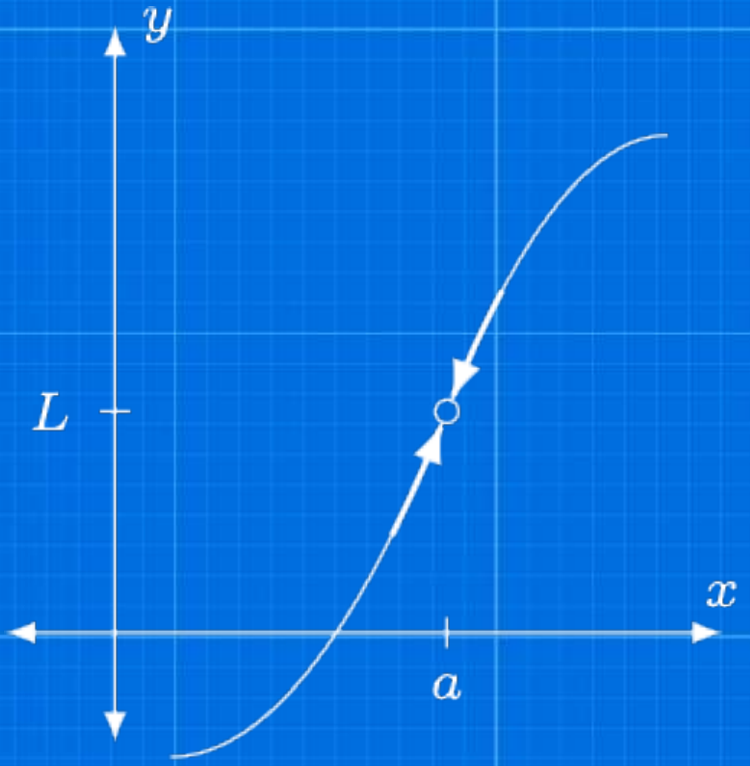
# DISCONTINUITIES

DANTE MACÍAS | MIGUEL FERRIZ

# What is a discontinuity

A discontinuity is a point where a function is sort of interrupted. It is like a branch cut. Many people refer to it as a "Jump".

*Imagine a normal function with a small gap or hole; that is called a discontinuity.*



# Types of Discontinuities

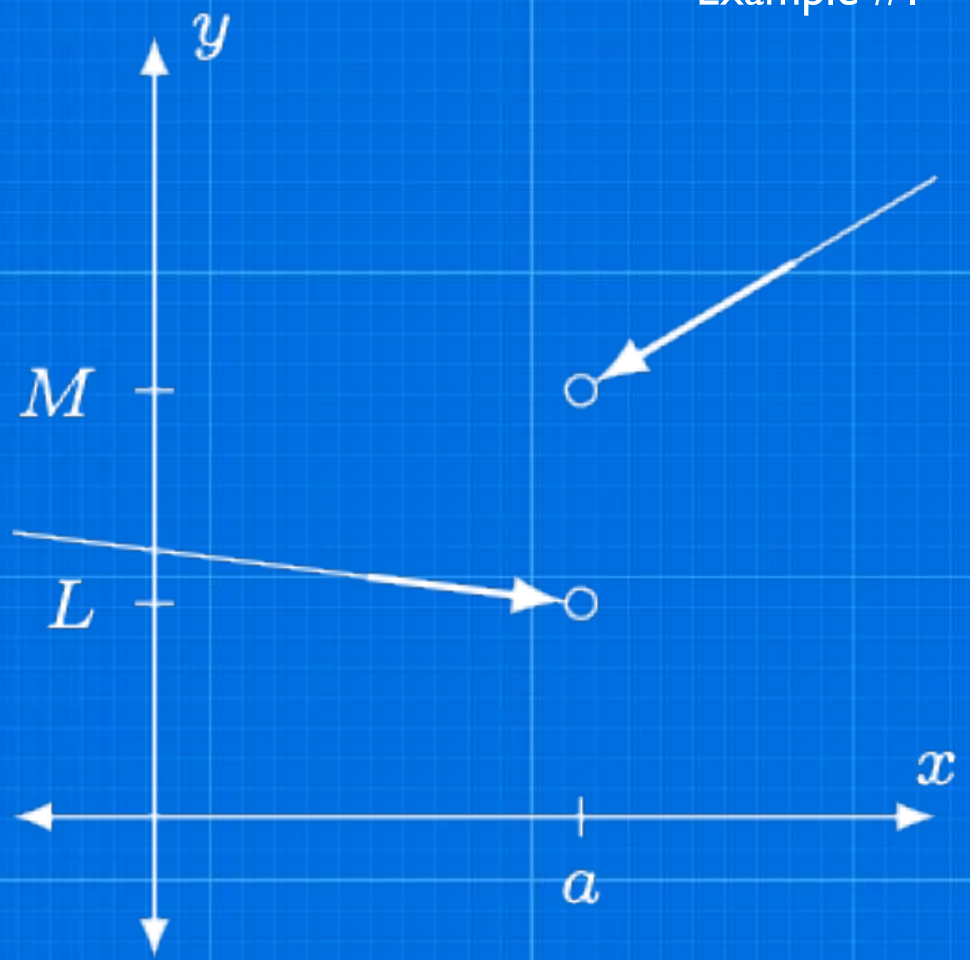
## Type 1: Jump Discontinuity

In the followng graph you can notice that:

$\lim_{x \to a^-} f(x) = L$ and $\lim_{x \to a^+} f(x) = M$.

