Advanced Algebra Concepts and Connections Unit 3
Georgia's K-12 Mathematics Standards
Name: $\qquad$ Period: $\qquad$ Date: $\qquad$

## Exploring Rational Exponents

This handout is an alternative to the Desmos Activity, Rational Exponents and Radicals.

1. Graph $y=9 x$. Sketch the graph and then describe it with words. What is the value when $x=1 / 2$ ?
2. Graph $y=9^{x}$. Sketch the graph and then describe it with words. What is the value when $x=1 / 2$ ?


What does it mean to take the $1 / 2$ power of a number? Let's use what we know about exponents to figure out what an exponent of $1 / 2$ means. Exponents tell you how many factors of a number to multiply. For example, $9^{5}$ means 9.9.9-9.9.
3. What does $9^{12}$ mean, in words? What number would fit that description?
4. Recall how exponents work when we multiply: $9^{4} \cdot 9^{3}=9^{\text {a }}$. What does a equal? If you get stuck, write it in expanded form.
5. Now consider this: $9^{1 / 2} \cdot 9^{1 / 2}=9^{b}$ What does $b$ equal?
6. If $9^{1 / 2} \cdot 9^{1 / 2}=9$ that means something multiplied by itself is 9 . What other symbol do you know that asks this same question?

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7. Recall how exponents work when we take a power of a power: $\left(9^{4}\right)^{3}=$ $9^{a}$. What does a equal?
8. Now consider this: $\left(9^{2}\right)^{\frac{1}{2}}=9^{a}$ What does $b$ equal?
9. If $\left(9^{2}\right)^{\frac{1}{2}}=9$ that means the $\frac{1}{2}$ power is the inverse of squaring something. What is the inverse of the square function?
10. In your own words, summarize what it means to raise a number to a $\frac{1}{2}$ power. What do you think it means to raise a number to a power of $\frac{1}{3}$ ?

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