- **Reminder:** Problem Set 9 is due today.
- **Reminder:** Test 4 is next week. It will cover up to the end of this week's lecture material (i.e., up to all but the last two videos on Playlist 13).
- Today's lecture will assume you have watched up to and including video 13.14.

For tomorrow's lecture, watch videos 13.15 through 13.17.

Quick warm-up – Convergent or divergent?

$$\begin{array}{ll}
\mathbf{0} & \sum_{n}^{\infty} (1.1)^{n} \\
\mathbf{0} & \sum_{n}^{\infty} (1.1)^{n} \\
\mathbf{0} & \sum_{n}^{\infty} \frac{1}{n^{0.9}} \\
\mathbf{0} & \sum_{n}^{\infty} \frac{n^{3} + n^{2} + 11}{n^{4} + 2n - 3} \\
\mathbf{0} & \sum_{n}^{\infty} \frac{(-1)^{n}}{e^{1/n}} \\
\mathbf{0} & \sum_{n}^{\infty} \frac{\sqrt{n^{5} + 2n + 16}}{n^{4} - 11n + 7} \\
\mathbf{0} & \sum_{n}^{\infty} \frac{1}{n^{1.1}}
\end{array}$$

Slower questions - Convergent or divergent?

$$\sum_{n=1}^{\infty} \frac{2^{n} - 40}{3^{n} - 20}$$

$$\sum_{n=1}^{\infty} \frac{(\ln n)^{20}}{n^{2}}$$

$$\sum_{n=1}^{\infty} \sin^{2} \frac{1}{n}$$

$$a \sum_{n}^{\infty} \frac{1}{n(\ln n)^3}$$

$$\sum_{n}^{\infty} \frac{1}{n \ln n}$$

$$\sum_{n}^{\infty} e^{-n^2}$$

Suppose we know:

•
$$orall n \in \mathbb{N}$$
, $0 < a_n < 1$;

 \sim

• the series
$$\sum_{n=1}^{\infty} a_n$$
 is convergent,

Determine whether the following series converge, diverge, or we do not have enough information to decide:

$$\sum_{n=1}^{\infty} \sin a_{n}$$

$$\sum_{n=1}^{\infty} \cos a_{n}$$

$$3 \sum_{n}^{\infty} (a_n)^2$$
$$4 \sum_{n}^{\infty} \sqrt{a_n}$$

п



$$4 \sum_{n=1}^{\infty} \frac{(-1)^n}{n^2}$$
$$5 \sum_n^{\infty} \frac{1}{\ln n}$$
$$5 \sum_n^{\infty} \frac{(-1)^n}{\ln n}$$