Math 215 – Fall 2017

Practice Homework 9 – Assigned October 9th, due October 12th

Note: Remember that you must show your work to get full credit for a problem.

1. (From p. 68 of our text)
   a. Find the greatest common divisors of the following pairs of integers.
      i. 52134, 312
      ii. -324, 552
      iii. 6271, 245
   b. Express the GCD's that you found in part (a) as a linear combination of the associated pairs of integers.

2. Here we practice the Division Algorithm and Euclidean Algorithm in the context of polynomials with *real* coefficients.
   a. Please find the greatest common divisor of $x^2 + x + 1$ and $x^2 - x + 1$.
   b. Please find two polynomials $a(x)$ and $b(x)$ so that
   $$GCD(x^2 + x + 1, x^2 - x + 1) = (x^2 + x + 1)a(x) + (x^2 - x + 1)b(x)$$
   c. Please find the greatest common divisor of $x^5 - 1$ and $x^2 - 1$.
   d. Please find two polynomials $a(x)$ and $b(x)$ so that
   $$GCD(x^5 - 1, x^2 - 1) = (x^5 - 1)a(x) + (x^2 - 1)b(x)$$
   e. Please find two polynomials $c(x)$ and $d(x)$ so that
   $$(x^2 + x + 1)c(x) + (x^2 - x + 1)d(x) = 2 - 2x$$