

Math 10270 : Midterm
March 8, 2017

Name:

Sign the pledge. “On my honor, I have neither given nor received unauthorized aid on this Exam”:

1. (10 points.) A Greek column casts a 22 foot long shadow. At the same time of day a 6 foot measuring stick has a 4 foot shadow.

How high is the column?

2. (10 points.) (a) Explain how to construct an equilateral triangle using only a straightedge and compass, starting from a given line segment for the base.

Describe each stage carefully and illustrate the steps with sketches.

(b) Explain how to bisect the given line segment.

3. (10 points.) The diagram shows a regular hexagon with vertices labeled. Let P be the symmetry given by reflection in the vertical axis and Q be rotation about the center by 120° counterclockwise.

(a) Write P and Q in matrix form using the numbered vertices.

(b) Calculate QP and PQP and describe their effects geometrically.

4. (10 points.) A truss as shown carries a 100 lb. load at its lowest point and is supported by two hooks which can apply a vertical force only.

(a) Find the magnitude of the force applied by each of the three frames.

(b) Are the frames in compression or tension?

5. (10 points.) Describe some differences between Romanesque and Gothic architecture. Mention both vaulting and buttressing.