1050 Quiz **QL05**, Jan 24, 2006. NAME:_____. Grade:_____ (____/10)
Closed book. Individual test. Do not look at other people's work. Please write legibly.

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1) What is the power set of the set { 0, 1 }?

Answer: $\{\phi, \{0\}, \{1\}, \{0,1\}\}$

2) What can you say about the sets A and B if we know that $A - B = B - A$?

Answer: $A = B$
(Can be proven by contradiction.)

3) What can you say about the sets A and B if we know that $A \oplus B = A$?

Answer: $B = \phi$
(Can be proven by contradiction.)

4) a) Find $f \circ g$ where $f(x) = x^2 + 1$ and $g(x) = x + 2$ are functions from **R** to **R**.

Answer: $f \circ g(x) = (x+2)^2 + 1$

b) Find $g^{-1}(\{0\})$ where $g(x) = \lfloor x \rfloor$ is a function from **R** to **R**.

Answer: [0,1)
(I.e., the set of all real numbers that have a floor of 0 is everything from 0 to 1, not including 1).

5) Show that if A and B are sets, then $A - B = A \cap \overline{B}$

Answer:
$$\begin{aligned} A - B &= \{x : x \in A \wedge x \notin B\} \\ &= \{x : x \in A \wedge x \in \overline{B}\} = A \cap \overline{B} \end{aligned}$$