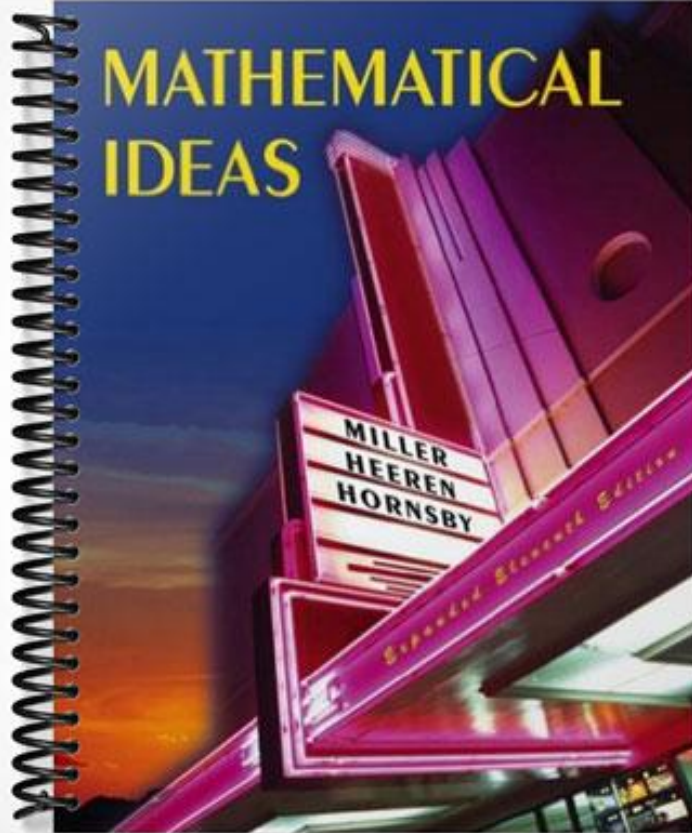


**TEST BANK**

**MATHEMATICAL  
IDEAS**



Mathematical Ideas  
Chapter 2 Test A

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Complete the blank with either  $\in$  or  $\notin$  to make the statement true.

- 1)  $-8 \underline{\quad} \{8, 10, 12, \dots, 20\}$  1) \_\_\_\_\_  
A)  $\in$  B)  $\notin$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Tell whether the statement is true or false.

- 2)  $\{s, q, y, o, d\} = \{o, d, q, s, y\}$  2) \_\_\_\_\_

Write true or false for the following statement.

Let  $A = \{3, 5, 7, 9, 11, 13\}$

$B = \{3, 5, 9, 11\}$

$C = \{5, 9, 13\}$

- 3)  $\{x \mid x \text{ is an odd counting number less than } 15\} = A$  3) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether or not the set is well defined.

- 4)  $\{x \mid x \text{ is a stock on the AmEx today}\}$  4) \_\_\_\_\_  
A) Well defined B) Not well defined

Find  $n(A)$  for the set.

- 5)  $A = \{x \mid x \text{ is a month in the year}\}$  5) \_\_\_\_\_  
A)  $n(A) = 1$  B)  $n(A) = 52$  C)  $n(A) = 24$  D)  $n(A) = 12$

Identify the set as finite or infinite.

- 6)  $\{x \mid x \text{ is a prime number}\}$  6) \_\_\_\_\_  
A) Infinite B) Finite

List the elements in the set.

- 7)  $\{x \mid x \text{ is an even integer smaller than } 8\}$  7) \_\_\_\_\_  
A)  $\{0, 2, 4, 6\}$   
B)  $\{\dots, -6, -4, -2, 0, 2, 4, 6\}$   
C)  $\{\dots, -6, -4, -2, 2, 4, 6\}$   
D)  $\{2, 4, 6\}$

Write the set in set-builder notation.

- 8)  $\{-3, -1, 1, 3, 5, \dots\}$  8) \_\_\_\_\_  
A)  $\{x \mid x \text{ is an integer greater than } -4\}$   
B)  $\{x \mid x \text{ is an odd integer greater than } -4\}$   
C)  $\{x \mid x \text{ is an odd integer between } -4 \text{ and } 6\}$   
D)  $\{x \mid x \text{ is an odd integer}\}$

Use  $\subseteq$  or  $\not\subseteq$  in the blank to make a true statement.

