



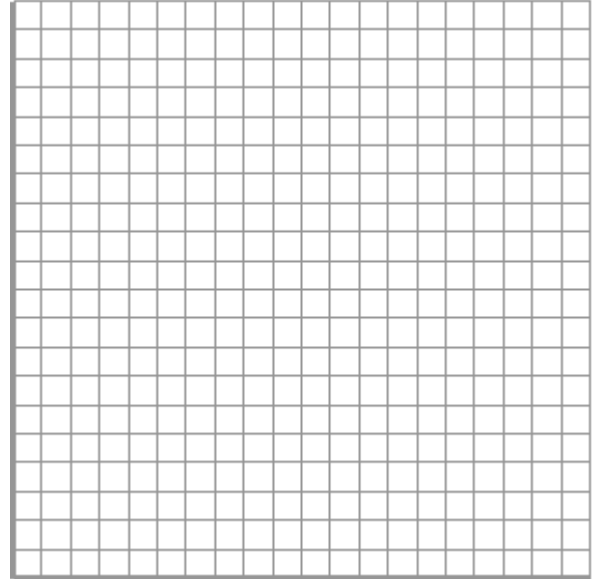
Name: _____ Period: _____ Date: _____

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 $x = \frac{1}{2}$?

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What does it mean to take the $\frac{1}{2}$ power of a number? Let's use what we know about exponents to figure out what an exponent of $\frac{1}{2}$ means. Exponents tell you how many factors of a number to multiply. For example, 9^5 means $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$.

3. What does 9^{12} mean, in words? What number would fit that description?
4. Recall how exponents work when we multiply: $9^4 \cdot 9^3 = 9^a$. What does a equal? If you get stuck, write it in expanded form.
5. Now consider this: $9^{\frac{1}{2}} \cdot 9^{\frac{1}{2}} = 9^b$ What does b equal?
6. If $9^{\frac{1}{2}} \cdot 9^{\frac{1}{2}} = 9$ that means something multiplied by itself is 9. What other symbol do you know that asks this same question?



7. Recall how exponents work when we take a power of a power: $(9^4)^3 = 9^a$. What does a equal?

8. Now consider this: $(9^2)^{\frac{1}{2}} = 9^a$ What does b equal?

9. If $(9^2)^{\frac{1}{2}} = 9$ 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 $\frac{1}{3}$?