

Problem Solving Activities Sections 1.4 & 1.5

1) Tom, Tanya, and Josh live on Main Street. Two of them live on the east side of the street, and one lives on the west side of the street. One house is painted red, another has a circular driveway, and a third house is made of brick. The brick house is on the west side of the street. Tom has a pick-up truck, which is parked in his circular driveway. Tanya lives across the street from Tom. Which house does Josh live in?

2) You are on the Island of Knights and Knaves, an island entirely populated with knights and knaves. Knights *always* tell the truth, and knaves *always* lie. You come across two inhabitants of the island. The first of them says, "At least one of us is a knave." What is each of these two people?

3) Sarah got on the school bus. At the stop after Sarah's, 7 students got on. Five students got on the bus at the next stop. At the last stop before the school, 9 students got on. When the bus arrived at school, 38 students got off. How many students were already on the bus when Sarah got on?

4. Chuck needs to get a pair of socks out of his drawer, but it is dark in the room because his wife Sue is still sleeping, and he doesn't want to wake her up. There are 22 socks in the drawer (all just thrown in there and not folded together) consisting of five pairs of black socks, four pairs of brown socks, and two pairs of blue socks. What is the smallest number of socks Chuck needs to grab to ensure he has a matching pair? Explain the reasoning that led you to your answer.

5. Sue wakes up later. It is still dark, and she leaves the lights off too because she thinks Chuck is still sleeping. She needs a pair of gloves. There are 22 gloves in the drawer (she really likes gloves!). There are five pairs of black gloves, four pairs of white gloves, and two pairs of pink gloves. What is the smallest number of gloves Sue needs to grab in order to ensure that she had a matching pair? Is your answer here the same as your answer to problem 4? Why or why not?

6. There were thirty-eight students enrolled in my Math 105 class in fall semester 2013, none of whom appeared to be over fifty years of age. Argue convincingly that at least two students in that class must have graduated high school in the same year. (Note: A statement such as, "I know people who were in your class then, and I know that Andy and Pedro graduated in the same year," is not a legitimate response to this problem.)