- 9)  $\{11, 35, 40\}$  \_\_\_  $\{5, 35, 40, 50\}$  9) \_\_\_\_\_  
A)  $\subseteq$  B)  $\not\subseteq$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Determine whether the statement is true or false.

- Let  $A = \{1, 3, 5, 7\}$   
 $B = \{5, 6, 7, 8\}$   
 $C = \{5, 8\}$   
 $D = \{2, 5, 8\}$   
 $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$

- 10)  $A \neq \{7, 5, 3, 1\}$  10) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Let  $U = \{1, 2, 4, 5, a, b, c, d, e\}$ . Find the complement of the set.

- 11)  $T = \{a, b, d, e, 1, 2, 4, 5\}$  11) \_\_\_\_\_  
A)  $U$  B)  $\{c, 3\}$  C)  $\{c\}$  D)  $\emptyset$

Find the number of proper subsets of the set.

- 12)  $\{13, 14, 15\}$  12) \_\_\_\_\_  
A) 7 B) 5 C) 2 D) 6

Decide whether the given statement is always true or not always true.

- 13) If  $A \subseteq B$ , then  $A \cup B = A$  13) \_\_\_\_\_  
A) Not always true B) Always true

Decide whether  $\subseteq$ ,  $\subset$ , both, or neither can be placed in the blank to make a true statement.

- 14)  $\{5, 6, 7\}$  \_\_\_  $\{5, 6, 7\}$  14) \_\_\_\_\_  
A) Neither B)  $\subset$   
C)  $\subseteq$  D) Both  $\subset$  and  $\subseteq$

**Solve the problem.**

- 15) An adventure travel company has reservations from four people (Lee, Maria, Nancy, and Pablo) for its white water rafting trip on June 1st. However the company knows that any of these people may fail to show up on the day of the trip. Denoting these four people by l, m, n, p, list all possibilities for the group of people who show up on June 1st for the rafting trip (ie list all possible subsets of {l, m, n, p}). 15) \_\_\_\_\_
- A) {l}, {m}, {n}, {p}, {l, m}, {l, n}, {l, p}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}, {l, m, n, p}
- B) {l}, {m}, {n}, {p}, {l, m}, {l, n}, {l, p}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}, {m, n, l}, {l, m, n, p}
- C)  $\emptyset$ , {l}, {m}, {n}, {p}, {l, m}, {l, n}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}
- D)  $\emptyset$ , {l}, {m}, {n}, {p}, {l, m}, {l, n}, {l, p}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}, {l, m, n, p}

Let  $U = \{\text{all soda pops}\}$ ,  $A = \{\text{all diet soda pops}\}$ ,  $B = \{\text{all cola soda pops}\}$ ,  $C = \{\text{all soda pops in cans}\}$ , and  $D = \{\text{all caffeine-free soda pops}\}$ . Describe the set in words.

- 16)  $(A \cup D) \cap C'$  16) \_\_\_\_\_
- A) All non-cola soda pops not in cans
- B) All diet soda pops not in cans or all caffeine-free soda pops not in cans
- C) All non-diet, non-caffeine-free soda pops not in cans
- D) All diet, caffeine-free soda pops not in cans

**Solve the problem.**

- 17) Monticello residents were surveyed concerning their preferences for candidates Moore and Allen in an upcoming election. Of the 800 respondents, 300 support neither Moore nor Allen, 100 support both Moore and Allen, and 250 support only Moore. How many residents support Moore? 17) \_\_\_\_\_
- A) 150                      B) 350                      C) 250                      D) 100

**Determine whether the sets are equal, equivalent, both, or neither.**

- 18)  $\{x \mid x \text{ is a real number}\}$  and  $\{x \mid x \text{ is a rational number}\}$  18) \_\_\_\_\_
- A) Neither    B) Equivalent
- C) Both    D) Equal

