

Math 231 HW #9

Section 6.1 #5a, 12h, 19ab, 24fg, 33

$$C \subseteq D$$

6.1 #5a $\{n \in \mathbb{Z} \mid n = 6r - 5 \text{ for } r \in \mathbb{Z}\} \subseteq \{m \in \mathbb{Z} \mid m = 3s + 1 \text{ for } s \in \mathbb{Z}\}$

PF Take $n \in C$, will show $n \in D$.

Since $n \in C$ we have $n = 6r - 5$

$$\text{so } n = 6(r-1) + 6 - 5$$

$$= 6(r-1) + 1$$

$$= 3(2(r-1)) + 1$$

$\Rightarrow 2(r-1) \in \mathbb{Z}$, so $n \in D$.

6.1 12h $A = [-3, 0]$ $B = (-1, 2)$

$$A^c \cup B^c = ((-\infty, -3) \cup (0, \infty)) \cup ((-\infty, -1] \cup [2, \infty))$$

$$= (-\infty, -1] \cup (0, \infty)$$

6.1 19ab $A_i = \{i, i^2\}$

a) $A_1 \cup A_2 \cup A_3 \cup A_4 = \{1, 2, 3, 4, 9, 16\}$

b) $A_1 \cap A_2 \cap A_3 \cap A_4 = \emptyset$

6.1 24fg $W_i = (i, \infty)$

f) $\bigcup_{i=0}^{\infty} W_i = (0, \infty)$

g) $\bigcap_{i=0}^{\infty} W_i = \emptyset$

6.1 33

a) $\mathcal{P}(\emptyset) = \{\emptyset\}$

b) $\mathcal{P}(\mathcal{P}(\emptyset)) = \{\emptyset, \{\emptyset\}\}$

c) $\mathcal{P}(\mathcal{P}(\mathcal{P}(\emptyset))) = \{\emptyset, \{\emptyset\}, \{\{\emptyset\}\}, \{\emptyset, \{\emptyset\}\}\}$