Names

Please work in groups with no more than four people and complete this worksheet during class. Hand in one worksheet for each group.

1. Consider the limit

\[ \lim_{x \to 1} \frac{\tan\left(\frac{\pi x}{4}\right) - 1}{\pi(x - 1)}. \]

With the help of a calculator, estimate the value of the limit to 5 decimal places at \( x = 1.1, 1.01, 1.001 \) and 1.0001. Put your solution in the form of a table.

Based on these numbers, make a guess of what the value of the limit should be.

2. Let

\[ f(x) = \frac{x^2 - 1}{x^3 - 1}. \]

Either make a table as in problem 1), or draw a graph of the function to estimate the value of the limit

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

Show your work.
3. Let

\[ f(x) = \frac{|x - 4|}{x - 4}. \]

Either make a table as in problem 1), or draw a graph of the function to estimate the values of the limits

\[ \lim_{x \to 4^+} f(x) \quad \text{and} \quad \lim_{x \to 4^-} f(x). \]

Show your work.

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4. Let

\[ f(x) = \sin \left( \frac{1}{x} \right). \]

Either make a table as in problem 1), or draw a graph of the function to estimate the value of the limit

\[ \lim_{x \to 0^+} f(x). \]

Show your work.