Review Guide: Chapter 1

Variables and Mathematical Statements

- What are the two main ways variables are used? *(p. 1)*
- What is a universal statement? Give one example. *(p. 2)*
- What is a conditional statement? Give one example. *(p. 2)*
- What is an existential statement Give one example. *(p. 2)*
- Give an example of a universal conditional statement. *(p. 3)*
- Give an example of a universal existential statement. *(p. 3)*
- Give an example of an existential universal statement. *(p. 4)*

Sets

- What does the notation $x \in A$ mean? *(p. 7)*
- What does the notation $x \notin A$ mean? *(p. 7)*
- How is the set-roster notation used to define a set? *(p. 7)*
- What is the axiom of extension? *(p. 7)*
- What do the symbols **R**, **Z**, and **Q** stand for? *(p. 8)*
- What is the set builder notation? *(p. 8)*
- If S is a set and $P(x)$ is a property that elements may or may not satisfy, how should the following be read out loud: $\{x \in S \mid P(x)\}$? *(p. 8)*

Subsets

- If A and B are sets, what does it mean for A to be a subset of B? What is the notation that indicates that A is a subset of B? *(p. 9)*
- What does the notation $A \nsubseteq B$ mean? *(p. 9)*
- What does it mean for one set to be a proper subset of another? *(p. 9)*
- How are the symbols $\subseteq$ and $\in$ different from each other? *(p. 10)*

Cartesian Products

- What does it mean for an ordered pair (a, b) to equal an ordered pair (c, d)? *(p. 11)*
- Given sets A and B, what is the Cartesian product of A and B.? What is the notation for the Cartesian product of A and B? *(p. 11)*
- What is the Cartesian plane? *(p. 12)*

Relations

- What is a relation from a set A to a set B? *(p. 14)*
- If R is a relation from A to B, what is the domain of R? *(p. 14)*
- If R is a relation from A to B, what is the co-domain of R? *(p. 14)*
- If R is a relation from A to B, what does the notation $x\,R\,y$ mean? *(p. 14)*
- How should the following notation be read: $x \not R\, y$? *(p. 14)*
- How is the arrow diagram for a relation drawn? *(p. 16)*

Functions

- What is a function F from a set A to a set B? *(p. 17)*
- What are less formal/more formal ways to state the two properties a function F must satisfy? *(p. 17)*
- Given a function F from a set A to a set B and an element x in A, what is $F(x)$? *(p. 17)*
- What is the squaring function from $\mathbf{R}$ to $\mathbf{R}$? *(p. 20)*
- What is the successor function from $\mathbf{Z}$ to $\mathbf{Z}$? *(p. 20)*
- Give an example of a constant function. *(p. 20)*
- What is the difference between the notations f and $f(x)$?. *(pp. 17, 20)*
- If f and g are functions from A to B, what does it mean for f to equal g? *(p. 20)*