Name: _____

1. Set Operations. Let $\mathbb{R}$ be the set of all real numbers and let $\overline{A}$ indicate the complement of the set A. We define the sets A, B and C as follows:

$$A = \{\ x \in \mathbb{R} \mid 5 \leq x \leq 13\ \} \qquad B = \{\ x \in \mathbb{R} \mid 2 < x < 11\ \} \qquad C = \{\ x \in \mathbb{R} \mid 9 < x \leq 19\ \}$$

Describe the following sets:

a. $A \cup B$

b. $A \cap C$

c. $\overline{A} \cup \overline{B}$

d. $A \cap \overline{B}$

e. $\overline{A \cup C}$

2. Graph Definition. Consider a graph G. Let X be a subset of the vertices in G. We say that X is a *dominating set* if every vertex in G is either already in X or is connected by an edge to a vertex that is in X.

a. In the graph below, find a dominating set X with 4 vertices. List the vertices here:

$X = \{$ $\}$

b. Briefly explain why these 4 vertices satisfy the definition of dominating set.

c. Does this graph have a dominating set with fewer than 4 vertices? Explain your answer.