1. True or False. If true, prove it. If false, then give a counterexample. A necessary condition for an integer to be divisible by 6 is that it be divisible by 2.

\( (P \text{ is a necessary condition for } q) \equiv (q \rightarrow p) \)

For this problem, \( P = \) the integer is divisible by 2
\( q = \) the integer is divisible by 6

So the problem asks:

\[ 6 \mid n \Rightarrow 2 \mid n \]

This is \( \text{True} \)

If \( 6 \mid n \), then \( n = 6k \) for some integer \( k \). Thus
\[ n = 2 \cdot 3k \] thus \( 2 \mid n \).

2. True or False. If true, prove it. If false, then give a counterexample. The sum of any two irrational numbers is irrational.

\( \sqrt{2} \) is irrational, \( -\sqrt{2} \) is irrational.

but \( \sqrt{2} + (-\sqrt{2}) = 0 \) which is rational.