Homework 1

Math 118 section 004

Due: Wednesday, January 23rd

1. Suppose x_1 and x_2 are the two solutions of the quadratic equation $ax^2 + bx + c = 0$.
   (a) Show that $x_1 + x_2 = \frac{-b}{a}$.
   (b) Show that $x_1 \times x_2 = \frac{c}{a}$.

2. Consider the quadratic equation $144x^2 - 89x - 55 = 0$.

   (a) Find one solution (Hint: think small integer).

   (b) Using your answer to part a) and question 1, find the other solution.

3. Consider the quadratic equation $F_n x^2 - F_{n-1}x - F_{n-2} = 0$.

   (a) Show that $x = 1$ is a solution.

   (b) As above, show that the other solution is $x = \frac{F_{n-1}}{F_n} - 1$.

4. Find the integer values of a, b, c, and d so that:

   (a) $\varphi^8 = a\varphi + b$,

   (b) $\varphi^6 = c\sqrt{5} + d$.

5. Calculate the following to five decimal places:

   (a) $89\left(\frac{1+\sqrt{5}}{2}\right)+55$,

   (b) φ^{11}.

   (c) Given that $F_{200} \approx 2.80571 \times 10^{41}$, approximate F_{201}.