3.1.1 A)

a) True $27 \in A$ b) False $27 \notin B$ c) True $100 \in B$ d) False $E \nsubseteq C$ e) $E \subseteq A$ True

f) $A \not\subset C$ False g) $E \in A$ ~~True~~ False

3.1.2 B)

a) False $15 \subset A$ b) ~~False~~ True $\{15\} \subset A$ c) True $\emptyset \subset A$ d) True $A \subseteq A$ e) $\emptyset \in B$ False

3.1.5 C)

b) $\{3, 6, 9, 12 \ldots\} = \{x \in \mathbb{N} : x \geq 3$ and x is an integer multiple of $3\}$
The cardinality is infinite.

d) $\{0, 10, 20, 30, \ldots, 1000\} = \{x \in \mathbb{N} : x \leq 1000$ and x is an integer mulitple of $10\}$
The cardinality is ~~100~~ 101.

3.2.1 D)

a) $2 \in X$ True b) $\{2\} \subseteq X$ True c) $\{2\} \in X$ False d) $3 \in X$ False e) $\{1,2\} \in X$ True

f) $\{1,2\} \subseteq X$ True g) $\{2,4\} \subseteq X$ True h) $\{2,4\} \in X$ False i) $\{2,3\} \subseteq X$ False

j) $\{2,3\} \in X$ False k) $|X| = 7$ False

3.2.4

b) Let $A = \{1,2,3\}$. What is $\{X \in P(A) : 2 \in X\}$

$P(A) = \{ \emptyset, \{2\}, \{1\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\} \}$

$\boxed{\{\cancel{x} \in P(A)\} \quad \{2, \{PA\}\} \times}$

$\boxed{\{x \in P(A) : 2 \in x\} = \{\{2\}, \{1,2\}, \{2,3\}, \{1,2,3\}\}}$ ✓

3.3.1

c) $A \cap C = \{-3, 1, 17\}$ ✓

D) $A \cup (B \cap C) = \{ \cancel{18}\ -5, -3, 0, 1, 4, 17\}$ ✓ $\cup$

$\{-5, 1\}$

E) $A \cap B \cap C = \{1\}$ ✓

$$\begin{array}{r} {}^{2} \\ 25 \\ \times 5 \\ \hline 125 \end{array}$$

3.3.3

$\emptyset$ $\quad\quad$ $\{1\}$ ✓

a) $\bigcap_{i=2}^{5} A_i = \{1, 5, 25\}$ × $\quad$ or $A_i\ \{x \in N : 0 \leq x \leq 2$, and x is ~~a power of~~ an exponent of $5\}$

$\{1, 3, 16, 125\}$ ✗

b) $\bigcup_{i=2}^{5} A_i = \{1, 3, 16, 125\}$ $\quad A_2 \cup A_3 \cup A_4 \cup A_5 \quad \{1, 2, 3, 4, 9, 16, 25\}$

e) $\bigcap_{i=1}^{100} C_i \quad \{x \in R : -1/100 \leq x \leq 1/100\}$ ✓

f) $\bigcup_{i=1}^{100} C_i \quad \{x \in R : -1 \leq x \leq 1\}$ ✓

$A_2 \quad \{1, 2, 4\}$ $\quad A_3 \quad \{1, 3, 9\}$

$A_i = \{i^0, i^1, i^2\} i^3$

$\bigcap_{i=2}^{5} A_i$

3.3.4

(b) $P(A \cap B)$

$A = \{a, b\}$

$B = \{b, c\}$

$A \cap B = \{b\}$

$P(\{b\}) = 2$

$P(A \cup B)$

$A = \{a, b\}$

$B = \{b, c\}$

$A \cup B = \{a, b, c\}$

$P(A \cup B) = 2^3 = 8$

$\boxed{\{\emptyset, \{a\}, \{b\}, \{c\}, \{a,b\}, \{a,c\}, \{b,c\}, \{a,b,c\}\}}$ ✓

d) $P(A) \cup P(B)$

$P(A) = \{\emptyset, \{a\}, \{b\}, \{a,b\}\}$

$P(B) = \{\emptyset, \{b\}, \{c\}, \{b,c\}\}$

$\boxed{P(A) \cup P(B) = \{\emptyset, \{a\}, \{b\}, \{c\}, \{a,b\}, \{b,c\}\}}$ ✓

3.5.1

b) $B \times A \times C$

$\boxed{\{\text{foam}, \text{tall}, \text{whole}\} \in B \times A \times C}$ ✓

c) ✓

{(foam, non-fat),
(foam, whole)
(no-foam, non-fat),
no-foam, whole}

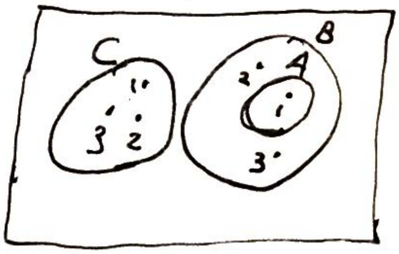
3.5.3

b) $Z^2 \subseteq R^2$: True ✓

c) $Z^2 \cap Z^3 = \emptyset$: True ✓

e) For any three sets A, B, and C, if $A \subseteq B$, then $A \times C \subseteq B \times C$

