

Quiz 3. February 6, 2013. Name

1) Consider a semicircular arch with 5 identical voussoirs. Given that each voussoir weighs 250 pounds, estimate the horizontal force with which the keystone of the arch pushes outward in each direction.

2) Describe a method that the Romans used in laying out the oval ground plans for their theaters (and possibly also for the Colosseum). Start with a careful sketch of the underlying geometry, then describe how the Romans used it.

Formulas: $H_0 = \frac{W}{2} \cdot \frac{1}{\tan \frac{\alpha}{2}}$, $H_1 = W \cdot \frac{1}{\tan \frac{3\alpha}{2}}$, $H_2 = W \cdot \frac{1}{\tan \frac{5\alpha}{2}}$, $P_0 = \frac{W}{2} \cdot \frac{1}{\sin \frac{\alpha}{2}}$, $P_1 = W \cdot \frac{1}{\sin \frac{3\alpha}{2}}$, $P_2 = W \cdot \frac{1}{\sin \frac{5\alpha}{2}}$.