Unit 6, Lesson 10

Fractional Exponents

Let's interpret expressions involving exponents and roots.

10.1 Notice and Wonder: All Kinds of Exponents

What do you notice? What do you wonder?

- $4^2 = 4 \cdot 4$
- $4^1 = 4$
- $4^0 = 1$
- $4^{\frac{1}{2}} = \sqrt{4}$
- $4^{\frac{1}{3}} = \sqrt[3]{4}$

10.2 Roots and Exponents

1. Rewrite each expression so it has exponents instead of roots.

   a. $\sqrt{5}$

   b. $\sqrt{x}$

   c. $\sqrt[5]{3}$

   d. $\sqrt[4]{y}$

   e. $\sqrt[7]{z}$

2. Rewrite each expression so it has roots instead of exponents.

   a. $a^{\frac{1}{2}}$

   b. $3^{\frac{1}{6}}$

   c. $b^{\frac{1}{4}}$

   d. $(\frac{2}{3})^{\frac{1}{5}}$

   e. $(\frac{c}{2})^{\frac{1}{7}}$

10.3 Counting Fish

A group of scientists have been monitoring a population of fish in a lake for a few years. They have found that the population's growth can be modeled by the equation $y = 10(3)^x$, where y is the fish population x years since they began monitoring.

1. The scientists started monitoring the fish population when $x = 0$. What was the fish population then?

2. What was the fish population 4 years after they started monitoring?

3. What was the fish population when $x = 2$? What does it mean in this situation?

4. What was the fish population when $x = \frac{1}{2}$? What does it mean in this situation?