

**MATH 4335 TEST 2**

Name: \_\_\_\_\_

Testing conditions:

- notes, books, and calculators are allowed;
- inter-student communication, telecommunication, and internet access are not allowed.

Exercise	Point Possible	Score
1	50	
2	50	
Total	100	

**1. [50 points]** Suppose that  $f: (0, \infty) \rightarrow \mathbb{R}$  is uniformly continuous.

(a) Show by counterexample that  $\{f(n)\}$  may not converge.

(b) Prove that the sequence  $\{f(1/n)\}$  converges. (Hint:  $1/n$  is Cauchy; prove  $f(1/n)$  is Cauchy too.)

**2. [50 points]** Use the method of bisection to approximate, with at least two decimal places accuracy, the root of  $f(x) = x^4 + x - 3$  in the interval  $[1, 1.2]$ . (This requires a minimum of 5 bisections since  $0.2 \cdot 2^{-4} > 0.01 > 0.2 \cdot 2^{-5}$ ).