SOME LIMIT COMPUTATIONS

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For next lecture

For Wednesday (Oct 17), watch the videos:

- IVT and EVT: 2.21, 2.22
- Definition of a derivative: 3.1, 3.2, 3.3

Computations!

Using that $\displaystyle\lim_{x\to 0}\frac{\sin x}{x} = 1$, compute the following limits:

1 $\displaystyle\lim_{x\to 2}\frac{\sin x}{x}$

4 $\displaystyle\lim_{x\to 0}\frac{\sin e^x}{e^x}$

2 $\displaystyle\lim_{x\to 0}\frac{\sin(5x)}{x}$

5 $\displaystyle\lim_{x\to 0}\frac{1-\cos x}{x}$

3 $\displaystyle\lim_{x\to 0}\frac{\tan^2(2x^2)}{x^4}$

6 $\displaystyle\lim_{x\to 0}\frac{\tan^{10}(2x^{20})}{\sin^{200}(3x)}$

Limits at infinity

Compute:

1 $\lim\limits_{x \to \infty} \left(x^7 - 2x^5 + 11 \right)$

2 $\lim\limits_{x \to \infty} \left(x^2 - \sqrt{x^5 + 1} \right)$

3 $\lim\limits_{x \to \infty} \dfrac{x^2 + 11}{x + 1}$

4 $\lim\limits_{x \to \infty} \dfrac{x^2 + 2x + 3}{3x^2 + 4x + 5}$

5 $\lim\limits_{x \to \infty} \dfrac{x^3 + \sqrt{2x^6 + 1}}{2x^3 + \sqrt{x^5 + 1}}$

6 $\lim\limits_{x \to \infty} \dfrac{\sin(2x + 7)\cos\left(x^2\right) + \cos^2\left(4 - x^3\right)}{x}$

Compute:

1 $\displaystyle \lim_{x \to -3} \ \frac{x^2 - 9}{3 - 2x - x^2}$

2 $\displaystyle \lim_{x \to 1^+} \ \frac{x^2 - 9}{3 - 2x - x^2}$

Computations

1 $\displaystyle\lim_{x \to 0} \frac{1}{x} \left(\sqrt{1 + x + x^2} - 1 \right)$ **2** $\displaystyle\lim_{x \to \pi} \frac{\sin^2(x)}{1 + \cos(x)}$