Discrete Math
Quiz 9

Name:_____

You have 10 minutes to complete this quiz. You may not use any unauthorized sources and you may not communicate with others about the exam. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Prove Theorem A, a statement about the natural numbers, using one of the following strategies. Circle the strategy that best describes the strategy you are using. There are many possible answers to this question!

Direct Proof $\quad\boxed{\text{Proof of the Contrapositive}}\quad$ Proof by Contradiction

Theorem A. If n is even and $n = k^2$, then k is even.

Proof.

Assume that k is not even. This means that k is not divisible by the prime 2. But then k^2 is not divisible by 2. (A product is divisible by a prime if and only if one of the factors is divisible by the prime.) But if k^2 is not divisible by 2, then k^2 is not even. Hence either $n \neq k^2$ or n is not even.

$\square$

You may use the following definitions and theorem in your proof.

Definition. A natural number n is **even** if there exists some natural number m such that $n = 2m$. A natural number that is not even is called **odd**.

Theorem. If n is odd, then there exists an m such that $n = 2m + 1$.

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