MATHEMATICS

 ALGEBRA

 NAME:

 INSTITUTION:

 DATE:

**INTRODUCTION**

In mathematics, we deal with various operations . Well define what a complex fraction is and the rules of the exponents.

A complex fraction is a type of fraction where either the numerator or the denominator or even both are a fraction. To simplify we need to find a common denominator then multiply the numerator and denominator by the common denominator then simplify the fraction gotten. If the denominators of the complex fraction has exponents or mixed numbers simplifying can be hard. There are certain guidelines that we ought to follow . The first one is mixed numbers should be turned into improper fractions by multiplying the whole number by the denominator and adding the numerator. To convert a mixed number to an improper fraction, multiply the whole number by the denominator the answer you add with the numerator. An example is 4(1/2) whereby ;

4(1/2)=(4x2)+1/2= 9/2 :9/2

Then we look for the common denominator by multiplying the denominators of the fraction and then simplify the fraction by dividing the common denominator by each denominator. Multiply each numerator by the answer ,you then simplify the gotten fraction by dropping out common factors An example is;

Simplify the complex fraction

2(1/3)/3(2/5)

**Solution**

1.Change the numbers to improper fraction

2(1/3)=2x3+1/3=7/3

3(2/5)=3x5+2/5=17/5

2.Find a common denominator

Find the LCM of3 and 5 which is 15

7/3=(7x5)/(3x5)=35/15

17/5=(17x3)/(5x3)=51/15

3.Simplify the complex fraction 2(1/3)/3(2/5)=(7/3)/(17/5)=(7/3)x(5/1735/51.

Therefore the simplified form of the fraction; 2(1/3)/3(2/5) is 35/51.

**Exponents as fractions**

Exponents is a method of expressing large numbers in power form. It is necessarily multiplying a number by itself multiple times. Exponents written as fractions they represent roots of a number example is 4^6 which is 4x4x4x4x4. 4 is the exponent and 6 is the base.

Symbol used for representing the exponent is (^).

Laws of exponents are explained on the power they hold:

• Multiplication law; similar ones.Add

**Multiplication Law:** Bases – multiplying the similar ones .Join the exponents and make sure the base are identical.

If the base are raised to another one multiply the exponent and make sure the base is similar.

When bases are raised with power to another, multiply the exponents and keep the base the same

Division law: bases- divide the identical ones. Subtract the exponent of the denominator by the one of the numerator . Make sure the base is identical .

Let (x) be an integer and (s) and (a) be positive integers that represent the above stated laws in that:

* xs. xs = x^s+a
* (xx)n = x^sa
* (xb)n = x^ab^a
* (x/b)n = x^a/b^a
* x^s/x^a= xs-a
* xs/xa = 1/x^s-a

They are referred as properties of exponents because they simplify complex algebras into understandable numbers.

**Exponents rules**

The rules include:

* A number with zero as its exponent is the same as 1

Example

4^0=1

* A number or variable which has 1 as its exponent is the same as the number itself

Example :b^1=b

* A negative integer gotten from an exponent can be written a-k = 1/ak

3-2 = 1/32 = 1/(3 × 3) = 1/9

#  Exponent table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Exponent** | **Expression**  | **Expansion** |  | **Simplified value** |
| Zero exponent | 30 |  | 1 | 1 |
| One exponent | 21 |  | 2 | 2 |
| Exponent and power | 33 | 3x3x3 |  | 27 |
| Negative exponent | 4-3 | 1/43 = 1/(4x4x4) | 1/64 |  |
| Rational exponent | 161/2 | √16 |  | 4 |
| Multiplication | 32 × 33 | 3(2 + 3) = 35 |  | 273 |
| Quotient | 65/ 63 | 6(5 – 3) = 62 |  | 36 |
| Power of exponent | (92)2 | 9(2 × 2) = 94 |  | 6561 |

#  **CONCLUSION**

Once you understand the rules of exponents ,how to convert mixed numbers to improper fraction and finding the common denominator to simplify the expression it becomes much easier to practice and understand .

# References;

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