Question 1

(a) Suppose \( n \in \mathbb{Z} \) is an integer. Write down the contrapositive of the following statement.

If \( 7n - 2 \) is even then \( n \) is even.

(b) Use proof by contraposition to prove the statement in part (a).

Question 2

If \( r \) and \( s \) are real numbers then their geometric mean is \( \sqrt{rs} \), the square root of their product.

Suppose that \( r \) and \( s \) are non-zero real numbers with geometric mean \( g \) where \( g \) is rational. Prove that \( r \) is rational if and only if \( s \) is rational.

\[ r \text{ is rational } \iff s \text{ is rational} \]