MAT 147
Homework # 1
Due: Thursday, September 14th, 2017

Directions: Write careful solutions to each of the following problems on separate sheets of paper. (You may put more than one solution on the same sheet of paper, if you have enough room). Be sure to show all of your work. You are allowed to talk to your classmates about these problems. If you do receive help from a classmate, be sure to give them credit by noting their name on your solution. All solutions should be written in your own words, regardless of if you've received help. Partial credit is available. Each problem is worth five points.

1. Write the following sets using the "roster method". That is, write the sets in list form.

(a) $A = \{x \in \mathbb{N} : -13 \leq x \leq 5\}$
(b) $B = \{x \in \mathbb{N} : x \text{ appears in the decimal expansion of } 375/999\}$
(c) $C = \{x : x \text{ is the name in English of a month of the year}\}$
(d) $D = \{x : x \text{ is a prime number divisible by 2}\}$
(e) $E = \{x : x \text{ is an integer less than 1}\}$

2. List the next three elements in each of the following sets.

(a) $\{1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8} \ldots\}$
(b) $\{1, 2, 3, 5, 8, 13, \ldots\}$
(c) $\{-1, 3, -9, 27, \ldots\}$

3. Given the following sets, answer either true or false to each of the statements (a) - (h).

$$A = \{4, 8, 12, \ldots, 96, 100\} \qquad B = \{-1, 0, 1, 2, 3, 4, 5, 6\} \qquad C = \emptyset$$

$$D = (-\infty, -7] \qquad E = [-1, 6] \qquad F = (-1, \infty)$$

(a) $-7 \in D$
(b) $B \subset E$
(c) $0 \in A$
(d) $-1 \in F$
(e) $0 \in C$
(f) $C \subset A$
(g) $\{8\} \in A$
(h) $E \subset F$

4. The **power set** of a given set A is the set of all subsets of A, and is denoted by $\mathscr{P}(A)$. Find the set $\mathscr{P}(\{\emptyset, \{\emptyset\}\})$.