



MATH 3326-1

Intro to Abstract Mathematics

Spring 2011

Homework 11

Due Date: February 16

In class we defined the *Fibonacci numbers* by the following recurrence relation:

$$f_0 = f_1 = 1, \text{ and for } n \geq 2, f_n = f_{n-1} + f_{n-2}.$$

Problem 26. Prove that $f_0 + f_1 + f_2 + \cdots + f_n = f_{n+2} - 1$.

Problem 27. Verify the statement made in class that

$$\frac{1}{\sqrt{5}} (\alpha^{k+1} - \beta^{k+1}) + \frac{1}{\sqrt{5}} (\alpha^k - \beta^k) = \frac{1}{\sqrt{5}} (\alpha^{k+2} - \beta^{k+2}),$$

where $\alpha = \frac{1 + \sqrt{5}}{2}$ and $\beta = \frac{1 - \sqrt{5}}{2}$.

Problem 28. Let $a, b \in \mathbb{Z}$. Show that if $a|b$ and $a|(b+1)$, then $a = \pm 1$.