

Answers to Concept Quiz Sections 6.1-6.3

1. **Function.** Let A and B be sets. Give a correct definition of a *function* f from A to B , $f: A \rightarrow B$. Write in complete sentence(s).

A function f from A to B is a subset $f \subseteq A \times B$ such that for every element $a \in A$, there is a unique element $b \in B$ such that $(a, b) \in f$.

2. **Injection/Surjection.** Let A and B be sets and suppose that $f: A \rightarrow B$ is a function. Please define the following terms. Use complete sentences.

f is a surjection.

A function f from A to B is a surjection if for every $b \in B$, there is an $a \in A$ such that $f(a) = b$.

f is an injection.

A function f from A to B is an injection if for every $a, \alpha \in A$, if $f(a) = f(\alpha)$, then $a = \alpha$.

3. **More Injection/Surjection.**

Let $f: \mathbb{R}_+ \rightarrow \mathbb{R}$ be the function whose value at a nonnegative real number $x \in \mathbb{R}_+$ is \sqrt{x} .

Is f injective?

(✓) Yes

Is f surjective?

(✓) No

Is the function h with the same domain and codoman as f defined by $h(x) = \ln(x)$,

[✓] an injection?

[✓] a surjection?

[✓] a bijection?