The funtions comes to different points depending on the direction it's coming from. You express the discontinuity as x=a

Example #1



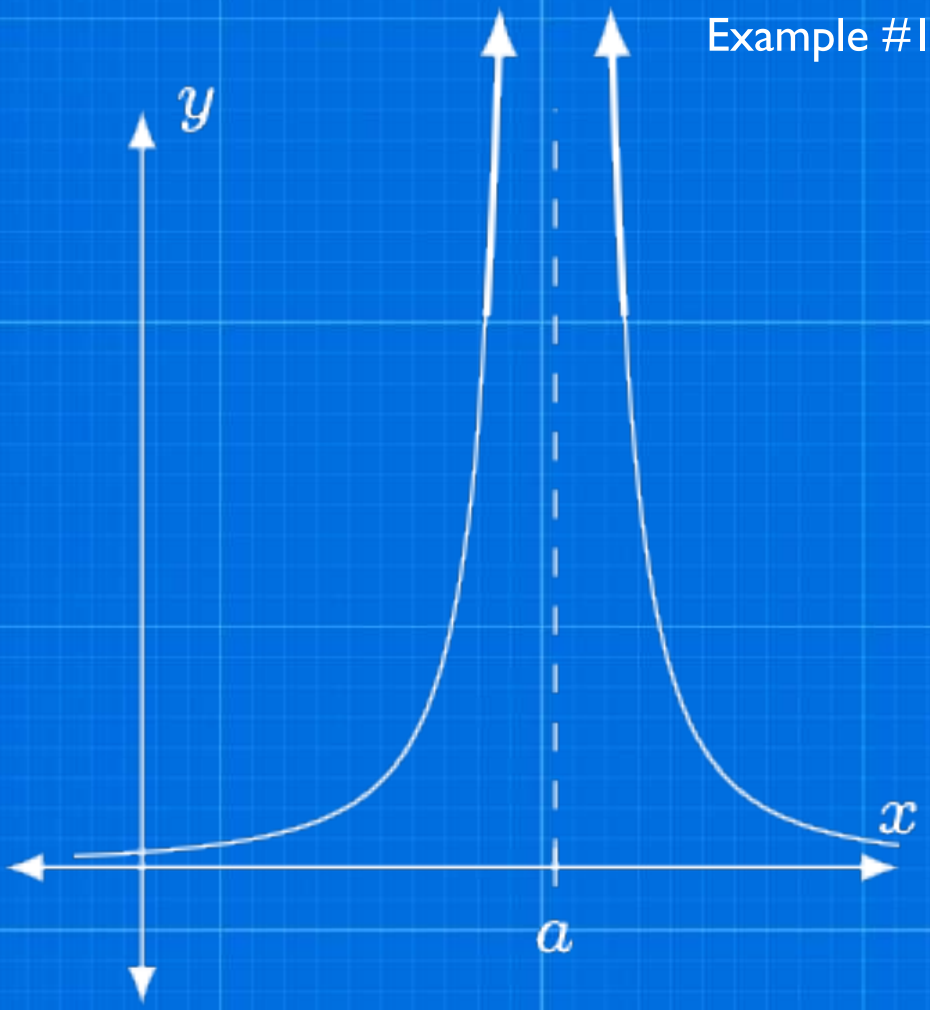
# Types of Discontinuities

## Type 2: Infinite Discontinuity

When the graph grow continuously and doesnt show any finite value (usually indicated by the arrows it is considered an infinite discontinuity

