- Today we will discuss the intuitive definition of limit.

- Homework before Wednesday's class: watch videos 2.5, 2.6.

- Note: use the examples which we do not cover (there will be more of them later) as practice problems.

Intuitive definition of limit

Definition

Let f be a function defined on an interval containing $a \in \mathbb{R}$, except possibly at a. The limit of f is L means that if x is close to a, then $f(x)$ is close to L.

Some limits

For each of the following, find the limit if it exists.

1. $\lim_{x \to 2} \frac{x^2 - 5x + 6}{x - 2}$

2. $\lim_{x \to 0} |x|$
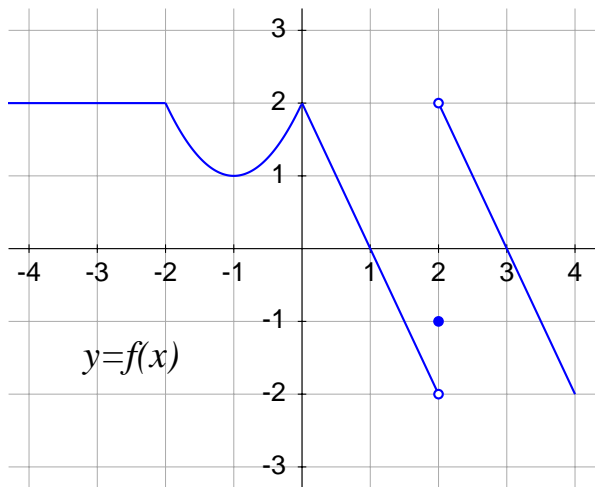
3. $\lim_{x \to 0} \frac{|x|}{x}$

4. $\lim_{x \to 1} \frac{x^2 - 1}{x^2 - 2x + 1}$

Some limits

Define $f(x)$ by the following:

$$f(x) = \begin{cases} \frac{x^2+2x-3}{\sqrt{x}-1}, & \text{if } x \neq 1 \\ 5, & \text{if } x = 1 \end{cases}$$

Find $\lim_{x \to 1} f(x)$.

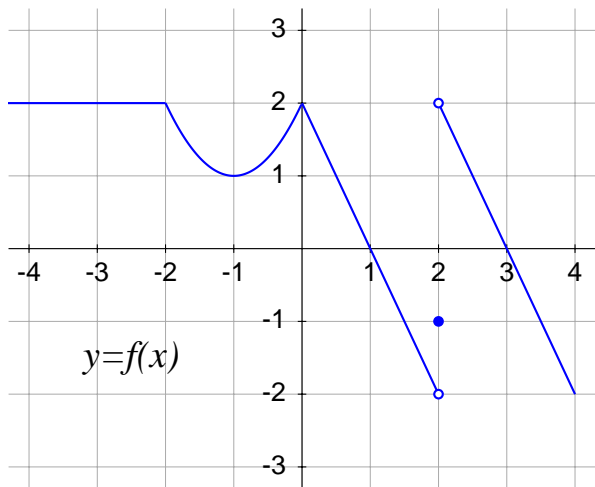# Limits from a graph

$y=f(x)$

Find the value of
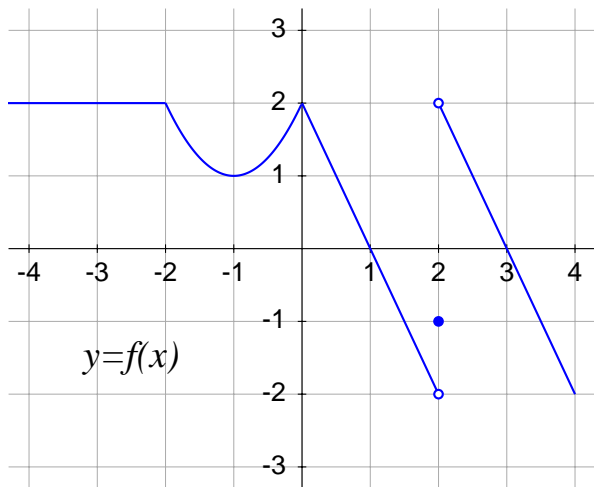
1. $\lim\limits_{x\to 2} f(x)$

Limits from a graph

$y=f(x)$

Find the value of

1. $\lim_{x \to 2} f(x)$
2. $\lim_{x \to 2} [f(x)]^2$

Limits from a graph

y=f(x)

Find the value of

1. $\lim_{x\to 2} f(x)$
2. $\lim_{x\to 2} [f(x)]^2$
3. $\lim_{x\to 0} f(f(x))$

Compute:
$$\lim_{t \to 0^+} e^{1/t}, \qquad \lim_{t \to 0^-} e^{1/t}.$$

Suggestion: Sketch the graph of $y = e^x$ first.