This homework assignment is due on 10/09/12 at the beginning of class. Write all answers (and any necessary work) on the provided answer sheet. Clearly identify your final answers.

1. Use the following sets to answer the true/false questions. When finding complements of sets, assume sets $A, B, C, D,$ and $E$ are subsets of the universal set $U_1$ and sets $F, G,$ and $H$ are subsets of the universal set $U_2$. Otherwise, just view sets $A-H$ as a group of sets in one big universal set.

$U_1 = \{ x | x$ is a letter in the alphabet$\}$
$U_2 = \{ 0, 1, 2, \ldots 10 \}$
$A = \{ a, b, c \}$
$B = \{ a, e, i, o, u \}$
$C = \{ d, e, g, h, z \}$
$D = \{ b, c, a \}$
$E = \{ w, x, y, z \}$
$F = \{ 0, 2, 4, 6, 8 \}$
$G = \{ 1, 2, 3, 4, 5 \}$
$H = \{ 1, 2, 7, 8 \}$

True or False? You MUST write the ENTIRE word TRUE or FALSE to receive credit on these.

(a) $A = D$
(b) $\emptyset \in F$
(c) $B \subseteq U_1$
(d) $F^C = \{ x | x$ is an odd integer between 0 and 10$\}$
(e) $B^C \cap C = \{ d, g, h, z \}$
(f) $G^C \cup F = \{ 0, 2, 4, 6, 7, 8, 9, 10 \}$
(g) $G \subseteq U_2$
(h) $\emptyset \subset E$
(i) $E$ has 16 proper subsets
(j) $A \cup (B \cap E)^C = U_1$
(k) $\{ 3 \} \in G$
(l) $2 \in F$
(m) $\emptyset = \{ \emptyset \}$
(n) $D$ has 8 subsets
(o) $A \subseteq D$
(p) $\{ w, x \} \subseteq E$
(q) $C^C$ has 2,097,152 subsets
(r) $A \cup B = \{ a \}$
(s) $H \subset G$
(t) $n(B \cup F) = 10$
(u) $\{ a, b \} \notin A$
(v) $(H \cap F) \subseteq G^C$
(w) $\{ h, o, w, d, y \} \subset U_1$
(x) $\emptyset = \{ \}$
(y) $n(C \cup H) = 0$
(z) $U_1 + U_2 = 37$

For Questions #2-4, shade a Venn diagram (with similar orientation to the one given to the right) which represents the given set. You will have a new Venn diagram for each numbered question.

2. $B \cap C$

(2 points)
3. $(C^C \cup A) \cap B$

(2 points)
4. $A^C \cup (B \cap C^C)$

(2 points)
5. Given $n(U) = 100, n(A^C) = 55, n(B) = 35$, and $n(A \cup B) = 65$, find $n(A \cap B^C)$. 
(4 points)
6. A survey of 130 people was conducted.
   \( S \) is the set of people surveyed who like 70s music.
   \( E \) is the set of people surveyed who like 80s music.
   \( N \) is the set of people surveyed who like 90s music.

Use the information given to fill in each region of a Venn diagram (with orientation similar to the one below) with the number of people surveyed who would be located in the region.

- 20 said they liked music from all three decades
- 25 said they liked music from the 80s and 90s
- 30 said they liked music from the 70s and 80s, but not the 90s
- 26 said they liked music from the 70s and 90s
- 55 said they liked music from the 80s, but not the 90s
- 66 said they liked music from the 70s
- 38 said they liked music from the 70s or 90s (or both), but not the 80s