This graph shows an infinite discontinuity at x=a

Example #1



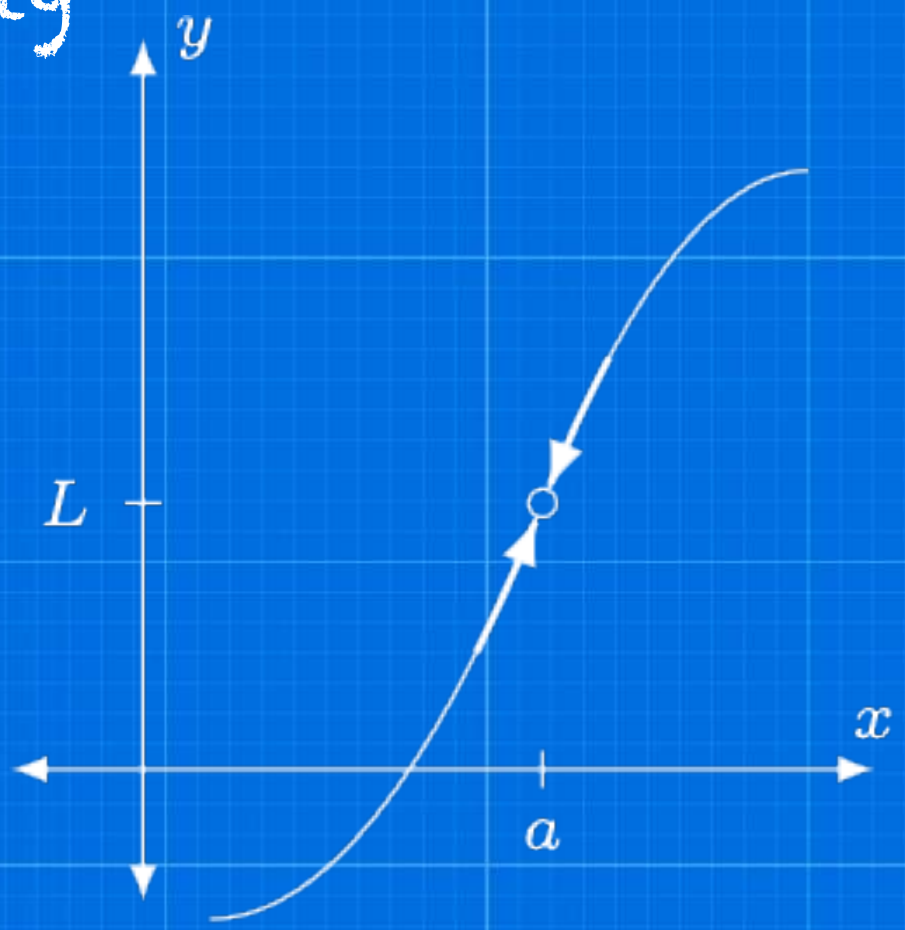
# Types of Discontinuities

## Type 3: Removable Discontinuity

A removable discontinuity is basically a whole; an interruption on a function that if removed, the graph would be complete

Eventhough there is a whole at x=a, there is an existent limit value.