**Show that the set has cardinal number  $\aleph_0$  by establishing a one-to-one correspondence between the set of counting numbers and the given set. Be sure to show the pairing of the general terms in the sets.**

- 19)  $\{0, 3, 6, 9, 12, \dots\}$  19) \_\_\_\_\_
- |  |  |
|--|--|
| <p>A) <math>\{1, 2, 3, 4, \dots, n, \dots\}</math></p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p><math>\{0, 3, 6, 9, \dots, 3n - 1, \dots\}</math></p> | <p>B) <math>\{1, 2, 3, 4, \dots, n, \dots\}</math></p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p><math>\{0, 3, 6, 9, \dots, 3n, \dots\}</math></p>     |
| <p>C) <math>\{1, 2, 3, 4, \dots, n, \dots\}</math></p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p><math>\{0, 3, 6, 9, \dots, 3n + 3, \dots\}</math></p> | <p>D) <math>\{1, 2, 3, 4, \dots, n, \dots\}</math></p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p><math>\{0, 3, 6, 9, \dots, 3n - 3, \dots\}</math></p> |

A one-to-one correspondence between the set of counting numbers and the given set has been established. Find an expression for the  $n$ th term of the given set that corresponds to the counting number  $n$ .

20)

20) \_\_\_\_\_

{3, 9, 27, 81, ..., □, ...}

↑ ↓   ↑ ↓   ↑ ↓   ↑ ↓   ↑ ↓   ↑ ↓

{1, 2, 3, 4, ..., n, ...}

A)  $3 + n$

B)  $3^n$

C)  $n^2$

D)  $n^3$

## Answer Key

Testname: CHAPTER 2 TEST A

- 1) B
- 2) TRUE
- 3) FALSE
- 4) A
- 5) D
- 6) A
- 7) B
- 8) B
- 9) B
- 10) FALSE
- 11) C
- 12) A
- 13) A
- 14) C
- 15) D
- 16) B
- 17) B
- 18) A
- 19) D
- 20) B

Mathematical Ideas  
Chapter 2 Test B

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Complete the blank with either  $\in$  or  $\notin$  to make the statement true.

- 1)  $10 \underline{\hspace{1cm}}$   $\{5, 6, 7, \dots, 10\}$  1) \_\_\_\_\_  
A)  $\in$  B)  $\notin$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Write true or false for the following statement.

Let  $A = \{3, 5, 7, 9, 11, 13\}$   
 $B = \{3, 5, 9, 11\}$   
 $C = \{5, 9, 13\}$

- 2)  $5 \notin C$  2) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find  $n(A)$  for the set.

- 3)  $A = \{x \mid x \text{ is a month in the year}\}$  3) \_\_\_\_\_  
A)  $n(A) = 12$  B)  $n(A) = 52$  C)  $n(A) = 1$  D)  $n(A) = 24$

List the elements in the set.

- 4)  $\{x \mid x \text{ is an even integer smaller than } 8\}$  4) \_\_\_\_\_  
A)  $\{0, 2, 4, 6\}$   
B)  $\{2, 4, 6\}$   
C)  $\{\dots, -6, -4, -2, 2, 4, 6\}$   
D)  $\{\dots, -6, -4, -2, 0, 2, 4, 6\}$

Use  $\subseteq$  or  $\not\subseteq$  in the blank to make a true statement.

- 5)  $\{11, 13, 15\} \underline{\hspace{1cm}}$   $\{x \mid x \text{ is an odd counting number}\}$  5) \_\_\_\_\_  
A)  $\not\subseteq$  B)  $\subseteq$

Let  $U = \{1, 2, 4, 5, a, b, c, d, e\}$ . Find the complement of the set.

- 6)  $W = \{1, 5, e, d, a\}$  6) \_\_\_\_\_  
A)  $\{2, 3, 4, b, c\}$  B)  $\{2, 4, b, c\}$   
C)  $\{1, 2, 4, b, c\}$  D)  $\{2, 3, 4, a, b, c\}$

Find the number of subsets of the set.

