Answers to Concept Quiz 4.1

1. **Principle of Mathematical Induction.** Let $P(n)$ be a statement for every positive integer n. Suppose that we want to prove that $P(n)$ is true for all positive integers n, that is, $\forall n \in \mathbb{N}(P(n))$ (Here, $\mathbb{N}$ starts with 1). If we show that Step 1:

   $P(1)$ is true.

   and Step 2:

   For every positive integer k, if $P(k)$ is true, then $P(k+1)$ is true.

   Then $P(n)$ is true for all positive integers n.

2. **Inductive Sets.** Give the definition of an inductive set.

   A subset T of the integers $\mathbb{Z}$ is an *inductive set* provided that for every integer k, if $k \in T$, then $k+1 \in T$.

   Can a finite, nonempty set of integers be an inductive set?

   No.

   Is the empty set, $\emptyset = \{\}$ an inductive set?

   Yes.

   Is the set of even integers an inductive set?

   No.