

Name \_\_\_\_\_

University of Baltimore

Math 321: Discrete Structures

Date \_\_\_\_\_

Chapter 1(D): Sets, Logic & Functions

BECAUSE THIS IS A GRADED ASSIGNMENT, YOU MAY NEITHER GIVE NOR RECEIVE HELP. Answer each question as indicated. **Think** first, then write. **Show all your work**, and remember to **check** your answers! Place your answers in the spaces provided.

For #1a and #1b, let  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ ,  $A = \{x : x \text{ is prime}\}$ ,  $B = \{1, 5, 8, 10\}$ .

Note that the entire universe consists of the elements of  $U$ .

1a. What is the cardinality of the *power set* of  $B$ ?

extra credit: On the back of this page, list the power set of  $B$ .

1b. List the elements in  $\overline{A} \cup B$ .

2. Use the membership table below to prove that  $(R - T) \cap (S - T) = (R \cap S) - T$  for all sets  $R$ ,  $S$  and  $T$ .

$R$	$S$	$T$	
1	1	1	
1	1	0	
1	0	1	
1	0	0	
0	1	1	
0	1	0	
0	0	1	
0	0	0	

3. State the converse, contrapositive and inverse of the following: If I am a plant, then I am tall.

converse:

contrapositive:

inverse:

4. Use the truth table below to determine whether or not  $(p \rightarrow q) \vee (r \rightarrow q)$  and  $(p \vee r) \rightarrow q$  are logically equivalent.

$p$	$q$	$r$	
T	T	T	
T	T	F	
T	F	T	
T	F	F	
F	T	T	
F	T	F	
F	F	T	
F	F	F	