

1-1

## Attributes of a function

Obj: I can identify different attributes of a function

### Attributes

review [ Domain  
Range  
Increasing  
Decreasing  
x-intercepts  
y-intercepts  
Even/Odd/Neither  
one-to-one  
Maximum  
Minimum

End Behavior

Asymptotes/Discontinuities

**Domain:** Represents the **x-values**. These are read left to right

**Range:** Represents the **y-values**. These are read from low to high

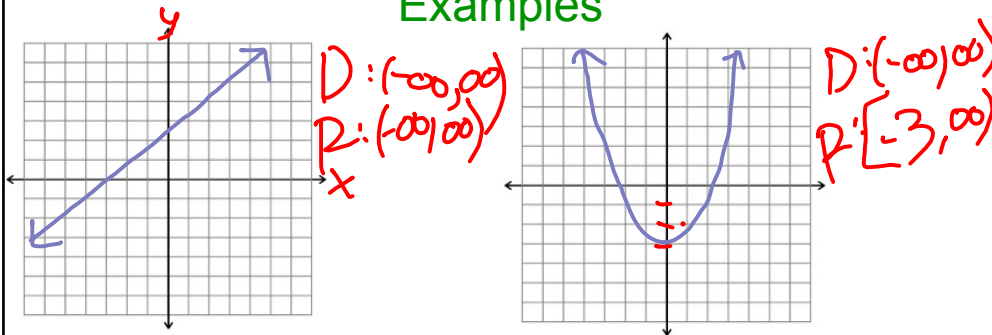
**Interval notation:**

(smallest value, biggest value)

( , ) values not included [ , ] values included

$-\infty, \infty$

**Examples**



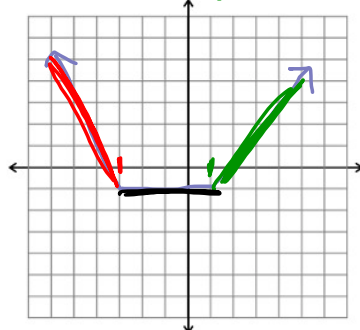
**Increasing:** as you move from left to right the y-values increase

**Decreasing:** as you move from left to right the y-values decrease

**Constant:** as you move from left to right the y-values do not change *flat*  $\longrightarrow$

this behavior is reported using interval notation for the X-VALUES where the graph has a certain behavior

**Example**

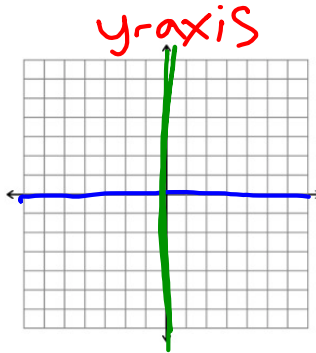


Inc:  $(1, \infty)$   
 Dec:  $(-\infty, -3)$   
 Const:  $(-3, 1)$

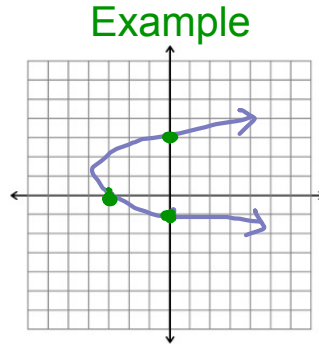
**x-intercepts:** where the graph crosses the x-axis  $(x, 0)$

**y-intercepts:** where the graph crosses the y-axis  $(0, y)$

These are written as **ordered pairs**  $(x, y)$

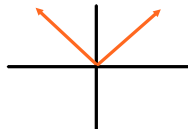


X-int.  
 $(-3, 0)$   
 Y-int.  
 $(0, -1)$   
 $(0, 3)$

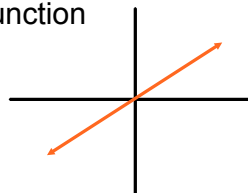


**Symmetry: Even/Odd/Neither**

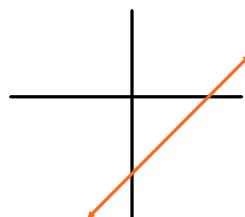
**Even:** If the graph is symmetric to the y-axis, it is an even function



**Odd:** If the graph is symmetric to the origin (quadrants I and III are the same, and quadrants II and IV are the same), it is an odd function

