

Section 8.5

Ex. 8.

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |A \cap B \cap C| + |A \cap B \cap C|$$

$$= 70 - 64 - 94 - 58 + 26 + 28 + 22 - 14 = 116$$

Section 8.6

Ex. 12.

$\{1, 2, 3, 4\}$: derangements: $\{2, 1, 4, 3\}$, $\{2, 3, 4, 1\}$, $\{2, 4, 1, 3\}$,
 $\{3, 1, 4, 2\}$, $\{3, 4, 1, 2\}$, $\{3, 4, 2, 1\}$,
 $\{4, 1, 2, 3\}$, ~~$\{4, 2, 1, 3\}$~~ $\{4, 3, 1, 2\}$ $\{4, 3, 2, 1\}$

Section 9.1

Ex. 6.

- (a) $x+y=0$: not reflexive, symmetric, not antisymmetric, not transitive
- (b) $x \neq y$: reflexive, symmetric, not antisymmetric, transitive
- (c) $x-y$ is a rational number: reflexive, symmetric, not antisymmetric, transitive
- (d) $x=2y$: not reflexive, not symmetric, antisymmetric, not transitive
- (e) $xy \geq 0$: reflexive, symmetric, not antisymmetric, transitive not transitive
- (f) ~~x and y are both negative or both nonnegative:~~
~~reflexive, symmetric, not antisymmetric, transitive~~
- (f) $xy=0$: not reflexive, symmetric, not antisymmetric, not transitive
- (g) $x=1$: reflexive, not symmetric, antisymmetric, not transitive
 not
- (h) $x=1$ or $y=1$: not reflexive, not symmetric, not antisymmetric, not transitive