Math 105: Finite Mathematics

Homework 2: Due Jan 29, 2008

January 22, 2008

1 Set Theory

1.1

You are given the following sets of resources from **Settlers of Catan**.

- $R = \{Brick, Lumber\}$

- $S = \{Brick, Lumber, Wheat, Wool\}$

- $C = \{Ore, Wheat\}$

- $D = \{Ore, Wheat, Wool\}$

Given that the five items $Brick, Lumber, Wheat, Wool$ and Ore comprise all the possible resources, what elements are in the following sets?

1.1.1

$R \cup C$

1.1.2

$S \cap C$

1.1.3

$R \cap D$

1.1.4

C'

1.1.5

$S \cup D$

1.1.6

$(C \cup R) \cap S$

1.2

Using the same sets from above, which of the following assertions are true?

1.2.1

$R \subset S$

1.2.2

$C \cup D = D$

1.2.3

$D \subset (S \cup R)$

2 Venn Diagrams

2.1

Draw one Venn Diagram to illustrate the overlap of the following sets, and denote the size of each set.

2.1.1

A standard deck of cards.

2.1.2

Cards with the suit Diamonds.

2.1.3

Cards with a face.

2.1.4

Cards with value less than 7.

2.2

Illustrate the following equality through Venn diagrams by drawing the subsets listed below:
$$A \cup (B \cap C) = (A \cap B) \cup (A \cap C)$$

2.2.1

$B \cap C$

2.2.2

$A \cap B$

2.2.3

$A \cap C$

2.2.4

$A \cup (B \cap C)$

2.2.5

$(A \cap B) \cup (A \cap C)$