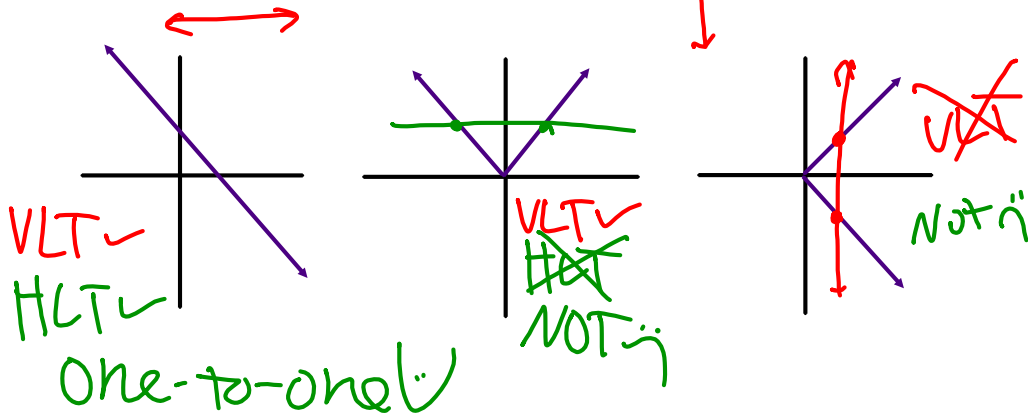


**Neither:** If it doesn't fit either odd or even, then it is neither



## One-to-One

If a graph passes both the vertical line test and the horizontal line test it is one-to-one



## Extrema

### maximums

- relative (local)
- absolute (upper bound)

highest point

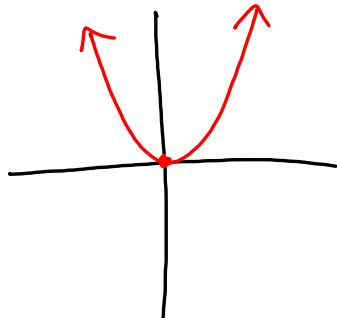
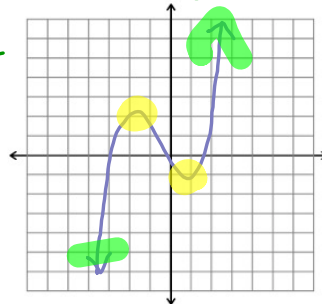
### minimums

- relative (local)
- absolute (lower bound)

lowest point

Numerical value

Example

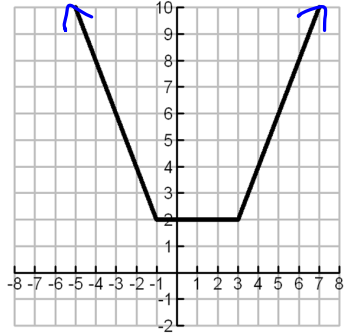


min: (0,0)  
max: none



## End Behavior

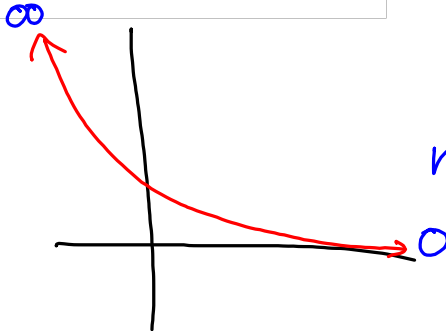
What the y-values are approaching on each side



left:  $y \rightarrow \infty$

right:  $y \rightarrow \infty$

left:  $y \rightarrow$   
 right:  $y \rightarrow$

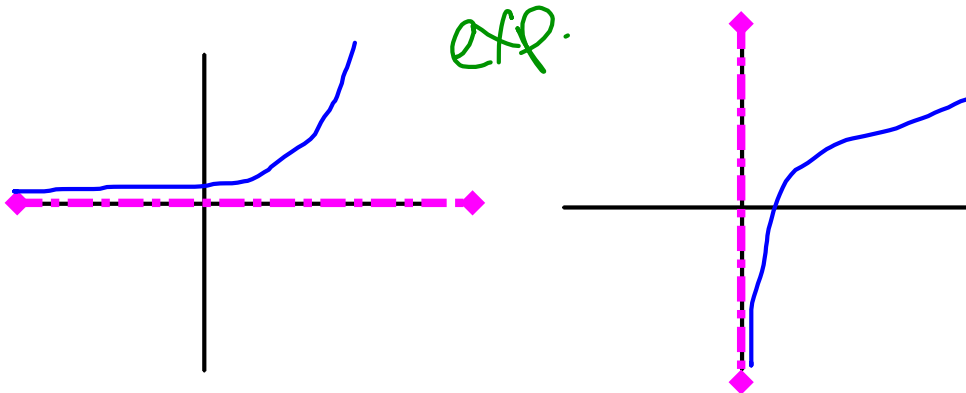


left:  $y \rightarrow \infty$

right:  $y \rightarrow 0$

## Asymptotes

A line that a graph approaches but never touches\*

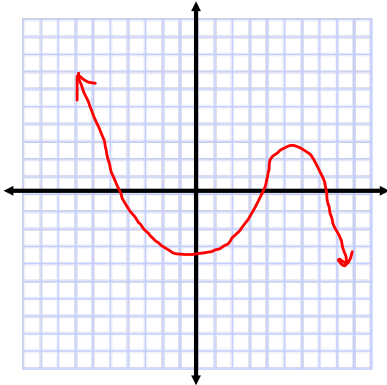


\*This is true for vertical asymptotes, we will go into more detail for horizontal asymptotes later

**Continuous:** A function is continuous if you can draw it in one motion without picking up your pencil.

**Discrete:** made of ordered pairs or individual parts

**Continuous**  
Function



**Discrete**  
Function

