Consider the following valid arguments.

1.   This number is rational or it is irrational.
      This number is not rational.
      ∴   This number is rational.

2.   a) $(f \wedge b) \rightarrow t$
      b) $m \wedge \neg t$
      c) $(\neg f \vee \neg b) \rightarrow e$
      d) $\therefore e$

3.   a) $(\neg p \vee q) \rightarrow r$
      b) $s \vee \neg q$
      c) $\neg t$
      d) $p \rightarrow t$
      e) $(\neg p \wedge r) \rightarrow \neg s$
      f) $\therefore \neg q$

4.   If my calculator is on the kitchen table, then I saw it at dinner. I was reading my
      Discrete Math book in the living room or I was reading it in the kitchen. If I was
      reading my Discrete Math book in the living room, then my calculator is on the
      coffee table. I did not see my calculator at dinner. If I was completing my
      crosswords in bed, then my calculator is on my bedside table. If I was reading
      my Discrete Math book in the kitchen, then my calculator is on the kitchen table.
      Therefore, my calculator is not on the coffee table.

5.   My cat *Pythagoras* lives a life without sin. *Pythagoras* is not happy. If
      Pythagoras lives without sin and wrestles with depression, then he is happy. If
      he does not wrestle with depression, then he will conquer France. Therefore,
      Pythagoras will conquer France.

6.   Math is fun and Logic is easy. If Math is fun or life is sad, then it is raining. It is
      cold. If life is easy then either it is not raining or it is not cold. Therefore, life is
      not easy.

7.   If my car is painted red, then it runs well. If my car is not painted red or it runs
      well, then it will make a loud noise. If my car makes a loud noise, it will smoke. If
      my car is clean, it will not smoke. Therefore, my car is not clean.

This is off a past exam:

8.   (20 pts) In 1997, the *Society for the Advancement of Domesticated Cats to the
      Throne of Planet Earth* posed the following argument to substantiate that a new
      world order should have a cat at the throne.

If cats believe in God, then they worship routinely and they live a monogamous life. Biologists have known for years that cats either don't worship anything and they are polygamous. But clearly by observation from us all, cats either believe in God or they are capable of forgiveness. It is just as clear that cats believe in God or they believe that they are more important than humans. If cats are capable of forgiveness and they believe that they are more important than humans, then they should rule the world. Consequently, cats should indeed rule the world!

Verify that the given argument is valid: first, assign a letter to each component, then provide the steps of the argument step by step (symbolically, of course) and explicitly provide the reason for each step (whether it is a hypothesis or one of our rules of inference/logical equivalences). I have provided you with the needed list of rules of inference and logical equivalences.