1. In the following problems, draw a three-circle Venn diagram and label the circles R, S, and T. Shade the portion of the diagram corresponding to the given set.

   (a) *1 point* $R \cup S' \cup T'$

   (b) *1 point* $R' \cap (S \cup T)$

2. Suppose a coin is tossed six times and the outcome is recorded as a sequence of H's and T's. For example, two possible outcomes include (T, H, H, H, H, H) and (H, T, H, H, H, T).

   (a) *1 point* How many outcomes are possible?

   (b) *1 point* How many outcomes have exactly four heads?

   (c) *1 point* In how many outcomes are the first and last tosses identical?

3. Suppose that a certain math club has 24 members, and 8 of the members are women. The members of the club are selecting a group of three students to attend a conference.

   (a) *1 points* In how many ways can the club choose 3 of its 24 members to attend the conference?

   (b) *1 points* In how many ways can the club choose 3 women to attend the conference?

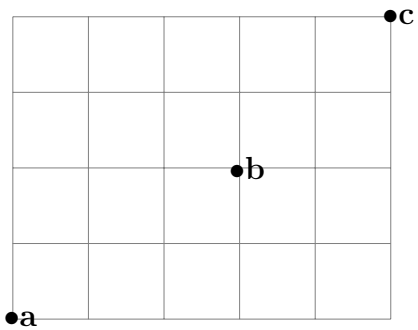

Figure 1: Use this figure to complete problem 4.

4. Use Figure 1 to answer the following questions. Routes between designated points can use only east steps and north steps.

   (a) *1 point* How many routes are there from **a** to **c**?

   (b) *1 point* How many routes from **a** to **c** pass through **b**?