MATH213 HW 10

Due Wednesday, November 2
Solve five of the six problems below.

1-2. (This problem is counted as two problems.) Solve the nonhomogeneous recurrence relation $h_n = 5h_{n-1} - 4h_{n-2} - 6n$, $(n \geq 2)$ with the initial values $h_0 = -2/3$ and $h_1 = 1$.

3. Find the number of permutations of the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ in which the numbers 3, 6, and 9 are not in their natural positions.

4. At a party, 8 gentlemen check their hats. In how many ways can their hats be returned so that
(a) no gentleman receives his own hat?
(b) exactly one gentleman receives his own hat?

5. How many functions f from the set $\{1, 2, 3, 4, 5, 6, 7, 8\}$ to the set $\{1, 2, 3, 4\}$ are there
(a) that are onto functions?
(b) that are onto functions and $f(1) = 1$?

6. Determine whether the relation R on the set of all real numbers is reflexive, irreflexive, symmetric, antisymmetric, and/or transitive, where $(x, y) \in R$ if and only if
(a) $x - y$ is a rational number; (b) $x = 1$ or $y = 1$; (c) $xy \geq 0$; (d) $xy > 0$.
Which of these are equivalence relations?