Example #1



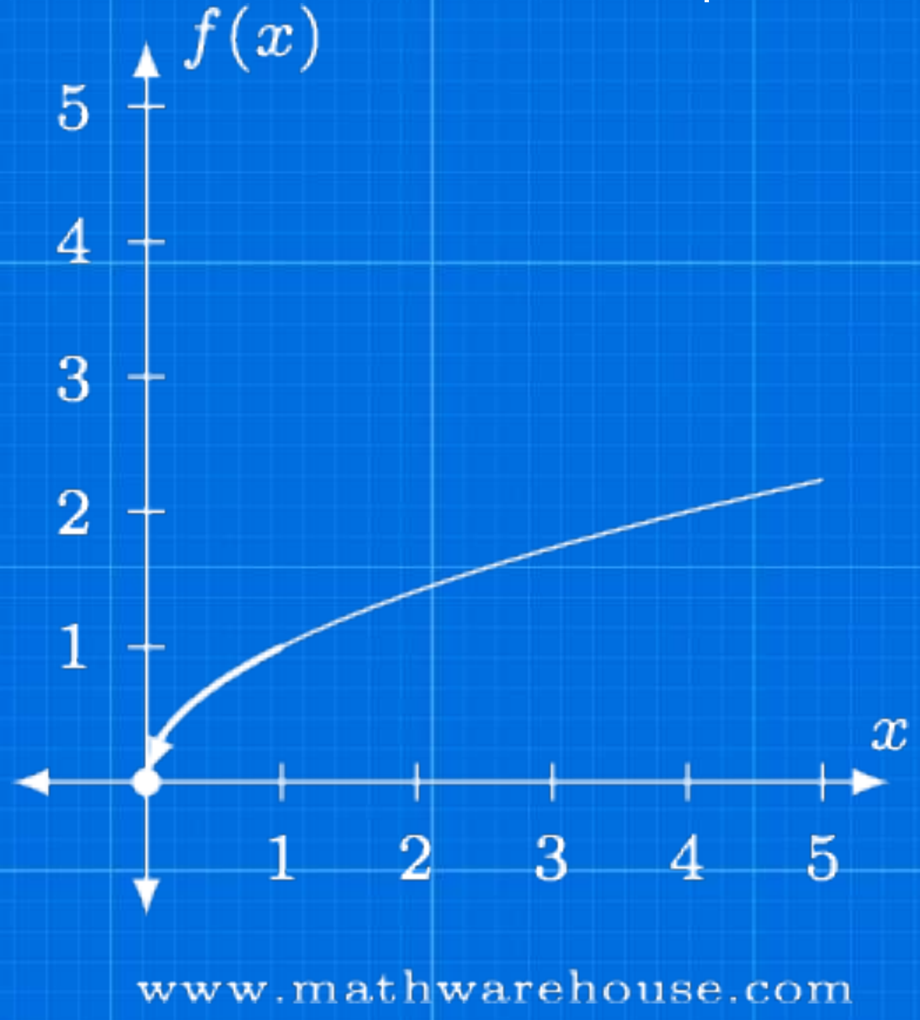
# Types of Discontinuities

## Type 4: Endpoint Discontinuity

A funtion is considered to be endpoint, when the limit can't be at that endpoint. This is because the limit has to examine the function values as x approaches from both sides.

The discontinuity can't exist at 0 there fore is an endpoint.

Example #1

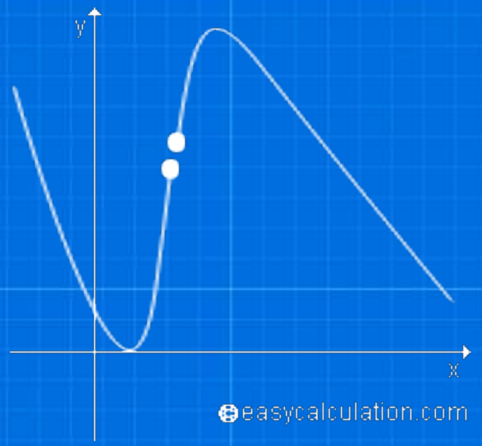


# Examples

*Example #1 is found at each slide of each type of discontinuity

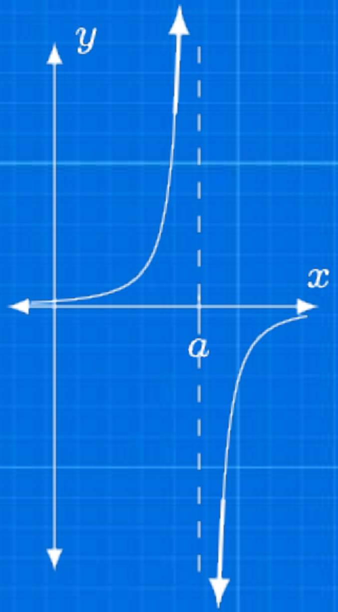
## Jump Discontinuity

Example #2



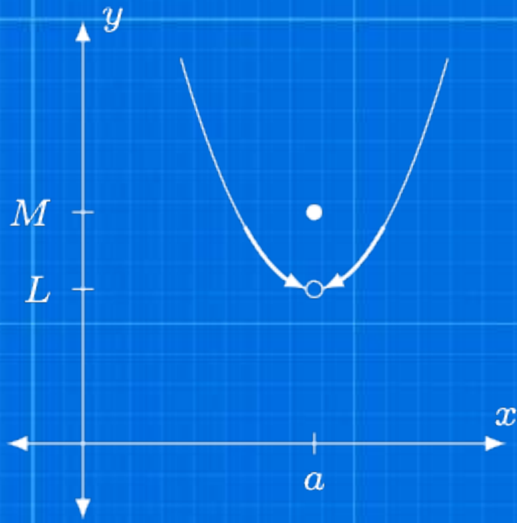

## Infinite Discontinuity

Example #2



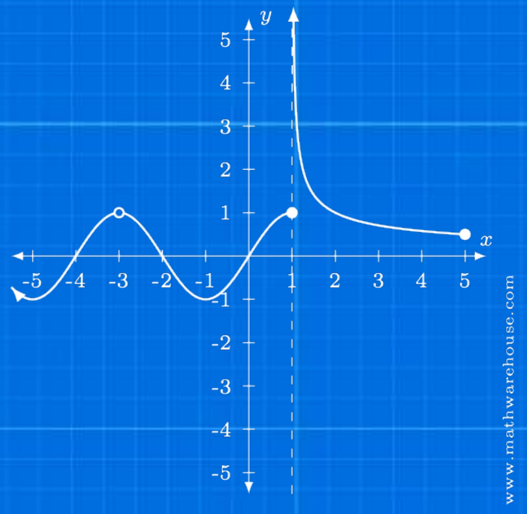

## Removable Discontinuity

Example #2




## EndPoint Discontinuity

Example #2




Graph for Questions 4-6

# REFERENCES

All the information and graphs were retrieved from:

What are the types of Discontinuities? (n.d.). Retrieved August 28, 2017, from http://www.mathwarehouse.com/calculus/continuity/what-are-types-of-discontinuities.php