1094-37-403 **GREGORY GALPERIN*** (ggalperin@eiu.edu), EASTERN ILLINOIS UNIVERSITY, 600 Lincoln Ave., Charleston, IL 61920. *A billiard particle bouncing off the scatterers in a gravitational field.*

A billiard particle drops down in a vertical (almost) constant gravitational field in 3D space and reflects elastically by the billiard reflection law from infinitely many bounded disjoint scatterers located at a horizontal plane (horizontal line in the 2D case) and enumerated by positive integers. The symbolic sequence for a given billiard trajectory (orbit) is the infinite sequence of the scatterers that reflect the particle moving along this orbit. We will prove that under some natural convexity conditions imposed on the scatterers, all possible symbolic one- and two-sided sequences (a_i) satisfying, for an arbitrary positive number M, the inequality $|a_i - a_{i+1}| < M$ can be realized by billiard trajectories. In particular, the scatterers can be hemispheres or ellipsoids of different sizes in the 3D space, or semicircles or ellipses in the 2D plane. The symbolic sequence can be, for example, the 2-sided sequence ...8281828172314159265... – the union of the numbers e and π – which can be realized by a billiard orbit. Topological and variational principles will be applied in the proof of that result. (Received August 28, 2013)