Adding and Subtracting Fractions: A Detailed Guide

Fractions are a fundamental concept in mathematics that represent parts of a whole. They are used in a wide range of applications, including measuring, cooking, and construction. Adding and subtracting fractions are essential skills for any student of mathematics.

Adding Fractions

To add fractions, the denominators (the bottom numbers) must be the same. If they are not, the fractions must first be converted to equivalent fractions with the same denominator. Once the denominators are the same, the numerators (the top numbers) can be added together. The denominator of the resulting fraction is the same as the original denominators.
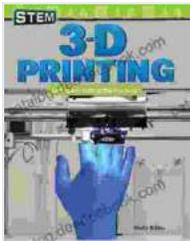
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For example, to add the fractions 1/2 and 1/4, we first convert 1/4 to 2/8. Now we can add the fractions: $$1/2 + 2/8 = 4/8 + 2/8 = 6/8 = 3/4$$

Subtracting Fractions

To subtract fractions, the same rule applies: the denominators must be the same. If they are not, the fractions must first be converted to equivalent fractions with the same denominator. Once the denominators are the same, the numerator of the second fraction is subtracted from the numerator of the first fraction. The denominator of the resulting fraction is the same as the original denominators.

For example, to subtract the fraction 1/3 from the fraction 2/5, we first convert 1/3 to 5/15. Now we can subtract the fractions: $$2/5 - 5/15 = 6/15 - 5/15 = 1/15$$

Special Cases

There are a few special cases to keep in mind when adding and subtracting fractions.

- If the denominators are the same, the fractions can be added or subtracted directly. For example, 1/2 + 1/2 = 2/2 = 1.

- If one fraction is a whole number, it can be converted to a fraction with a denominator of 1. For example, 3 + 1/2 = 3/1 + 1/2 = 7/2.

- If the fractions are negative, the negative sign can be distributed to the numerator and denominator. For example, -1/2 + 1/2 = -1/2 + 1/2 = 0.

Adding and subtracting fractions is a fundamental skill in mathematics. By understanding the rules and practicing the procedures, you can master this essential operation.
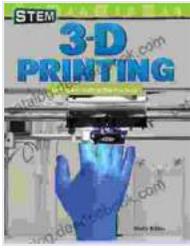
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