Will Gasser

4.1.1

a.) True $27 = 3^3$

b.) False $\sqrt{27} \neq$ integer

c.) True $\sqrt{100} = 10$

d.) False ~~$-3 \in \mathbb{N}$~~

4.1.3

a.) True

b.) True

c.) False

d.) True

4.2.1

a.) True

b.) True

c.) False

d.) False

4.3.1

a.) $A \cup B = \{-12, -5, -3, 0, 1, 4, 6, 17\}$

b.) $A \cap B = \{1, 4\}$

c.) $A \cap C = \{-3, 1, 17\}$

d.) $A \cup (B \cap C) = \{-5, -3, 0, 1, 4, 17\}$

4.4.4

a.) false $A \cup B = \{\} \rightarrow 11 = 0$

b.) True $\{1, 2\} \subset P(A)$ ✓

c.) True

d.) False ~~$\{0, -1\}$~~

4.5.1

a.) Complement Law: $\bar{A} \cup A = U$

b.) Absorption Laws (Demorgan's before)

c.) De Morgan's Laws

d.) Double Complement

4.5.2

a.) $(\bar{A} \cap C) \cup (A \cap C)$

$(\bar{A} \cup (\bar{A} \cap A)) \cap C$ Distributive

$(\emptyset) \cup C$ complement law

C identity law

b.) $(B \cup A) \cap (\bar{B} \cup A) = A$

$A \cup (B \cap \bar{B})$ Distributive

$A \cup (\emptyset)$ complement

A identity

c.) $\overline{A \cap \bar{B}}$

$\bar{A} \cup \bar{\bar{B}}$ Demorgan's

$\bar{A} \cup B$ Double complement

d.) $\bar{A} \cap (A \cup B)$

$(\bar{A} \cap A) \cup (\bar{A} \cap B)$ Distributive

$(\emptyset) \cup (\bar{A} \cap B)$ complement

$\bar{A} \cap B$ identity

4.6.1

a.) (tall, foam, non-fat)

b.) (foam, tall, non-fat)

c.) {(foam, nonfat), (foam, whole), (no-foam, non-fat), (no-foam, whole)}

4.6.3

a.) False

b.) True

c.) True

d.) True

4.7.1

a.) No, Distrin 2, $2 \in A, B$

b.) No, $X = 6$ and $X = 1$, $D \not\subset B \cup C$

c.) Yes