

Wednesday, March 18

# Clicker Questions

# Clicker Question 1

## The Alternating Series Test

Which of the following series can the Alternating Series Test be applied to?

A.  $1 + \frac{1}{2} - \frac{1}{3} + \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \frac{1}{7} + \frac{1}{8} - \frac{1}{9} + \dots$

B.  $\sum_{n=1}^{\infty} \frac{1}{n^{3/2}}$

C.  $\sum_{n=1}^{\infty} (-1)^n \frac{1 + \cos n}{n}$

D.  $\sum_{n=1}^{\infty} (-1)^n \left( \frac{1}{2} + \frac{1}{n} \right)$

E. none of the above

## Reasons

A is not alternating in the correct way

B is not alternating at all

C does not have a decreasing sequence

D does not have a summand that tends to 0

## Clicker Question 2

### I love to count

How many of these objects converge?

• the sequence  $\left\{ \frac{1}{\sqrt{n}} \right\}$

• the sequence  $\left\{ (-1)^n \frac{1}{\sqrt{n}} \right\}$

• the series  $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$

• the series  $\sum_{n=1}^{\infty} (-1)^n \frac{1}{\sqrt{n}}$

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

### Which ones?

The **two sequences** both converge to 0 (the second one using a mini-Squeeze Theorem argument). The first series is a  $p$ -series with  $p = \frac{1}{2}$ , so diverges. The **second series** passes the Alternating Series Test, so converges.