This is an 80% examlet. Indicate if you have special permission to take it for 100%. ☐

CS 173 (B), Spring 2015, Make-Up Examlet Part B

NAME:	NETID:

Discussion Section: BDA:1PM BDB:2PM BDC:3PM BDD:4PM BDE:5PM

1. Let α be a positive integer. How many solutions does the equation $x + y + z = 0$ have in which x, y, z are integers greater than or equal to $-\alpha$? [5 points]

☐ A. $\binom{\alpha+2}{2}$

☐ B. $\frac{\alpha(\alpha+1)}{2}$

☑ C. $\binom{3\alpha+2}{2}$

☐ D. $\alpha^3 - \alpha^2 + \alpha - 1$

☐ E. None of the above.

2. Define a relation # over $\mathbb{Z}$ as follows. For $x, y \in \mathbb{Z}$, $x\#y$ holds if and only if $5x \equiv y \pmod 4$. Which of the following are correct? [5 points]

☐ A. # is a partial order. ⟅1 point for each of the first 4 choices; 1 extra point for getting B,C,D correct (equivalence).⟆

☑ B. # is reflexive.

☑ C. # is transitive.

☑ D. # is symmetric.

☐ E. None of the above.

3. Let S, T be finite sets. Choose all the correct statements. [6 points]

☑ A. $|S \cup T| = |S - T| + |T - S| + |S \cap T|$ ⟅1 point for each option.⟆

☑ B. $|S \cup T| = |S \cap T| \quad \leftrightarrow \quad S = T$

☐ C. $(S - T) \cup (T - S) = S \cup T$

☐ D. $S - T = \emptyset \quad \leftrightarrow \quad S = T$

☑ E. $S = S \cap T \quad \leftrightarrow \quad S - T = \emptyset$

☐ F. $(S - T) \cup S = S \quad \leftrightarrow \quad T \subseteq S$