1. Write down the negation of the following statement: “No slow learners attend this school.”

2. Suppose I have a penny, a dime, and a dollar, and I say, “If you make a true statement, I will give you one of the coins. If you make a false statement, I will give you nothing.” What should you say to obtain the best coin?

3. What is wrong with the following “proof” of the statement 2=1?

   Let $x, y$ be real numbers, and suppose that $x = y$. This yields $x^2 = xy$, which implies that $x^2 - y^2 = xy - y^2$ by subtracting $y^2$ from both sides. Factoring yields $(x + y)(x - y) = y(x - y)$, and thus $x + y = y$. In the special case $x = y = 1$, we obtain $2 = 1$.

4. Show that the following statement is false: “If $a$ and $b$ are integers, then there are integers $m, n$ such that $a = m + n$ and $b = m - n$.” What can be added to the hypothesis of the statement to make it true?