

Math 10270 : Quiz 2

A Roman arch consists of 3 voussoirs of the same dimensions. The two side voussoirs each weigh 200 lbs but the keystone is lighter and weighs 100 lbs. Assume that the keystone is held in place without friction.

(a) Sketch such an arch and supporting columns, labeling the angles made by the voussoirs with the center of the span and the forces acting on each voussoir.

(b) Find the forces acting between the side voussoirs and the keystone, and between the supporting columns and the side voussoirs.

What is the horizontal component (the frictional part) of the force applied by the columns?