

Math 1B Section 107 Quiz #6

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GSI: Theo Johnson-Freyd
<http://math.berkeley.edu/~theo.jf>

Name: _____

1. **True or False** (1 pt each) For each of the following statements, decide if it is true or false. You do not need to show work: I will grade only your answers.

(a) If a sequence $\{a_n\}_{n=1}^{\infty}$ is strictly *increasing*, and there's a number M bounding the sequence from *below* (i.e. $a_n \geq M$ for every n), then $\lim_{n \rightarrow \infty} a_n$ exists.

(b) If a sequence $\{a_1, a_2, a_3, \dots\}$ converges, then the sequence $\{b_n\} = \{a_{2n}\} = \{a_2, a_4, a_6, \dots\}$ converges to the same limit.

(c) A geometric series cannot converge if the ratio between successive terms is negative.

2. (3 pts) Use the divergence test to show that the following series diverges. (You will need to actually compute a limit, or explain why the limit is not defined.)

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

3. (4 pts) Sum the following telescoping series:

$$\sum_{n=1}^{\infty} \frac{2}{(2n-1)(2n+1)} = \frac{2}{3} + \frac{2}{15} + \frac{2}{21} + \dots$$