- 7)  $\{0\}$  7) \_\_\_\_\_  
A) 1 B) 2 C) 0 D) 4

**Solve the problem.**

- 8) A committee is to be formed. Possible candidates for the committee are Eric, Frances, Greg, and Jose. Denoting these four people by e, f, g, j, list all possible committees if the committee is to contain at least two people and may contain up to four people. 8) \_\_\_\_\_
- A) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}, {e, f, g}, {e, f, j}, {f, g, j}, {e, f, g, j}
- B) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}, {e, f, g}, {e, f, j}, {e, g, j}, {f, g, j}, {e, f, g, j}
- C) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}, {e, f, g}, {e, f, j}, {e, g, j}, {f, g, j}
- D) {e, f}, {e, g}, {e, j}, {f, j}, {e, f, g}, {e, f, j}, {e, g, j}, {f, g, j}, {e, f, g, j}

**Decide whether the given statement is always true or not always true.**

- 9)  $(A \cup B)' = A' \cup B'$  9) \_\_\_\_\_
- A) Always true B) Not always true

Let  $U = \{\text{all soda pops}\}$ ,  $A = \{\text{all diet soda pops}\}$ ,  $B = \{\text{all cola soda pops}\}$ ,  $C = \{\text{all soda pops in cans}\}$ , and  $D = \{\text{all caffeine-free soda pops}\}$ . Describe the set in words.

- 10)  $(A \cap B) \cap C'$  10) \_\_\_\_\_
- A) All cola soda pops not in cans
- B) All diet cola soda pops not in cans
- C) All non-diet, non-cola soda pops not in cans
- D) All diet and all cola soda pops not in cans

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Let  $A$  and  $B$  be sets with cardinal numbers,  $n(A) = a$  and  $n(B) = b$ , respectively. Decide whether the statement is true or false.

- 11) If  $B \subseteq A$ ,  $n(B) = n(A) - n(A - B)$ . 11) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

**Find the Cartesian product .**

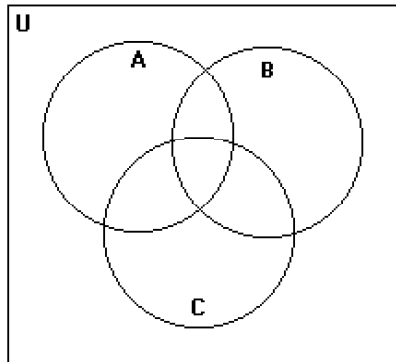
- 12)  $A = \{5, 2, 6, 9\}$  12) \_\_\_\_\_  
 $B = \{0, 1\}$   
Find  $B \times A$ .
- A)  $\{0, 1, 5, 2, 6, 9\}$
- B)  $\{(5, 0), (2, 0), (6, 0), (9, 0), (5, 1), (2, 1), (6, 1), (9, 1)\}$
- C)  $\{(0, 5), (0, 2), (0, 6), (0, 9), (1, 5), (1, 2), (1, 6), (1, 9)\}$
- D)  $\{(5, 0), (5, 1), (2, 0), (2, 1)\}$



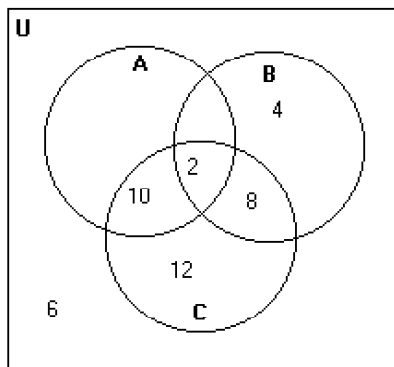
For the given sets, construct a Venn diagram and place the elements in the proper region.

