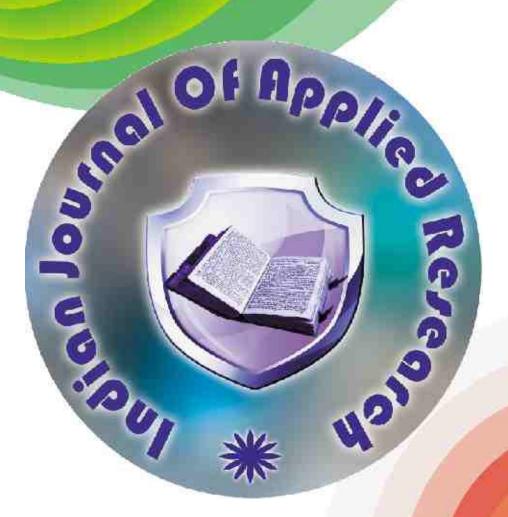
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### Research Paper

### **Education**



# Teaching Strategies For Simplifying Fractions In Mathematics

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### ABSTRACT

Teaching mathematics is a lot of importance in shaping the career of students and at the same time, it is a dreaded subject for the student community. However, the middle school math activities can help to build a strong foundation, which will make the further path easy for the students. Mathematically, fraction means a part of a whole number. Fractions are exhibited in the form of a numerator and a denominator. There are some simple tricks we need to keep in mind to learn how to simplify fractions. For most math lovers simplifying fractions is like a child's play. A better way is to make kids do lots of problems with fraction manipulatives and draw fraction pictures for problems. In this way, this research paper highlights the simple strategies one needs to apply while simplifying fractions.

### Keywords: Fractions, Numerator, Denominator, Adding

### Introduction

umbers & letters are the two eyes of living kind" says Thirukkural. Of these 2 numbers are considered as the basis of science. In the development of science, first we should know about the properties & operations on numbers which are very important in our daily life. The world of today, which learn more & more heavily on science & technology, demands more & more mathematical knowledge on the part of more & more people. And the world of tomorrow will make still greater demands on a person to be will educated in the technological society of today, and as such he / she should have some degree of mathematical literacy.

Fractions are an integral part of mathematics. There are some simple tricks we need to keep in mind to learn how to simplify fractions. For most math lovers simplifying fractions is like a child's play. But for most of us, it can be like learning a completely new language. Fractions are notorious for being complicated and extremely confusing. But, fractions are not invincible. There is a key to cross the maze of fractions. First need to comprehend the basics of fractions, which is generally week in many of us. This is the main cause of the struggle with fractions. We also need to acknowledge the significance of the fraction, and at the same time induce confidence that even fractions can be manipulated.

By a fractional number or a fraction, we mean a part of a whole number, fractions arise naturally, from a number of life situations. Suppose a family has 3 children and a cake is ordered. Each child then gets 1/3 of the cake, when the cake is shared equally among the children. Again assume that a question paper is to be answered in two hours. If there are 8 questions, how much time will you get to answer each question? Exactly 2/8 hours, this way the need for fractions such as 1/3, 2/8 .................. arises in a number of life situations.

### What are Fractions?

A fraction (from Latin: fractus, "broken") represents a part of a

whole or, more generally, any number of equal parts. When spoken in everyday English, we specify how many parts of a certain size there are, for example, one-half, five-eighths and three-quarters.

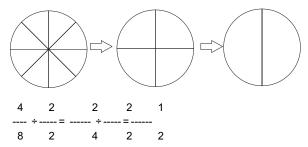
The word "fraction" literally means a part. So mathematically, fraction means a part of a whole number. Fractions are exhibited in the form of a numerator and a denominator. Let us take the example of a pizza shows below. Say, if we cut it into 8 equal pieces, and if you take 4 pieces out of it, then we need to find the portion of the entire pizza that you have. In math terms, it is known as fraction of pizza owned by you. Here is a pictorial representation of how we denote a fraction.



Fraction owned = 4/8

### How to Simplify Fractions?

For example, we will say that we have 4/8 part of the pizza. But, someone might say half (1/2) of the pizza. That is the simplified form of the fraction 4/8. The image A shows 4 out of the eight parts that you have. Then we divide both numerator and denominator by 2 each, so that, we have the image B and then we repeat the procedure of dividing by 2 and get  $\frac{1}{2}$ .



So, now we can clearly define What is simplification of fraction. Simplifying fractions means reducing the fraction to a form as simple as possible. Till now we were talking about proper fractions, but how to simplify improper fractions? In improper fractions, the numerator is greater than the denominator. That doesn't make any difference. Just use the same technique to simply improper fractions. Use the same method to know how to simplify fractions with exponents. Here's the simple strategies one who needs to apply while simplifying fractions

- Determine a common factor between the numerator and denominator. Now, a common factor is the number that can be used to divide both numbers to get two whole numbers. In the above example, 2 was the common factor of 4 and 8.
- After this divide the numerator and denominator by the common factor.
- Just keep repeating this process until there exist no common factors between the numerator and denominator.
- The fraction is simplified when no more common factors
  exist

### **Adding Fractions**

Every fraction has a numerator and a denominator. Numerator signifies the part of the whole entity whereas denominator indicates the whole total. So when we are given two fractions to add, there are three possibilities. They can be fractions with different numerators and same denominators, same numerators and different denominators or different numerators and different denominators. Not to miss on a very important point, remember that only if the numerator is equal to or less than the denominator, it is called a proper fraction, else the fraction is known as an improper fraction.

a) Add Fractions with Same Denominators

When we have two fractions with same denominators, check whether they are proper fractions first. If they are, add the numerators and the result will be a fraction too. If the fractions to be added are improper fractions, then we may have to simplify the fraction.

