Name: _____   Date: _____

Learning Goal 4.3	Evaluate expressions with fractional and negative exponents. Connect fractional exponents to radicals, and negative exponents to reciprocals.

Recall the Product of Powers rule to simplify the following expressions.

1. $3^6 3^2$

2. $6^7 6^2$

3. $7^6 7$

And the Quotient of Powers rule:

4. $3^6 \div 3^2$

5. $\dfrac{6^2}{6^7} =$

6. $7 \div 7^6$

Take a (silent) minute. What do you think the negative exponents represent?

When *x* is any non-zero number and *n* is a rational number,

Example Evaluate the following expressions **without a calculator.** Leave your answers as fractions.

1. 7^{-2}

2. $(-1.5)^{-3}$

3. $\left(-\dfrac{3}{4}\right)^{-3}$

4. $\left(\dfrac{10}{3}\right)^{-2}$

What if the exponent is not in integer? Take a minute (silently) to consider.

$$8^{-2/3}$$

Example Evaluate the following expressions, **without using a calculator**.

1. $16^{-5/4}$

2. $\left(\dfrac{25}{36}\right)^{-1/2}$

3. $\left(\dfrac{9}{16}\right)^{-3/2}$

4. $(-0.008)^{-4/3}$