Math 3B: Lecture 4

Noah White

October 6, 2017

Last time

Last time, we spoke about

• Graphing using calculus

Last time

Last time, we spoke about

- Graphing using calculus
- Slanted asymptotes

Last time

Last time, we spoke about

- Graphing using calculus
- Slanted asymptotes
- Examples

A function is three pieces of information

• A domain, $D \subset \mathbb{R}$

- A domain, $D \subset \mathbb{R}$
- A range, $R \subset \mathbb{R}$, and

- A domain, $D \subset \mathbb{R}$
- A range, $R \subset \mathbb{R}$, and
- A rule $f: D \longrightarrow R$ that assigns to every element of D an element of R.

- A domain, $D \subset \mathbb{R}$
- A range, $R \subset \mathbb{R}$, and
- A rule $f: D \longrightarrow R$ that assigns to every element of D an element of R.

A function is three pieces of information

- A domain, $D \subset \mathbb{R}$
- A range, $R \subset \mathbb{R}$, and
- A rule $f: D \longrightarrow R$ that assigns to every element of D an element of R.

Example

The functions

A function is three pieces of information

- A domain, $D \subset \mathbb{R}$
- A range, $R \subset \mathbb{R}$, and
- A rule $f: D \longrightarrow R$ that assigns to every element of D an element of R.

Example

The functions

• $f: \mathbb{R} \longrightarrow \mathbb{R}; x \mapsto x^2$

A function is three pieces of information

- A domain, $D \subset \mathbb{R}$
- A range, $R \subset \mathbb{R}$, and
- A rule f: D → R that assigns to every element of D an element of R.

Example

The functions

- $f: \mathbb{R} \longrightarrow \mathbb{R}; x \mapsto x^2$
- $f: \mathbb{R}_{\geq 0} \longrightarrow \mathbb{R}; x \mapsto x^2$

A function is three pieces of information

- A domain, $D \subset \mathbb{R}$
- A range, $R \subset \mathbb{R}$, and
- A rule f: D → R that assigns to every element of D an element of R.

Example

The functions

- $f: \mathbb{R} \longrightarrow \mathbb{R}; x \mapsto x^2$
- $f: \mathbb{R}_{\geq 0} \longrightarrow \mathbb{R}; x \mapsto x^2$
- $f: \mathbb{R} \longrightarrow \mathbb{R}_{>0}; x \mapsto x^2$

Global Maximums and minimums

Definition (Global maximum)

A function $f:D\longrightarrow R$ has a global maximum at a if

$$f(x) \le f(a)$$
 for all $x \in D$

Global Maximums and minimums

Definition (Global maximum)

A function $f: D \longrightarrow R$ has a global maximum at a if

$$f(x) \le f(a)$$
 for all $x \in D$

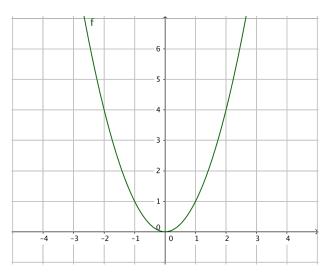
Definition (Global minimum)

A function $f: D \longrightarrow R$ has a global minimum at a if

$$f(x) \ge f(a)$$
 for all $x \in D$

Example of a global minimum

 $f: \mathbb{R} \longrightarrow \mathbb{R}; x \mapsto x^2$ has a min at x = 0



Example of a global maximum

$$f:(-\infty,0]\longrightarrow \mathbb{R}; f(x)=x^3$$
 has a max at $x=0$