- 13)  $U = \{2, 4, 6, 8, 10, 12\}$   
 $A = \{2, 6, 10\}$   
 $B = \{2, 4, 8\}$   
 $C = \{2, 8, 10, 12\}$

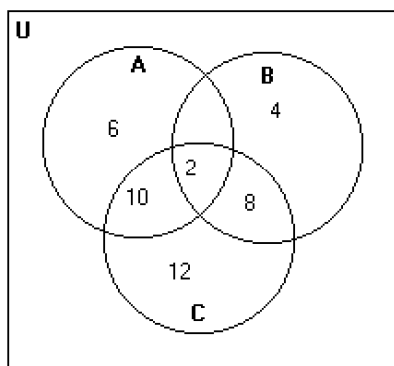
13) \_\_\_\_\_



A)



B)



The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

<u>Alabama</u>	<u>Arkansas</u>	<u>Louisiana</u>
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let  $U$  be the smallest possible universal set that includes all of the crops listed, and let  $A$ ,  $K$  and  $L$  be the sets of five crops in Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

- 14)  $A \cap K \cap L$  14) \_\_\_\_\_
- A) {c, h, n, p, r, s, t, w}                      B) {n, p, s}
- C) {s}    D) {n, p}

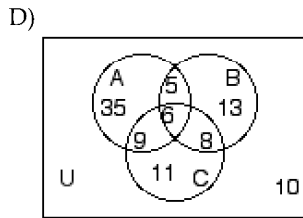
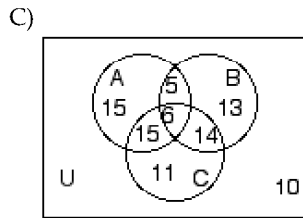
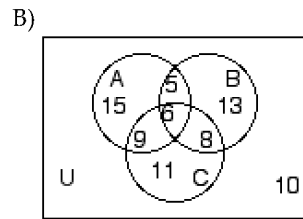
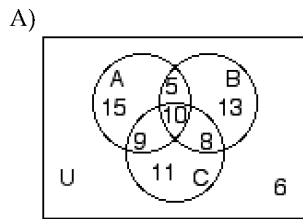
List the elements in the set .

Let  $U = \{q, r, s, t, u, v, w, x, y, z\}$   
 $A = \{q, s, u, w, y\}$   
 $B = \{q, s, y, z\}$   
 $C = \{v, w, x, y, z\}$ .

- 15)  $(A \cup B)' \cap C'$  15) \_\_\_\_\_
- A) {v, w, x, y}                                      B)  $\emptyset$
- C) {q, r, s, t, u}                                    D) {q, r, s, t, u, z}

Draw an appropriate Venn diagram and use the given information to fill in the number of elements in each region.

- 16)  $n(A) = 35$ ,  $n(A \cap B') = 24$ ,  $n(A \cap C) = 15$ ,  $n(B \cap C) = 14$ ,  $n(A' \cap B' \cap C') = 10$ , 16) \_\_\_\_\_  
 $n(A \cap B \cap C) = 6$ ,  $n(B \cup C) = 52$ ,  $n(B \cap C') = 18$



Find the cardinal number of the indicated set. Use the cardinal number formula.

- 17) If  $n(A) = 6$ ,  $n(B) = 13$  and  $n(A \cap B) = 4$ , what is  $n(A \cup B)$ ? 17) \_\_\_\_\_
- A) 14    B) 19    C) 16    D) 15

Determine whether the sets are equal, equivalent, both, or neither.

- 18)  $\{x \mid x \text{ is an even integer}\}$  and  $\{x \mid x \text{ is an odd integer}\}$  18) \_\_\_\_\_  
 A) Equivalent B) Both  
 C) Neither D) Equal

Find the cardinal number of the set.

- 19) {The set of points on a straight line} 19) \_\_\_\_\_  
 A)  $\aleph_0$  B) 0 C)  $c$  D) 1

Show that the set is infinite by placing it in a one-to-one correspondence with a proper subset of itself. Be sure to show the pairing of the general terms in the sets.

