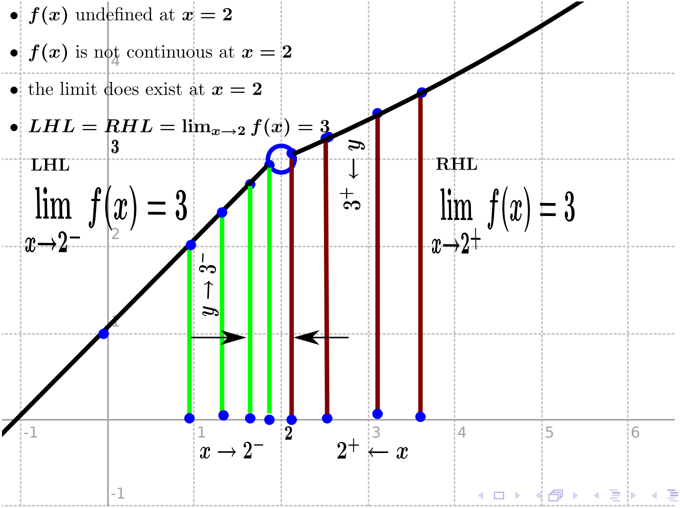
Limits

Limit exists, function not exist

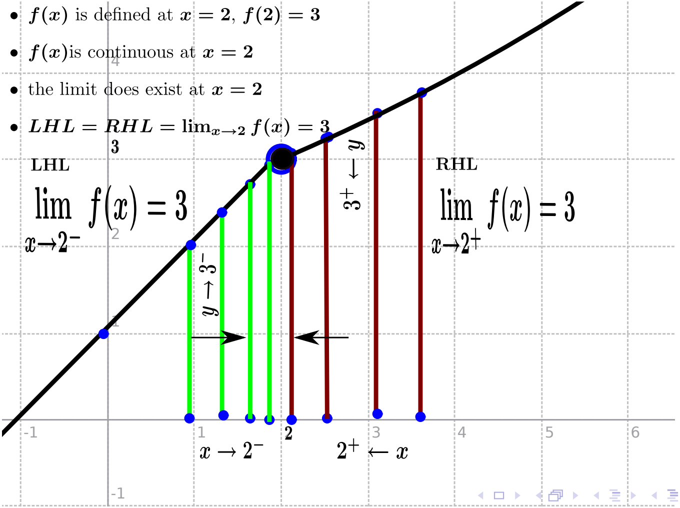
- $f(x)$ undefined at $x = 2$
- $f(x)$ is not continuous at $x = 2$
- the limit does exist at $x = 2$
- $LHL = RHL = \lim_{x\to 2} f(x) = 3$



Limits

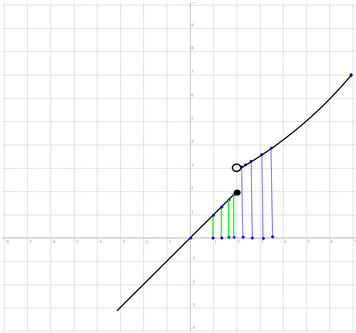
Limit=function $\Rightarrow$ continuous

- $f(x)$ is defined at $x = 2$, $f(2) = 3$
- $f(x)$is continuous at $x = 2$
- the limit does exist at $x = 2$
- $LHL = RHL = \lim_{x\to 2} f(x) = 3$



Limits

Limit $\neq$ function $\Rightarrow$ not continuous



- $f(x)$ exists at $x = 2$, $f(2) = 2$
- LHL: $\lim_{x \to 2^-} f(x) = 2$
- RHL: $\lim_{x \to 2^+} f(x) = 3$
- LHL $\neq$ RHL $\Rightarrow \lim_{x \to 2} f(x)$ does not exist.
- $f(x)$ is not continuous at $x = 2$
- $f(x)$ is continuous for all $x \neq 2$

Limits

Limits and continuous functions

- If $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then the

$$\lim_{x \longrightarrow a} f(x) = f(a)$$

- this means that if a $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then to find the limit of $\mathbf{f(x)}$ at $\mathbf{x = a}$ you only need to evaluate $\mathbf{f(x)}$ at $\mathbf{x = a}$.
- i.e. to find $\lim_{x \longrightarrow a} f(x)$ when $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ just find $\mathbf{f(a)}$.
- polynomials are smooth, continuous functions for all $\mathbf{x}$ so this method can be used with polynomials. If $\mathbf{P(x)}$ is a polynomial then:

$$\lim_{x \longrightarrow a} P(x) = P(a)$$

Limits

Limits and continuous functions

- If $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then the

$$\lim_{x \longrightarrow a} f(x) = f(a)$$

- this means that if a $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then to find the limit of $\mathbf{f(x)}$ at $\mathbf{x = a}$ you only need to evaluate $\mathbf{f(x)}$ at $\mathbf{x = a}$.
- i.e. to find $\lim_{x \longrightarrow a} f(x)$ when $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ just find $\mathbf{f(a)}$.
- polynomials are smooth, continuous functions for all $\mathbf{x}$ so this method can be used with polynomials. If $\mathbf{P(x)}$ is a polynomial then:

$$\lim_{x \longrightarrow a} P(x) = P(a)$$

Limits

Limits and continuous functions

- If $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then the

$$\lim_{x \longrightarrow a} f(x) = f(a)$$

- this means that if a $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then to find the limit of $\mathbf{f(x)}$ at $\mathbf{x = a}$ you only need to evaluate $\mathbf{f(x)}$ at $\mathbf{x = a}$.
- i.e. to find $\lim_{x \longrightarrow a} f(x)$ when $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ just find $\mathbf{f(a)}$.
- polynomials are smooth, continuous functions for all $\mathbf{x}$ so this method can be used with polynomials. If $\mathbf{P(x)}$ is a polynomial then:

$$\lim_{x \longrightarrow a} P(x) = P(a)$$

Limits

Limits and continuous functions

- If $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then the
$$\lim_{x \longrightarrow a} f(x) = f(a)$$
- this means that if a $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ then to find the limit of $\mathbf{f(x)}$ at $\mathbf{x = a}$ you only need to evaluate $\mathbf{f(x)}$ at $\mathbf{x = a}$.
- i.e. to find $\mathbf{\lim_{x \longrightarrow a} f(x)}$ when $\mathbf{f(x)}$ is continuous at $\mathbf{x = a}$ just find $\mathbf{f(a)}$.
- polynomials are smooth, continuous functions for all $\mathbf{x}$ so this method can be used with polynomials. If $\mathbf{P(x)}$ is a polynomial then:
$$\lim_{x \longrightarrow a} P(x) = P(a)$$