

## Math 341 Fall 2017 Study Guide for Exam 2

The exam covers Lecture 14 through Lecture 25. This includes section 3.6, all of chapters 4 and 5, section 6.1.

This study guide includes all theorems and problems listed in the handout from Monday (10/23).

### Proofs of theorems from the textbook to memorize

1. Boundedness Theorem, p. 135
2. Maximum-Minimum Theorem, you can use the proof from Lecture 21 pp. 6 to 10.1 or you can use the proof from the textbook p. 136
3. Location of Roots Theorem, p. 137
4. Uniform Continuity Theorem, p. 145
5. Product Rule, p. 164 (c)

### Review problems

1. Evaluate  $\lim_{x \rightarrow 0^+} \frac{\sqrt{x+1}}{x}$
2. Evaluate  $\lim_{x \rightarrow 0^+} \frac{\sqrt{x+1}}{x}$   $x > 0$
3. Use the  $\delta - \epsilon$  method to show that  $\lim_{x \rightarrow 2} (x^2 + 4x) = 12$
4. Use the Divergence Criterion on p. 108 in the textbook to show that  $\lim_{x \rightarrow 0^+} \cos \frac{1}{x}$  does not exist
5. Show that if  $f$  has a derivative at  $c \in I$  then  $f$  is continuous at  $c$ .
6. Use the definition of the derivative to find the derivative of  $g(x) = \sqrt{x}$  at each point  $c > 0$ .

7. Show that the polynomial  $p(x) = 3x^4 + x^3 - 1$  has at least two real roots.

**Review problems from the textbook**

1. Section 4.3, page 123. #11
2. Section 5.1, page 129. #6, #12
3. Section 5.2, pages 133-134. #1b
4. Section 5.3, page 140. #1
5. Section 5.4, page 148. #2