

MATH 150A-QUIZ 1, WINTER 2019

Name: _____

1. Do the following problems.

(1) (1 pt) State the definition of *Convergent Sequences*.

(2) (4 pts) Show that the limit of the sequence $\left\{ \frac{(-1)^n}{\sqrt{n}} \right\}$ exists and equals 0 by definition.

2. Use the theorems we learned in class regarding *Operations of Limits* to do the following two problems. Recall that in class we proved Theorem 1.3 which is for the limit of the sum sequences, Theorem 1.5 for the limit of the product sequences, and Theorem 1.7 for the limit of the quotient sequences. Indicate at each place when you use the theorems.

- (1) (3 pts) Prove that $\lim(a_n - b_n) = \lim a_n - \lim b_n$, provided $\lim a_n$ and $\lim b_n$ exist.
- (2) (2 pts) For the problem below, you may use any of the examples we've done in class as well.

$$\lim_{n \rightarrow \infty} \frac{n^4 - 2n^2 + 1}{n^4 + 1} = 1.$$