**Simplifying Radicals**

This week’s discussion problem involves simplifying radicals. Assume all variables represent positive numbers. My first problem is;

**Problem 66.**

**y^1/3 y^1/3**

Now we have to simplify the problem. Looking at the problem and identifying what every part of the problem is we get that “y” is the **principal root** and it is being raised to an **nth root,** the 1 in the exponent is the power and the 3 in the exponent is the root. So for my first problem I will have to use the **product rule** to add the exponents and then I would simplify for a final solution.

y^1/3y^1/3 Add the exponents

= y^2/3 Final simplified solution

**Problem 84.**

**9^-1\* 9^1/2**

The second problem is a little different that the first one. For this one we will use the **quotient rule.** The 9 is the principle root, the 1 is the power and the 2 is the root. The negative symbol represents the **reciprocal** to get the negative away and make it a positive number we will make

9^-1 = 1/9 To continue with the problem now we have changed it too

1/9 \* 9^1/2 Since it is a ½ we will look for the sqrt of 9.

1/9 \* √9 = 1/9 \* 3/1 Use cross multiply and result is 3/9

3/9 = 1/3 Simplified is the final answer.

That concludes my problems for week 3.

References

Dugopolski, M. (2012). *Elementary and intermediate algebra* (4th ed.)*.* New York, NY: McGraw-Hill Publishing.

**Simplifying Expressions Using the Rules of Exponentials**

The following are the rules of exponential (Clark & Anfinson, 2011).

Rule one: To multiply expressions with bases, which are identical, add their exponents. This is known as the **product rule.**

Rule two: To divide expressions with identical bases, subtract their exponents. This is referred to **Quotient rule.**

Rule three: multiply the exponents for expressions with one base, but with two or more exponents.

To simplify the two expressions given, the above rules of exponentials shall be applied as illustrated below;

Number 42; $\frac{27^{-2\_{3}}}{27^{-1\_{3}}}$

**Solution**

To divide identical bases, the rule of exponent stipulates that we subtract the respective exponents. Therefore, the above fraction will be simplified to;

=$27^{^{-2}/\_{3}+^{1}/\_{3}}$Solving the exponential part of the fraction we obtain;

= $-\frac{2}{3}+\frac{1}{3}=-\frac{1}{3}$ Substituting the solution ( - $\frac{1}{3})$ in the above equation we obtain$27^{^{-1}/\_{3}}$. The **reciprocal** of this can be written as$\frac{1}{27^{^{1}/\_{3}}}$.This is equivalent to finding the cube root of $\frac{1}{27} $i.e.$( \frac{1}{∛27}$ ). This will give;

$ \frac{1}{∛27}$= $\frac{1}{3}$

Therefore, the answer will be$^{1}/\_{3}$, which is the **principal cube root** of $^{1}/\_{27}$. In this case, 3 is also the **3rd root** of 27.

No. 101;$ \left(a^{1\_{2}}b\right)^{1\_{2}}\left(ab^{^{1}/\_{2}}\right)$

**Solution**

Applying rule three, the above expression can be simplified to;

$a^{^{1}/\_{4}}b^{^{1}/\_{2}}ab^{^{1}/\_{2}}$

Rearranging the above equation we obtain;

$a^{^{1}/\_{4}}ab^{^{1}/\_{2}}b^{^{1}/\_{2}}$

Applying rule one, we obtain;

$a^{1\_{4}}$ +1$b^{1\_{2}+1\_{2}}$

Simplifying the exponentials we obtain;

$\frac{1}{4}$ +1=$ \frac{ 1+4}{4}$ = $\frac{5}{4}$ and

$\frac{1}{2}+\frac{1}{2}=\frac{2}{2} $= 1

Substituting in the above equation we obtain;

$a^{^{5}/\_{4}}b$

Therefore the answer will be $a^{^{5}/\_{4}}$ b