

**ECONOMICS 207**  
**SPRING 2007**  
**LABORATORY EXERCISE 1**

**Problem 1.** Consider the following six sets.

$$A = \{1, 2, 4\}$$

$$B = \{2, 4, 5\}$$

$$C = \{1, 3, 5\}$$

$$D = \{1, 2, 3, 4, 5, 6, 8\}$$

$$E = \{1, 2, 4, 6, 8, 10\}$$

$$F = \{0, 2, 3, 4, 6, 7, 8\}$$

$$X = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

a. A is a subset of which other sets?

b. What is  $A \cap B$ ?

c. What is  $C \cap F$ ?

- d. What is  $A \cap B \cap C$ ?
- e. What is  $A \cup (B \cap D)$ ?
- f. What is  $(A \cup B) \cap D$ ?
- g. What is  $(A \cup B) \cap (A \cup D)$ ?
- h. What is  $A \cap (B \cup D)$ ?
- i. What is  $(A \cap B) \cup (A \cap D)$ ?
- j. What is  $(A \cap B) \cup D$ ?
- k. What is  $(A \cup D) \cap (B \cup D)$ ?
- l. What is  $(A \cap D) \cup (B \cap D)$ ?

m. Given  $X$ , what is  $A^C$ ?

n. Given  $X$ , what is  $(A \cup B)^C$ ?

o. Given  $X$ , what is  $(A \cap B)^C$ ?

p. What is  $D \setminus E$ ?

q. What is  $F \setminus A$ ?

**Problem 2.** Consider the following sets.

$$A = \left\{ \frac{a}{b} : a \in \{0, 1, 2, 3, 4\}, -1 \leq b \leq 3 \text{ and } b \in \text{integers}, b \neq 0 \right\}$$

$$B = \{ \{x, y\} : x + y = 5, x < 3 \text{ and } x \in \text{natural numbers}, y \leq 7 \}$$

$$C = \{ \{x, y\} : x + y = 5, x < 10 \text{ and } x \in \text{natural numbers}, y \leq 7 \text{ and } y \in \text{integers} \}$$

$$D = \{ \{x, y\} : x + 2y = 12, x < 10 \text{ and } x \in \text{natural numbers}, y \leq 7 \text{ and } y \in \text{integers} \}$$

$$E = \{ \{x, y\} : x + 2y = 12, x < 8 \text{ and } x \in \text{integers}, y \leq 7 \}$$

$$F = \{ \{x, y\} : 4x + y = -1, x < 2 \text{ and } x \in \text{integers}, y \leq 7 \}$$

$$G = \{ \{x, y\} : x + y = 5, x < 2 \text{ and } x \in \text{integers}, y \leq 7 \}$$

$$X = \{ \{x, y\} : |x| < 10, |y| < 5 \}$$

- a. List the elements of each of the sets: A, B, C, D, E, F, G, and X.

b. What is  $A \cap B$ ?

c. What is  $B \cap C$ ?

d. What is  $B \cap D$ ?

e. What is  $B \cap E$ ?

f. What is  $E \cap F$ ?

g. What is  $E \cap G$ ?

h. What is  $E \cap F \cap G$ ?

**Problem 3.** Simplify the following fractions.

a.  $\frac{14}{16}$

b.  $\frac{105}{77}$

c.  $\frac{252}{462}$

d.  $\frac{693}{2520}$

e.  $\frac{79002}{149625}$

f.  $\frac{15015}{35343}$

**Problem 4.** Complete the following operations.

a.  $\frac{14}{16} + \frac{3}{4}$

b.  $\frac{\frac{105}{77}}{\frac{5}{7}}$

c.  $\frac{16}{21} + \frac{3}{7}$

d.  $\frac{17}{30} + \frac{7}{8}$

e.  $\frac{6}{7} + \frac{29}{42} + \frac{5}{6}$

f.  $\frac{7}{8} + \frac{5}{24} + \frac{1}{6} + \frac{15}{36}$