MAT137 - Calculus with proofs

- Assignment 9 due on March 25
- Assignment 10 due on April 8
- Test 5 opens on April 22

• Today: Ratio Test

• Wednesday: Power series (Watch Videos 14.1, 14.2)

Quick review: Convergent or divergent?

1.
$$\sum_{n}^{\infty} (1.1)^{n}$$

5.
$$\sum_{n=1}^{\infty} \frac{(-1)^n}{\ln n}$$

2.
$$\sum_{n}^{\infty} (0.9)^{n}$$

 $3. \sum_{n=1}^{\infty} \frac{1}{n^{1.1}}$

$$4. \sum_{n=1}^{\infty} \frac{1}{n^{0.9}}$$

$$6. \sum_{n}^{\infty} \frac{(-1)^n}{e^{1/n}}$$

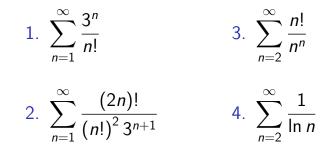
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$$\sum_{n=1}^{\infty} \frac{n^3 + n^2 + 11}{n^4 + 2n - 3}$$

8.
$$\sum_{n}^{\infty} \frac{\sqrt{n^5 + 2n + 16}}{n^4 - 11n + 7}$$

Ratio Test: Convergent or divergent?

Use Ratio Test to decide which series are convergent.



Challenge

We want to calculate the value of $A = \sum_{n=0}^{\infty} \frac{1}{3^n}, \quad B = \sum_{n=1}^{\infty} \frac{n}{3^n}.$ Let $f(x) = \frac{1}{1-x}.$

1. Recall that for |x| < 1

$$f(x) = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + x^4 + \dots$$

Use it to compute A.

2. Pretend you can take derivatives of infinite sums the way you take them of finite sums.

$$f'(x) = \ldots$$

Use it to compute B.