True ✓



3.5.6

d) xy : where $x \in \{0\} \cup \{0\}^2$ and $y \in \{1\} \cup \{\{1\}^2\}$

$x = \{\{0\}, \{0,0\}\}$

$y = \{\{1\}, \{1,1\}\}$

$x = \{0, 00\}$

$y = \{\cancel{01}, \cancel{10}, 11\}$

$xy = \{\cancel{1}, 0, 1, 00, 11\}$ x

~~$xy = 000111$~~

$xy =$

$x = \{0, 00\}$

$y = \{1, 11\}$

$\boxed{xy = \{01, 011, 001, 0011\}}$

e) $\{xy : x \in \{aa, ab\}$ and $y \in \{a\} \cup \{a\}^2\}$

$x = \{aa, ab\}$

$y = \{a, aa\}$ x

$xy = \{a, aa, ab\}$

$x = \{aa, ab\}$

$y = \{a\} \cup \{a\}^2 = \{a, aa\}$

$x = \{aa, ab\}$

$y = \{a, aa\}$

$\boxed{xy = aaaab}$ x

$\boxed{xy = \{aaa, aaaa, aab, aaab\}}$

3.5.7

c) $(A \times B) \cup (A \times C)$

$(A \times B) = \{ab, ac\}$

$(A \times C) = \{aa, ab, ad\}$

$\boxed{(A \times B) \cup (A \times C) = \{aa, ab, ac, ad\}}$

d) $(A \times B) \cap (A \times C)$

$\boxed{(A \times B) \cap (A \times C) = \{ab\}}$

f) $P(A \times B)$

$A \times B = \{ab, ac\}$

$P(A \times B) = \{\emptyset, \{ab\}, \{ac\}, \{aa\}, \{ba\}, \{c,a\}, \{bc\}, \{cb\}\}$

g) $P(A) \times P(B)$

$P(A) = P(\{a\}) = \{\emptyset, \{a\}\}$

$P(B) = P(\{b,c\}) = \{\emptyset, \{b\}, \{c\}, \{bc\}\}$

$P(A) \times P(B) = \{(\emptyset,\emptyset), (\{\emptyset, \{b\}), (\emptyset, \{c\}), (\emptyset, \{bc\}), (\{a\},\emptyset), (\{a\},\{b\}), (\{a\},\{c\}), (\{a\}, \{bc\})\}$

Create page
for Ms. Longmore
Selling Peanut Punch
Irish Moss
Sorel
Ginger Beer

kafka → Apache ⊓ → JSON → Trans ElasticSea
Secret key
Elastic Search | Graphs
Docker Zipkin
Mobile
Not Supporting
Zipkin

3.5.7

f) $P(A \times B)$

$A = \{a\}$

$B = \{b, c\}$

$A \times B = \{ab\}, \{ac\}$

$P(A \times B) = \{ \{ab\}, \{ac\}, \{ba\}, \{bc\} \}$ ×

$\boxed{P(A \times B) = \{\{\emptyset\}, \{ab\}, \{ac\}, \{ab, ac\}\}}$

This is a Basket

$(a, b) = ab =$ orange

$(a, c) = ac =$ apple

g) $\underbrace{P(A)} \times \underbrace{P(B)}$

$|P(A)| = 2^n = 2^1 = 2$ / $P(A) = \{\{\emptyset\}, \{a\}\}$

$|P(B)| = 2^n = 2^2 = 4$ / $P(B) = \{\{\emptyset\}, \{bc\}, \{b\}, \{c\}\}$

$(\{\emptyset\}, \{b, c\})$

$\boxed{\begin{aligned} P(A) \times P(B) = \{ & (\{\emptyset\}, \{\emptyset\}), (\{\emptyset\}, \{b, c\}), (\{\emptyset\}, \{b\}), (\{\emptyset\}, \{c\}), (\{a\}, \{\emptyset\}), \\ & (\{a\}, \{b, c\}), (\{a\}, \{b\}), (\{a\}, \{c\}) \} \end{aligned}}$

3.6.2

B) $(B \cup A) \cup (\bar{B} \cup A) = A$

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

X 1 $A \cup (B \cup \bar{B})$ = ~~Commut~~ Associative

2.

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

$A \cup (B \cap \bar{B})$ → Distrib.

$A \cup \emptyset$ ⇒ Complement ✓

A → Identity

C) $\overline{A \cap \bar{B}} = \bar{A} \cup B$

$\overline{A \cap \bar{B}}$

$\bar{A} \cup \bar{\bar{B}}$ ⇒ De Morgan ✓

$\bar{A} \cup B$ → Double Complement

3.6.3

B) $A - (B \cap A) = A$

If $A = \{1\}$ and $B = \{1,2\}$ by taking the Difference of A away from the intersection of B and A, you are removing the A set $\{1\}$, leaving only elements found in B $\{2\}$.

D) $(B - A) \cup A \neq A$

If $B = \{1,2\}$ and $A = \{1\}$ by taking the difference of B from A, you are left with $B - A = \{2\}$. This is then unionized with A to get a set $\{1,2\}$ which is not equal to $A = \{1\}$.

3.6.4

B) $A \cap (B - A) = \emptyset$

$A \cap (B - A)$

$A \cap (B \cap \bar{A})$ → Subtraction Law

$A \cap (\bar{A} \cap B)$ → Commutative

$(A \cap \bar{A}) \cap B$ → Associative

$\emptyset \cap B$ → Complement

$\emptyset$ → Domination

~~D) A - (B - A)~~

c) $A \cup (B - A) = A \cup B$

$A \cup (B - A)$

$A \cup (B \cap \bar{A})$ → Subtraction

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

$(A \cup B) \cap U$ → Complement

$A \cup B$ → Identity