

How to Build a Pyramid

Keith Brandt, Rockhurst University



Keith Brandt is a professor of Mathematics at Rockhurst University in Kansas City, Missouri. His interests include combinatorics, algebra, the theory of equations, and computer science. He is always on the lookout for interesting questions that accessible to students.

Abstract

As we teach our courses, we often look for new examples, exercises, and projects that illustrate important mathematical concepts. Questions of an applied nature are particularly useful because they help motivate the study of mathematics. A few years ago a student of mine, who happens to be a cabinet maker, posed a question regarding the construction of a chute. The essential ingredients in his question are contained in the following problem:

A construction crew is remodeling the second floor of an office building and will build a chute to guide debris into a truck below. The chute will have four walls, a large square opening at the top (say with side b_1), a smaller square opening at the bottom (say with side b_2), and length l . Determine the dimensions of the walls of the chute. In particular, determine the miter angles to be cut along the edges of the walls so that they fit together properly.