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 $L$. 
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. \( \lim_{x \to 1} \frac{x^2 - 1}{x^2 - 2x + 1} \)
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 $\lim_{x \to 1} f(x)$. 
Find the value of

1. \[ \lim_{x \to 2} f(x) \]
Limits from a graph

Find the value of

1. \( \lim_{x \to 2} f(x) \)

2. \( \lim_{x \to 2} [f(x)]^2 \)
Limits from a graph

Find the value of

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

Compute:

\[
\lim_{t \to 0^+} e^{1/t}, \quad \lim_{t \to 0^-} e^{1/t}.
\]

Suggestion: Sketch the graph of \( y = e^x \) first.