### Example

b) Add Fractions with Different Denominators

When there are different denominators for the fractions, then first find out a least common denominator (LCD), which is divisible by both the denominators.

Example 1:4/9+4/8

How do you find an LCD for these denominators? Very simple! Multiples of 9 are 9, 18, 27, 36, 45, 54, 63, 72, 81 ........ and multiples of 8 are 8, 16, 24, 32, 40, 48, 56, 64, 72, ...... Here the least common divisor for both is 72. Multiply the respective numerators with the multiplicands to get the appropriate fractions. For the first fraction 4/9, the multiplicand is 8 which needs to be multiplied by both numerators and denominators. For the second fraction 4/8, the multiplicand is 9. So 4/9 will be written as  $(4 \times 8)/(8 \times 9)$ .

Example 2: 1/3 + 1/6

In these fractions, 3 and 6 have a common divisor 6. Also 6 happens to be the least common denominator.

$$1/3 + 1/6 = (1 \times 2)/(3 \times 2) \div (1 \times 1)/(6 \times 1)$$
  
=  $2/6 + 1/6 = 3/6 \sim 1/2$ 

Hence, we must have understood how to add fractions with same and different denominators.

c) Add fractions with different denominators and numerators Now when we are given a pair of fractions with different numerators and different denominators, adding is comparatively complex than the above cases. But the rule of LCD remains the same. Let us see one example.

Example: 3/5 + 5/6

The common LCD for these denominators is 30. In cases where denominators are such that either of them is not divisible by the other, then multiply the denominators and you get the LCD which will serve as the common denominator. This method is also known as the cross multiplication method. In this case, it is  $5 \times 6 = 30$ 

$$3/5 + 5/6 = (3 \times 6)/(5 \times 6) + (5 \times 5)/(6 \times 5)$$
  
= 18/30 + 25/30  
= 43/30 (Improper fraction)  
13  
~1---- (Mixed number)  
30

So with the above stated examples and explanation, hope we have understood how to simplify add fractions. The thumb rule are must remember when adding fractions with different denominators is that the denominators must be same.

#### **Teaching Method of Fractions**

Fraction math can then become blind following of the rules, tossing the numbers here and there, calculating this and that and getting answers of which the kids have no idea, if they are reasonable or not. And of course, it is quite easy to forget these rules, or remember them wrong especially after 5 10 years.

Instead of merely presenting a rule as many school books do, a better way is to teach children to visualize fractions, and perform some simple operations with these visual images or pictures, without enduringly applying any given 'rule'.

If a child is able to visualize fractions in his / her mind, they become more concrete not just a number on top of other number without meaning. Then the child can estimate the answer before calculating, and evaluate the reasonableness of the final answer, and perform many of the simplest operations in the head. A better way is to make kids do lots of problems with fraction manipulatives and draw fraction pictures for problems. That way they will form a mental visual model and can think through the pictures for simple problems.

How will Fractions be Taught?

The child joins the school with a good chance of knowing halves. He may know about the fourth, but seldom about the third. As in life, so in school, let meaning come with use. "Take half of the students to the farm", "Crease your paper so as to show fourths". Initial work should be done with actual objects in terms of circles, squares or oblongs. The additions of subtractions should also be done in meaningful situations. The objective viewpoint is so fundamental that, unless it is secured, the children will be left more or less in confusion, and will not be able to retain the knowledge for long.

The teacher will do well to follow the procedure given below: Play at fractions until useful relations are seen and known. Have all circles of the same size. Mark off into halves, fourths, eights, sixteenth, thirds, twelfths. These are very useful fractions. A rectangular figure may be used to illustrate the less useful and more difficult fractions as shown in the illustration given. The shaded portion shows the fraction 3/7, i.e., three parts out of seven parts.



### Conclusion

Mathematics is a subject that has a lot of importance in shaping the career of students and at the same time, it is a dreaded subject in the student community. However, the middle school math activities can help to build a strong foundation, which will make the further path easy for the students. Mathematics needs a lot of practice and unfortunately, many students fail to understand this fact. The ultimate step is to practice as much as we can. It may be possible for some not to get the answer in the first, second or even the third attempt. But constantly facing the task and challenging the intellect is the key to learn how to solve math problems. A better way is to make kids do lots of problems with fraction manipulatives and draw fraction pictures for problems. So with the above teaching strategies and explanations, hope we have understood how to simplify fractions in mathematics.





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