

# Applied Algebra

**Instructions** Please write your name in the upper right-hand corner of the page. Use complete sentences, along with any necessary supporting calculations, to answer the following questions.

1. Suppose  $H$  is a subgroup of a group  $G$ . If  $a$  is an element of  $G$  such that the left coset  $aH$  equals the right coset  $Ha$ , must the element  $a$  commute with every element of  $H$ ?

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2. Consider the coding function that sends each two-character word  $ab$  to the codeword  $abaabb$ . How many errors will this code correct?