- 20)  $\{3, 5, 7, 9, \dots\}$  20) \_\_\_\_\_
- |  |  |
|--|--|
| <p>A) <math>\{3, 5, 7, 9, \dots, 2n+1, \dots\}</math><br/> <math>\downarrow \downarrow \downarrow \downarrow \quad \downarrow</math><br/> <math>\{5, 7, 9, 11, \dots, 2n+3, \dots\}</math></p> | <p>B) <math>\{3, 5, 7, 9, \dots, 2n+5, \dots\}</math><br/> <math>\downarrow \downarrow \downarrow \downarrow \quad \downarrow</math><br/> <math>\{5, 7, 9, 11, \dots, 2n+3, \dots\}</math></p> |
| <p>C) <math>\{3, 5, 7, 9, \dots, 2n+1, \dots\}</math><br/> <math>\downarrow \downarrow \downarrow \downarrow \quad \downarrow</math><br/> <math>\{4, 6, 8, 10, \dots, 2n+3, \dots\}</math></p> | <p>D) <math>\{3, 5, 7, 9, \dots, 2n+2, \dots\}</math><br/> <math>\downarrow \downarrow \downarrow \downarrow \quad \downarrow</math><br/> <math>\{5, 7, 9, 11, \dots, 2n+4, \dots\}</math></p> |

Answer Key

Testname: CHAPTER 2 TEST B

- 1) A
- 2) FALSE
- 3) A
- 4) D
- 5) B
- 6) B
- 7) B
- 8) B
- 9) B
- 10) B
- 11) TRUE
- 12) C
- 13) B
- 14) C
- 15) B
- 16) B
- 17) D
- 18) A
- 19) C
- 20) A

Mathematical Ideas  
Chapter 2 Test C

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

**Tell whether the statement is true or false.**

1)  $\{6, 16, 29, 8, 32\} - \{32, 16, 8, 92, 6\}$  1) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

**Determine whether or not the set is well defined.**

2)  $\{x \mid x \text{ is an expensive boat on the Great Lakes}\}$  2) \_\_\_\_\_  
A) Not well defined B) Well defined

**Identify the set as finite or infinite.**

3)  $\{1, 1/4, 1/16, 1/64, \dots\}$  3) \_\_\_\_\_  
A) Finite B) Infinite

**Write the set in set-builder notation.**

4)  $\{-3, -2, -1, 0, \dots\}$  4) \_\_\_\_\_  
A)  $\{x \mid x \text{ is an integer greater than } -4\}$   
B)  $\{x \mid x \text{ is an integer between } -4 \text{ and } 1\}$   
C)  $\{-3, -2, -1, 0\}$   
D)  $\{x \mid x \text{ is any integer}\}$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

**Determine whether the statement is true or false.**

Let  $A = \{1, 3, 5, 7\}$

$B = \{5, 6, 7, 8\}$

$C = \{5, 8\}$

$D = \{2, 5, 8\}$

$U = \{1, 2, 3, 4, 5, 6, 7, 8\}$

5)  $\{6, 5, 8, 7\} \subseteq B$  5) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Let  $U = \{1, 2, 4, 5, a, b, c, d, e\}$ . Find the complement of the set.

6)  $M = \{a\}$  6) \_\_\_\_\_  
A)  $\{1, 2, 3, 4, 5, b, c, d, e\}$  B)  $\{1, 2, 5, b, c, d, e\}$   
C)  $\{u, v\}$  D)  $\{1, 2, 4, 5, b, c, d, e\}$

7)  $A = \{2, 4, b, d\}$  7) \_\_\_\_\_  
A)  $\{1, 5, a, c, e\}$  B)  $\{1, 5, a, e\}$   
C)  $\{1, 2, 4, 5, a, b, c, d, e\}$  D)  $\{1, 3, 5, a, c, e\}$

Find the number of proper subsets of the set.

- 8)  $\{1, 2, 3, \dots, 9\}$  8) \_\_\_\_\_  
A) 506                      B) 512                      C) 1023                      D) 511

Decide whether  $\subseteq$ ,  $\subset$ , both, or neither can be placed in the blank to make a true statement.

- 9)  $\{5, 6, 7\} \_ \{4, 5, 6, 7\}$  9) \_\_\_\_\_  
A)  $\subseteq$     B)  $\subset$   
C) Both  $\subset$  and  $\subseteq$     D) Neither

The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

<u>Alabama</u>	<u>Arkansas</u>	<u>Louisiana</u>
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let  $U$  be the smallest possible universal set that includes all of the crops listed, and let  $A$ ,  $K$  and  $L$  be the sets of five crops in Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

- 10) The set of crops in either  $A'$  or  $L$  or both 10) \_\_\_\_\_  
A)  $\{n, r, t\}$     B)  $\{h, p, w\}$   
C)  $\{h, n, p, r, t, w\}$     D)  $\{c, n, r, s, t\}$

Decide whether the given statement is always true or not always true.

