An algebra $A$ over a field of real numbers graded by a group $G$ is called graded division if all nonzero homogeneous elements of $A$ are invertible. Two gradings on $A$ are called equivalent if there is an automorphism of $A$ which maps homogeneous components of one of the grading to those of the other. In this joint work with Professor Mikhail Zaicev, we completely classify all finite-dimensional associative real graded division algebras, up to equivalence, in the case where $G$ is abelian. In applications to Lie algebras, $G$ we can always be assumed abelian.