Math 1B Section 112 Quiz #6

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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 *above* (i.e. $a_n \leq M$ for every n), then $\lim_{n \to \infty} a_n$ exists.

   (b) Let $f(x)$ be a function, and define the sequence $a_n = f(n)$. If $\lim_{n \to \infty} a_n = L$, then $\lim_{x \to \infty} f(x) = L$.

   (c) A geometric series converges if and only if the ratio between successive terms is positive.

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.)

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

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

$$\sum_{n=1}^{\infty} \frac{3}{(3n - 1)(3n + 1)} = \frac{3}{4} + \frac{3}{28} + \frac{3}{70} + \dots$$