Math 241: HW 4
Due on Friday, September 13
Fall '13

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Problem 1

Compute the following limits:

\[ a) \lim_{x \to 0} \frac{\sin(\pi x)}{37x} \]

\[ b) \lim_{x \to 0} \frac{\sin(4x)}{16 \sin(2x)} \]

\[ c) \lim_{x \to 0} \frac{\tan^2(10x)}{\sec^2(5x)} \]

Problem 2

Compute the following limits:

\[ a) \lim_{x \to 0^+} \frac{x - 15}{x} \]

\[ b) \lim_{x \to 0^-} \frac{x - 15}{x} \]

\[ c) \lim_{x \to 7^+} \frac{(x - 4)(x + 3)}{x + 7} \] (Hint: this is easy)

\[ d) \lim_{x \to 7^+} \frac{(x - 4)(x + 3)}{x - 7} \]

Problem 3

Let \( \alpha, \beta \in \mathbb{R} \) such that \( 0 < \alpha < \beta \). Consider the function

\[ f(x) = \frac{x - \alpha}{x - \beta} \]

what is \( \lim_{x \to \beta^+} f(x) \)? How about \( \lim_{x \to \beta^-} f(x) \)?