

MATH 3162 Homework Assignment 6

Instructions: Solve and turn in all of the assigned problems, showing ALL steps or reasoning used in your solutions.

Due on Monday, March 4th, at the BEGINNING of class.

Abbott: 6.6.4, 6.7.2, 6.7.9(a), 7.2.4

- Prove that the conclusion of the Weierstrass Approximation Theorem holds even if you only consider polynomials with rational coefficients. In other words, prove that for every $[a, b]$, f continuous on $[a, b]$, and $\epsilon > 0$, there exists a polynomial p with rational coefficients where for all $x \in [a, b]$, $|p(x) - f(x)| < \epsilon$. (Hint: use the Weierstrass Approximation Theorem to come up with a polynomial p' close to f , and then figure out how to approximate p' by a polynomial with rational coefficients.)

Extra problems for graduate students:

Abbott: 7.2.7