1067-97-739 **Emel Demirel*** (demirele1@mail.montclair.edu), 112 Hamilton Ave, Hasbrouck Heights, NJ 07604, and **Aihua Li**. *Study of Polynomial Solutions to Certain Diophantine Equations.*

In this paper, we investigate a particular Diophantine equation, $X^2+Y^3=6912Z^2$, and a set of solutions to the equation, which are derived from some polynomials in $\mathbf{Z}[x,y]$. We focus on three polynomials $X=f(x,y), Y=g(x,y)$ and $Z=h(x,y)$ that satisfy the Diophantine equation and the greatest common divisors for the the integer values of the polynomials. These polynomials are relatively prime in $\mathbf{Q}[x,y]$. However, for a fixed integer pair x_0, y_0, the integer values $f(x_0,y_0), g(x_0,y_0)$ and $h(x_0,y_0)$ are not necessarily relatively prime in $\mathbf{Z}[x,y]$. We investigate the greatest common divisors (GCDs) between these three polynomial values for specific integer pairs x_0 and y_0. We focus on the cases where $y=1$ and $y=2$. For these cases, we give complete classifications on the distribution of the GCDs. We use the Gröbner Bases technique as an aid in investigating the GCDs for f,g,h in $\mathbf{Z}[x,y]$. We then generalize the results from the cases $y=1$ and $y=2$ to obtain similar properties for the GCDs of f,g,h for all x and y in $\mathbf{Z}[x,y]$. (Received September 17, 2010)