1072-03-112 **Arnold W. Miller*** (miller@math.wisc.edu), University of Wisconsin-Madison, Department of Mathematics, Van Vleck Hall, 480 Lincoln Drive, Madison, WI 53706, and **Paul B. Larson**, **Juris Steprāns** and **William A.R. Weiss**. *Universal Functions.* Preliminary report.

For the real line R a function $F : R \times R \to R$ is universal iff for any f of the same type there is $g : R \to R$ such that $f(x, y) = F(g(x), g(y))$ for all $x, y \in R$.

Sierpinski asked in the Scottish book, problem 132, if there exists a Borel function $F(x, y)$ which is universal. He had shown that the answer is yes assuming the continuum hypothesis. If Martin's Axiom is true, then then there is a universal function of Baire class 2. A universal function cannot be of Baire class 1.

Here we show that it is consistent that for each α with $2 < \alpha < \omega_1$ there is a universal function of class α but none of class $\beta < \alpha$. We show that it is consistent with ZFC that there is no universal function Borel or not, and we show that it is consistent that there is a universal function but no Borel universal function. We also prove some results concerning higher order universal functions. (Received June 23, 2011)