

Don Bosco Technical Institute

## AP Physics C Prep

### Day 1, Part 4: Introduction to Limits

## What is a limit?

- The limit of a function  $f$  at point  $a$  is the value that  $f$  approaches as it gets infinitely close to  $a$ .

$$\lim_{x \rightarrow a} f(x) \quad \text{vs.} \quad f(a)$$

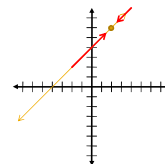
- Sometimes, they are the same.
- The limit follows the trend set by the rest of the function.
  - If the trend suddenly changes, then the limit and the actual value are different.
  - If the trend stays the same, then the limit and the actual value are the same.

$$f(x) = x + 4$$

$$f(2) = 2 + 4 = 6$$

$$\lim_{x \rightarrow 2} (x + 4) = 6$$

$$\lim_{x \rightarrow 2} (2 + 4) = 6$$

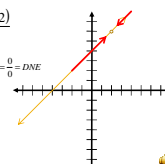


$$g(x) = \frac{(x+4)(x-2)}{(x-2)}$$

$$g(2) = \frac{(2+4)(2-2)}{(2-2)} = \frac{0}{0} = \text{DNE}$$

$$\lim_{x \rightarrow 2} \frac{(x+4)(x-2)}{(x-2)} = 6$$

$$\lim_{x \rightarrow 2} (x + 4) = 6$$



## Solving for limits

- Always try substitution first
  - If you get a real number, that is the limit
  - If you get  $0/0$ , then try simplifying before substitution
    - Factor and cancel
    - Rationalize denominators
    - Add/subtract with least common denominator
    - Simplify compound fractions

## Up Next...

- Videos from passcalculusdotcom YouTube channel
  - Limits of Functions – part 1  
<http://youtu.be/trAmOJ8pHNc>
  - Limits of Functions – part 2  
<http://youtu.be/PY5ZXbP9c3Q>
  - Limits of Functions – part 3  
<http://youtu.be/LC2hjbiK1So>
- These videos will start automatically if you are running the AP Physics C Prep Day 1 playlist