- 11)  $(A \cup B)' = A' \cup B'$  11) \_\_\_\_\_  
A) Always true    B) Not always true

Describe the conditions under which the statement is true.

- 12)  $A \cap A' = A$  12) \_\_\_\_\_  
A)  $A = U$     B) Always true  
C)  $A = \emptyset$     D)  $A \neq \emptyset$

Find the indicated cardinal number.

- 13) Find  $n(F)$ , given that  $n(B \times F) = 18$  and  $B = \{1, 3\}$ . 13) \_\_\_\_\_  
A) 6    B) 9    C) 36    D) 54

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Tell whether the statement is true or false.

- 14)  $\{(3, 1), (0, 6), (-4, -2)\} = \{(-4, -2), (3, 1), (6, 0)\}$  14) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

List the elements in the set .

Let  $U = \{q, r, s, t, u, v, w, x, y, z\}$

$A = \{q, s, u, w, y\}$

$B = \{q, s, y, z\}$

$C = \{v, w, x, y, z\}$ .

15)  $(A \cup B)'$  15) \_\_\_\_\_

A)  $\{r, t, v, x\}$

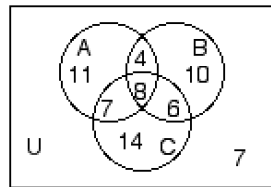
B)  $\{s, u, w\}$

C)  $\{t, v, x\}$

D)  $\{r, s, t, u, v, w, x, z\}$

Find the cardinal number of the set.

16) The numbers in the Venn Diagram below represent cardinalities. 16) \_\_\_\_\_



Find  $n(B \cup C)$

A) 60

B) 42

C) 14

D) 49

Solve the problem.

17) In a survey of 280 people, a travel company asked people about places they plan to visit in the next 5 years. The results were as follows: 17) \_\_\_\_\_

48 plan to visit Europe

58 plan to visit Latin America

34 plan to visit Asia

14 plan to visit Europe and Latin America

12 plan to visit Latin America and Asia

11 plan to visit Europe and Asia

4 plan to visit all three

How many people plan to visit exactly two of these places?

A) 18

B) 25

C) 37

D) 29

Decide whether or not it is possible to set up a one-to-one correspondence between the elements of the sets.

18)  $\{\text{Mon, Tue, Wed}\}$  and  $\{\text{Oct, Nov, Dec}\}$  18) \_\_\_\_\_

A) Not possible

B) Possible

Show that the set has cardinal number  $\aleph_0$  by establishing a one-to-one correspondence between the set of counting numbers and the given set. Be sure to show the pairing of the general terms in the sets.

19) {7, 12, 17, 22, ...} 19) \_\_\_\_\_

<p>A) { 1, 2, 3, 4, ..., n, ...}</p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p>{ 7, 12, 17, 22, ..., 5n + 2, ...}</p>	<p>B) { 1, 2, 3, 4, ..., n, ...}</p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p>{ 7, 12, 17, 22, ..., 4n + 2, ...}</p>
<p>C) { 1, 2, 3, 4, ..., n, ...}</p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p>{ 7, 12, 17, 22, ..., 5n + 1, ...}</p>	<p>D) { 1, 2, 3, 4, ..., n, ...}</p> <p style="text-align: center;">↓ ↓ ↓ ↓ ↓</p> <p>{ 7, 12, 17, 22, ..., 4n - 1, ...}</p>

A one-to-one correspondence between the set of counting numbers and the given set has been established. Find an expression for the nth term of the given set that corresponds to the counting number n.

