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A discrete form of the Beckman-Quarles theorem for two-dimensional strictly convex normed spaces. (English)

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An old theorem of *F. S. Beckman* and *D. Quarles* [Proc. Am. Math. Soc. 4, 810-815 (1953; [Zbl 0052.18204](#))] asserts that every unit distance preserving function from euclidean n -space into itself is an isometry (for $n \geq 2$). This paper continues the study of localized versions of this result. It is proved that if X and Y are 2-dimensional normed spaces, Y being strictly convex, d is a positive real number, and x and y are two points in X whose distance apart is a rational multiple of d , then there is a finite subset S of X , containing x and y , so that every function from S into Y which preserves the distance d must also preserve the distance between x and y . (Of course, this implies that S contains points whose distance apart equals d .)

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