

For each of the following statements, determine which of the following methods of proof is most appropriate, and then prove the statement.

Proof Methods: *direct proof*, *contrapositive*, *contradiction*, *proof by cases*.

STATEMENT 1. Let $n \in \mathbb{Z}$. If $n^2 + 6n + 5$ is even, then n is odd.

STATEMENT 2. The sum of two rational numbers is rational.

STATEMENT 3. The difference of two rational numbers is rational.

STATEMENT 4. Let $n \in \mathbb{Z}$. Then $n^2 + 2$ is not divisible by 4.

STATEMENT 5. Every integer greater than 1 is divisible by at least one prime. (An integer is **prime** if it is greater than 1 and if it is only divisible by 1 and itself.)

STATEMENT 6. If the product of two real numbers is greater than 100, then at least one of the numbers is greater than 10.

STATEMENT 7. If $x \in (0, 2)$, then $4x - 2 \in (-2, 6)$.