

## Quiz 2

D Term, 2015

Show all work needed to reach your answers.

High: 20
Median: 18
Low: 8

1. (4 points) If  $Y = \{1, \pi, \sqrt{7}\}$ , please find the power set of  $Y$ .

4  $\mathcal{P}(Y) = \{\emptyset, \{1\}, \{\pi\}, \{\sqrt{7}\}, \{1, \pi\}, \{1, \sqrt{7}\}, \{\pi, \sqrt{7}\}, Y\}$

2. (8 points) Suppose that  $A$ ,  $B$  and  $C$  are all subsets of some universe  $U$ . Please show that

$C \cap (A - B^c) \subset B - A^c$  (+1)  
Suppose  $x \in C \cap (A - B^c)$ . Then  $x \in C$  and  $x \in A - B^c$ . So by definition  
of set subtraction,  $x \in A \cap (B^c)^c = A \cap B$ . (+2) But then  
 $x \in B \cap A = B \cap (A^c)^c = B - A^c$ , (+2) which implies that  
 $C \cap (A - B^c) \subset B - A^c$ .

3. (8 points) Suppose that there are a sequence of statements  $\{S_1, S_2, S_3, \dots, S_n, \dots\}$ . If one is to prove all of these statements true by induction, what two steps must be proven?

(1): Prove that  $S_1$  is true. (+4)

(2): Assume that  $S_n$  is true, then use this assumption to prove that  $S_{n+1}$  is true. (+4)