

MATH 5200/7200 Exam 1

Dr. McCrory

Part A: IN CLASS EXAM, Friday, September 19, 2008

There are three problems in part A. Part B of the exam is take-home. It will be handed out at the end of the period.

Write your answers in complete sentences. Proofs are not required in problems 1 and 2(a). Proofs are required in problems 2(b) and 3.

- (a) What is the geometric mean of two positive real numbers x and y ?

(b) Given a segment AB and a point P on AB , explain how to construct a segment whose length is the geometric mean of AP and BP , using only the GSP Construct menu. You do not have to explain why your construction works.
- (a) State the arc angle theorem (inscribed angle theorem). (Don't prove it.)

(b) Use the arc angle theorem to prove that if a quadrilateral is inscribed in a circle, then the opposite angles of the quadrilateral are supplementary.
3. Prove that the diagonals of a trapezoid cut off proportional segments on each other. That is, for a trapezoid $ABCD$ as in the figure below, if E is the intersection of the diagonals, then $AE/EC = BE/ED$. (The sides AB and DC are parallel.)

