Find the logical conclusion of the statements below:
People allergic to bananas are also allergic to oranges. Who is allergic to apples is not allergic to oranges.

HOMEWORK

1. Use truth tables to check if:
   (a) the following statements are equivalent: "If you do not clean up your room, you will be punished" and "Clean up your room, or you will be punished".
   (b) the following statements are equivalent: "If a student does not take the final exam, that student gets an F", "If the student does not get an F, that student must have taken the final exam"
   (c) $A \implies B$ is equivalent to $(\neg A) \vee B$
   (d) $A \implies B$ is equivalent to $(\neg B) \implies (\neg A)$ (the last statement is called a *contrapositive*).
   (e) $(\neg(A \implies B)) \iff (A \wedge (\neg B))$ (i.e. the *contradiction* of $A \implies B$).
2. Now let us neatly apply what we learned about the "if-then", i.e. $A \implies B$ statements for simple proofs:
   (a) Try to prove using the contrapositive that "if n is an integer and $5n + 2$ is even, then n is even"
   (b) Try to prove using the contradiction that "if n is an integer and $5n + 2$ is even, then n is even"
3. Let A and B be the propositions "The election is decided" and respectively "The votes have been counted". Write each of the following logical propositions as an English sentence.
   (a) $\neg A$
   (b) $(\neg A) \wedge B$
   (c) $(\neg B) \implies (\neg A)$
   (d) $(\neg B) \vee ((\neg A) \wedge B)$
4. For each of the following statements, write an English statement which describes the negation of that statement in the most direct way.
   (a) This week it will snow on Wednesday.
   (b) This week it will snow on Saturday and Wednesday.
   (c) If it snows on Saturday this week then it will not snow on Wednesday.
5. For each of the following Lewis Caroll puzzles: identify the propositions, express the statements as "if-then", and afterwards state the logical conclusion from the conditionals.
   (a) All unripe fruit are unwholesome. All these apples are wholesome. No fruit, grown in the shade, is ripe.
   (b) Colored flowers are always scented. I dislike flowers that are not grown in the open air. No flowers grown in the open air are colorless.
   (c) None of the unnoticed things, met with at sea, are mermaids. Things entered in the log, as met with at sea, are sure to be worth remembering. I have never met with anything worth remembering, when on a voyage. Things met with at sea, that are noticed, are sure to be recorded in the log.