**Roots and Powers Math 10C Date: \_\_\_\_\_\_\_\_\_\_\_**

**Fractional Exponents and Radicals Notes**

In grade 9, you learned that for powers with integral bases and whole numbers:

We can extend this law to powers with fractional exponents with numerator 1:

Consider the following:

From the above, we can see that

|  |
| --- |
| **Powers with Rational Exponents with Numerator 1**  When is a natural number and is a rational number, |

**Example 1 – Evaluating Powers of the form**

1. b) c) d)

A fraction can be written as a terminating or repeating decimal, so we can interpret powers with decimal exponents; for example, so .

We can evaluate and on a calculator to show that both expressions have the same value.

What about fractions where the numerator is not 1?

|  |
| --- |
| **Powers with Rational Exponents**  When and is a natural numbers and is a rational number  or |

**Example 2 – Rewriting Powers in Radical and Exponent Form**

1. Write in both radical forms.
2. Write in exponential form.
3. Write in exponential form.

**Example 3 – Evaluating Powers with Rational Exponents and Rational Bases.**

Evaluate

1. b) c) d)