

## Math 365 Lecture Notes Section 2.1 – Describing Sets

### ★ Describing Sets

#### Definitions:

- 1) Set –
- 2) Element –
- 3) Well Defined Set –
- 4) Equal Sets –
- 5) Set Builder Notation –
- 6) The cardinality of a set –
- 7) Finite set –
- 8) Infinite set –
- 9) Empty set (null set) –
- 10) Subset –
- 11) Proper subset –
- 12) Universal set –
- 13) Complement of a set –
- 14) Venn diagram –
- 15) One-to-one correspondence –



**Problem 6:** Consider the following sets and answer the questions that follow.

$$A = \{1, 2, 3, 4, 5\}, \quad B = \{2x + 1 \mid 0 \leq x \leq 4 \text{ and } x \text{ is a whole number}\} \quad C = \{2, 4\}$$

1. True or False

- |                  |                    |                      |
|------------------|--------------------|----------------------|
| a) $A \subset B$ | b) $C \subseteq A$ | c) $2 \in B$         |
| d) $2 \in A$     | e) $1 \notin A$    | f) $A = B$           |
| g) $A \sim B$    | h) $n(A) = 5$      | i) $\emptyset \in A$ |

- Which of the sets above have a one-to-one correspondence?
- How many subsets are within  $B$ ?
- Find  $n(B)$ .
- Find the universal set.
- Find  $B^c$ .
- Draw a Venn diagram that represents the sets above.

**Problem 7:** Given  $B = \{a^2 - b^2 \mid a = 2 \text{ or } 3, \text{ and } b = 0, 1, \text{ or } 2\}$

	0	1	2
2			
3			

**Fundamental Counting Principle**

If event  $M$  can occur in  $m$  ways, and event  $N$  can occur in  $n$  ways,  
 events  $M$  and  $N$  can occur in  $m \cdot n$  ways.

**Problem 8:** How many different ways can you order a double dip ice cream cone at 31 Flavors<sup>®</sup>, if the layers must be different flavors?



**Problem 9:** Given set  $A = \{\heartsuit, \spadesuit, 1, \text{🍰}, \text{🔑}, \text{✉}\}$ . List all subsets of  $A$ .