

Evaluating Limits

Reading

- Sections 2.5

Practice problems

- Section 2.5: 5, 7, 11, 13, 21, 24, 25
- To turn in (together with 2.6): 2.5 16, 30

Notes

Algebraic Evaluation of Limits

- Many limits cannot be evaluated by substitution.
- Most typical case is a “0 over 0”.
- Example: $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$
- Solution: Perform algebraic manipulation to the function, without changing the value but eliminating the problematic part.
- In this example: $\frac{x^2 - 4}{x - 2} = \frac{(x - 2)(x + 2)}{x - 2} = x + 2$
- We were able to eliminate the term $x - 2$, which was the one causing the zeros.
> When dealing with limits that cannot be evaluated directly: > > - Perform algebraic transformations until the problematic terms go away. > - Evaluate limit of resulting expression by substitution/plugging in.
- Other examples:

- $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$. Use “conjugate”.

- $\lim_{x \rightarrow 1} \left(\frac{1}{x - 1} - \frac{2}{x^2 - 1} \right)$ ($\infty - \infty$ form). Make common denominators.

- $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan x}{\sec x}$. Write in terms of sin, cos.