Find the LCD of Rational Expressions

Find the LCD of $\frac{x}{9x^2y^2}$ and $\frac{5y}{6x^2y^3z}$

To add or subtract fractions, each fraction must have the same denominator. This is true for rational expressions as well: If two rational expressions do not have common denominators in an addition or subtraction problem, then we may need to rewrite the expressions by using the least common denominator (LCD).

The following steps can be used to find the LCD of rational expressions:

STEP 1: Factor each denominator into the product of its lowest terms, and express any repeating factors as powers.

- **$9x^2y^2$, written in its lowest terms will be 3*3*x*x*y*y or $3^2x^2y^2$.**
- **$6x^2y^3z$, written in its lowest terms will be 3*2*x*x*y*y*y*z or $3*2x^2y^3z$.**

STEP 2: List all the different factors that appear for each denominator. If a factor is common for any of the denominators, only list that factor to the highest power that it appears.

The factors that appear in each denominator are 2, 3, x, y and z.

STEP 3: The product of the factors listed in Step 2 will be the LCD.

The LCD is $2*3^2*x^2*y^3*z = 18x^2y^3z$.

Example 1: Find the LCD of $\frac{1}{x}$ and $\frac{1}{y}$

x is already written in its lowest term.

y is already written in its lowest term.

Therefore the LCD is x*y= xy.

Example 2: Find the LCD of $\frac{2}{x^2+6x+9}$ and $\frac{2}{3x+9}$

x^2+6x+9, written in its lowest terms will be $(x+3)(x+3)$ or $(x+3)^2$.

$3x+9$, written in its lowest terms will be $3(x+3)$.

The factors that appear in each denominator are 3 and $(x+3)$ and the LCD is $3(x+3)^2$.