

## What is Zero All About?

### *Examining Fractions Numerically and Graphically*

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What happens to a fraction when there is a zero in the numerator? What about in the denominator?

A. Calculate the values of these fractions using a calculator or computer technology.

$\frac{4}{5}$	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{0}{5}$
$\frac{5}{1}$	$\frac{5}{0.1}$	$\frac{5}{0.001}$	$\frac{5}{0}$

1. What do you notice about your results?
2. What happens in the second row as the denominator gets smaller?
3. Try some other fractions. What happens if the denominator is constant and the numerator increases?

B. Let's examine a fraction graphically using slope. Graph the line  $y = \frac{n}{d} \cdot x$ , where  $n$  is the numerator and  $d$  is the denominator.

4. Begin with slope of  $\frac{2}{1}$  and increase the numerator. What do you observe (make a sketch if desired)?
5. What happens when the numerator = 0?
6. Reset the numerator = 2 and adjust the denominator. What happens to the slope as the denominator increases? What happens to the slope as the denominator decreases?
7. What do you observe when the denominator = 0?

C. Open the calculator or computer file "Slope Fractions."

8. Show the slope triangle & explore. How is the slope triangle related to the fraction?

9. Can the equation of the line be put into slope-intercept form when the numerator of the slope = 0?  
When the denominator of the slope = 0?

10. Are there other forms of the equation that you could use instead if slope-intercept form doesn't work?  
Explain your thinking.

11. Fill in the following sentence frames:

A \_\_\_\_\_ line has slope = \_\_\_\_\_ and equation \_\_\_\_\_

A \_\_\_\_\_ line has slope = \_\_\_\_\_ and equation \_\_\_\_\_

When the \_\_\_\_\_ = 0, the slope = \_\_\_\_\_.

When the \_\_\_\_\_ = 0, the slope = \_\_\_\_\_.

12. *Notes to my future self:*

What do you want to remember about fractions containing zeros and graphs of different types of lines?