

Exam Results

- ▶ Scoring algorithm: $30 + (10 \text{ points per problem})$.
- ▶ Class statistics: mean 76, median 78, maximum 94. Good job!
- ▶ Solutions are posted.

Announcement

Math Club meeting tonight

Tuesday, April 2

7:00 pm in Blocker 220

Dr. Dean Baskin will talk about the quaternions.

l'Hôpital's rule or l'Hospital's rule (due to Johann Bernoulli)

Example

$$\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{\sin(3x)} = ?$$

The numerator and the denominator both become 0, but there is no obvious way to factor and cancel. What to do?

Solution

Replace each function with its linear approximation at 0:

$e^{2x} - 1 \approx 0 + 2x$, and $\sin(3x) \approx 0 + 3x$, so

$$\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{\sin(3x)} = \lim_{x \rightarrow 0} \frac{2x}{3x} = \frac{2}{3}.$$

In other words, $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{f'(a)}{g'(a)}$ assuming that $\lim_{x \rightarrow a} f(x) = 0$ and

$$\lim_{x \rightarrow a} g(x) = 0$$

Assignment (not to hand in)

- ▶ Section 4.4: Exercises 9, 11, 13, 15, 17, 19, 23, 27, 35, 47, 53