

2.1 – 2.2

1. List the members of the set
 $\{ x \mid x \text{ is the square of an integer and } x < 100 \}$

2. Use the set-builder notation to give a description of each of these sets.
 - a) $\{ 0, 3, 6, 9, 12 \}$
 - b) $\{ -3, -2, -1, 0, 1, 2, 3 \}$
 - c) $\{ m, n, o, p \}$

3. Determine whether each of these pairs of sets are equal.
 - a) $\{ 1, 3, 3, 3, 5, 5, 5, 5 \}, \{ 5, 3, 1 \}$
 - b) $\{ \{1\} \}, \{ 1, \{1\} \}$

4. Determine whether these statements are true or false.
 - a) $\emptyset \in \{ \emptyset \}$
 - b) $\{ \{ \emptyset \} \} \subset \{ \{ \emptyset \}, \{ \emptyset \} \}$
 - c) $x \in \{ x \}$
 - d) $\{ x \} \in \{ \{ x \} \}$
 - e) $\{ x \} \subseteq \{ x \}$
 - f) $\emptyset \subseteq \{ x \}$
 - g) $\{ x \} \in \{ x \}$
 - h) $\emptyset \in \{ x \}$

Practice Problems

CSI30

1. List the members of the set
 $\{x \mid x \text{ is the square of an integer and } x < 100\}$

$\{0, 1, 4, 9, 16, 25, 36, 49, 64, 81\}$

2. Use the set-builder notation to give a description of each of these sets.

a) $\{ 0, 3, 6, 9, 12 \}$

b) $\{ -3, -2, -1, 0, 1, 2, 3 \}$

c) $\{ m, n, o, p \}$

2. Use the set-builder notation to give a description of each of these sets.

a) $\{ 0, 3, 6, 9, 12 \}$

$\{ x \in \mathbf{N} \mid x \text{ is divisible by } 3 \text{ and } x \leq 12 \}$

b) $\{ -3, -2, -1, 0, 1, 2, 3 \}$

c) $\{ m, n, o, p \}$

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a) $\{ 0, 3, 6, 9, 12 \}$

$\{ x \in \mathbf{N} \mid x \text{ is divisible by } 3 \text{ and } x \leq 12 \}$

b) $\{ -3, -2, -1, 0, 1, 2, 3 \}$

$\{ x \in \mathbf{Z} \mid -3 \leq x \leq 3 \}$ or $\{ x \in \mathbf{Z} \mid |x| \leq 3 \}$

c) $\{ m, n, o, p \}$

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c) $\{ m, n, o, p \}$

$\{ x \mid x \text{ is a letter of alphabet, between l and q, not including} \}$

or

$\{ x \mid x \text{ is a letter of alphabet, between m and p, including} \}$

Practice Problems

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3. Determine whether each of these pairs of sets are equal.

a) $\{ 1, 3, 3, 3, 5, 5, 5, 5 \}, \{ 5, 3, 1 \}$

b) $\{ \{1\} \}, \{ 1, \{1\} \}$

Practice Problems

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3. Determine whether each of these pairs of sets are equal.

a) $\{ 1, 3, 3, 3, 5, 5, 5, 5 \}, \{ 5, 3, 1 \}$ Equal

because $\{ 1, 3, 3, 3, 5, 5, 5, 5 \} = \{ 1, 3, 5 \}$ (without duplicates)

b) $\{ \{1\} \}, \{ 1, \{1\} \}$ Not equal

because first set has only one element: $\{1\}$,

and the second set has two elements: 1 and $\{1\}$

4. Determine whether these statements are true or false.

a) $\emptyset \in \{\emptyset\}$

b) $\{\{\emptyset\}\} \subset \{\{\emptyset\}, \{\emptyset\}\}$

c) $x \in \{x\}$

d) $\{x\} \in \{\{x\}\}$

e) $\{x\} \subseteq \{x\}$

f) $\emptyset \subseteq \{x\}$

g) $\{x\} \in \{x\}$

h) $\emptyset \in \{x\}$

4. Determine whether these statements are true or false.

a) $\emptyset \in \{\emptyset\}$ True

\emptyset is an element of the set $\{\emptyset\}$

b) $\{\{\emptyset\}\} \subset \{\{\emptyset\}, \{\emptyset\}\}$

c) $x \in \{x\}$

d) $\{x\} \in \{\{x\}\}$

e) $\{x\} \subseteq \{x\}$

f) $\emptyset \subseteq \{x\}$

g) $\{x\} \in \{x\}$

h) $\emptyset \in \{x\}$

4. Determine whether these statements are true or false.

a) $\emptyset \in \{\emptyset\}$ **True**

\emptyset is an element of the set $\{\emptyset\}$

b) $\{\{\emptyset\}\} \subset \{\{\emptyset\}, \{\emptyset\}\}$ **False,**

because $\{\{\emptyset\}, \{\emptyset\}\} = \{\{\emptyset\}\}$,

so we shouldn't have \subset (proper subset), but should have \subseteq instead.

c) $x \in \{x\}$

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c) $x \in \{x\}$ **True**

d) $\{x\} \in \{\{x\}\}$ **True**

e) $\{x\} \subseteq \{x\}$ **True**, moreover they are equal (have the same elements).

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f) $\emptyset \subseteq \{x\}$ **True** (see Theorem 1)

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f) $\emptyset \subseteq \{x\}$ **True** (see Theorem 1)

g) $\{x\} \in \{x\}$ **False**, because $\{x\}$ is not an element of set $\{x\}$

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