Math5900 Homework #1

Answer these questions on a separate sheet of paper. Make sure your work is neatly presented. Show all your work, with thorough explanations.

1. If the diagonals of a square are drawn in, how many triangles (of all sizes) are formed?

2. Susan has 10 pockets and 44 dollar bills. She wants to arrange the dollars so that there are a different number of dollars in each pocket. Can she do it? Explain.

3. On a balance scale, two spools and 1 thimble balance 8 buttons. Also, one spool balances one thimble and one button. How many buttons will balance one spool?

4. Think of a number. Add 10. Multiply by 4. Add 200. Divide by 4. Subtract your original number. Your result should be 60. Mathematically explain why that's true.

5. If possible, find an odd number that can be expressed as the sum of four consecutive counting numbers. If impossible, explain why.

6. Four men, one of whom committed a crime, said the following:
   Bob: Charlie did it.
   Charlie: Eric did it.
   Dave: I didn't do it.
   Eric: Charlie lied when he said I did it.

   (a) If only one of the statements is true, who was guilty?
   (b) If only one of the statements is false, who was guilty?

7. Three boxes contain black and white marbles. One box has all black marbles, one has all white marbles, and one has a mixture of black and white marbles. All three boxes are mislabeled. By selecting only one marble, determine how you can correctly label the boxes.

8. Ed and Lisa met on the street and had the following conversation:
   Ed: How old are your three children?
   Lisa: The product of their ages is 36.
   Ed: That's not enough information.
   Lisa: The sum of their ages is your house number.
   Ed: That's still not enough information.
   Lisa: The oldest child plays the piano.
   Ed: Now I know!

Assume the ages are whole numbers and that twins have the same age. How old are the children?

From Beckman book: section 1.2 (page 11) #1, 2, 5, 8, 10, 11