

# Unit 4 Lesson 3: Understanding Rational Inputs

## 1 Keeping Equations True (Warm up)

### Student Task Statement

1. Select **all** solutions to  $x \cdot x = 5$ . Be prepared to explain your reasoning.

a.  $\frac{1}{25}$

b.  $\sqrt{5}$

c.  $\frac{5}{2}$

d.  $5^{\frac{1}{2}}$

e.  $\frac{\sqrt{5}}{2}$

f.  $\sqrt{25}$

2. Select **all** solutions to  $p \cdot p \cdot p = 10$ . Be prepared to explain your reasoning.

a.  $10^{\frac{1}{3}}$

b.  $\sqrt{10}$

c.  $\frac{10}{3}$

d.  $\frac{\sqrt{10}}{3}$

e.  $\sqrt[3]{10}$

f.  $\frac{1}{3}\sqrt{10}$

## 2 Florida in the 1800's

### Student Task Statement

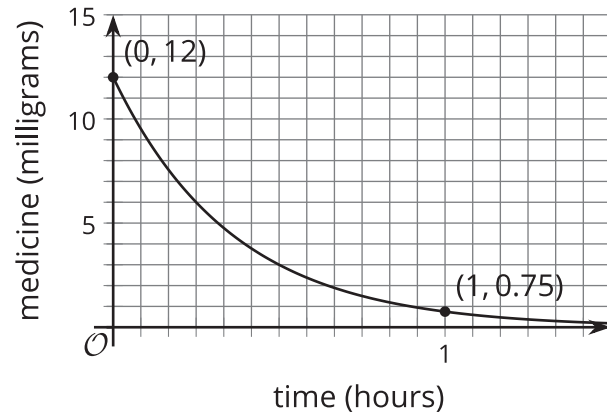
In 1840, the population of Florida was about 54,500. Between 1840 and 1860, the population grew exponentially, increasing by about 60% each decade.

1. Find the population of Florida in 1850 and in 1860 according to this model.
2. The population is a function  $f$  of the number of decades  $d$  after 1840. Write an equation for  $f$ .
3.
  - a. Explain what  $f(0.5)$  means in this situation.
  - b. Graph your function using graphing technology and estimate the value of  $f(0.5)$ .
  - c. Explain why we can find the value of  $f(0.5)$  by multiplying 54,500 by  $\sqrt{1.6}$ . Find that value.
4. Based on the model, what was the population of Florida in 1858? Show your reasoning.

### 3 Disappearing Medicine

#### Student Task Statement

The amount of a medicine in the bloodstream of a patient decreases roughly exponentially. Here is a graph representing  $f$ , an exponential function that models the medicine in the body of a patient,  $t$  hours after an injection is given.



1. Use the graph to estimate  $f\left(\frac{1}{3}\right)$  and explain what it tells us in this situation.
2. After one hour, 0.75 mg of medicine remains in the bloodstream. Find an equation that defines  $f$ .

### Images for Activity Synthesis

