3/4 of a box of books. How many boxes can the bookshelf hold in total? [HARD]

■ Answer Key

For teacher/tutor reference

1. 5/12

2. 3/6 = 1/2

3. 6/4 = 1 1/2 or 3/2

4. First, 2/8 + 1/8 = 3/8. Then, 3/8 * 3 = 9/8 = 1 1/8

5. First, 3/10 - 2/10 = 1/10. Then, 1/10 * 5 = 5/10 = 1/2

6. To make half the recipe, you need half of 3/4 cup, which is (3/4) * (1/2) = 3/8 cup

7. Since each shelf can hold 3/4 of a box and there are 5 shelves, the bookshelf can hold 5 * (3/4) = 15/4 = 3 3/4 boxes