20) 20) \_\_\_\_\_

{7, 49, 343, 2401, ..., □, ...}

↕ ↕ ↕ ↕ ↕ ↕

{1, 2, 3, 4, ..., n, ...}

A)  $n^2$                       B)  $7 + n$                       C)  $7^n$                       D)  $n^7$



Answer Key

Testname: CHAPTER 2 TEST C

- 1) FALSE
- 2) A
- 3) B
- 4) A
- 5) TRUE
- 6) D
- 7) A
- 8) D
- 9) C
- 10) D
- 11) B
- 12) C
- 13) B
- 14) FALSE
- 15) A
- 16) D
- 17) B
- 18) B
- 19) A
- 20) C

Mathematical Ideas  
Chapter 2 Test D

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Write true or false for the following statement.

Let  $A = \{3, 5, 7, 9, 11, 13\}$

$B = \{3, 5, 9, 11\}$

$C = \{5, 9, 13\}$

1) Every element of B is also an element of C. 1) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find  $n(A)$  for the set.

2)  $A = \{1/2, 1/3, 1/4, 1/5, \dots, 1/29, 1/30\}$  2) \_\_\_\_\_

A)  $n(A) = 31$

B)  $n(A) = 30$

C)  $n(A) = \text{Infinite}$

D)  $n(A) = 29$

List the elements in the set.

3)  $\{x \mid x \text{ is a whole number between 2 and 6}\}$  3) \_\_\_\_\_

A)  $\{2, 3, 4, 5, 6\}$

B)  $\{3, 4, 5\}$

C)  $\{3, 4, 5, 6\}$

D)  $\{2, 3, 4, 5\}$

4)  $\{x \mid x \text{ is a negative multiple of 4}\}$  4) \_\_\_\_\_

A)  $\{0, -4, -8, \dots\}$

B)  $\{-4, -16, -64, \dots\}$

C)  $\{4, 8, 12, \dots\}$

D)  $\{-4, -8, -12, \dots\}$

Use  $\subseteq$  or  $\not\subseteq$  in the blank to make a true statement.

5)  $\emptyset$  \_\_\_  $\emptyset$  5) \_\_\_\_\_

A)  $\subseteq$

B)  $\not\subseteq$

Let  $U = \{1, 2, 4, 5, a, b, c, d, e\}$ . Find the complement of the set.

6)  $W = \{1, 5, e, d, a\}$  6) \_\_\_\_\_

A)  $\{1, 2, 4, b, c\}$

B)  $\{2, 3, 4, a, b, c\}$

C)  $\{2, 3, 4, b, c\}$

D)  $\{2, 4, b, c\}$

Find the number of subsets of the set.

7)  $\{1, 2, 3, \dots, 8\}$  7) \_\_\_\_\_

A) 252

B) 256

C) 512

D) 16

Solve the problem.

8) List all possible subsets of the set  $\{m, n\}$ . 8) \_\_\_\_\_

A)  $\{m\}, \{n\}, \{m, n\}, \emptyset$

B)  $\{m\}, \{n\}$

C)  $\{m\}, \{n\}, \{m, n\}$

D)  $\{m\}, \{n\}, \emptyset$

Decide whether the given statement is always true or not always true.

- 9) If  $A \subseteq B$ , then  $A \cup B = A$  9) \_\_\_\_\_  
A) Always true B) Not always true

Let  $U = \{\text{all soda pops}\}$ ,  $A = \{\text{all diet soda pops}\}$ ,  $B = \{\text{all cola soda pops}\}$ ,  $C = \{\text{all soda pops in cans}\}$ , and  $D = \{\text{all caffeine-free soda pops}\}$ . Describe the set in words.

- 10)  $(A \cup B) \cup D$  10) \_\_\_\_\_  
A) All diet or all cola or all caffeine-free soda pops  
B) All soda pops  
C) All soda pops not in cans  
D) All diet, caffeine-free cola soda pops

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Let  $A$  and  $B$  be sets with cardinal numbers,  $n(A) = a$  and  $n(B) = b$ , respectively. Decide whether the statement is true or false.

- 11) If  $B \subseteq A$ ,  $n(B) = n(A) - n(A - B)$ . 11) \_\_\_\_\_

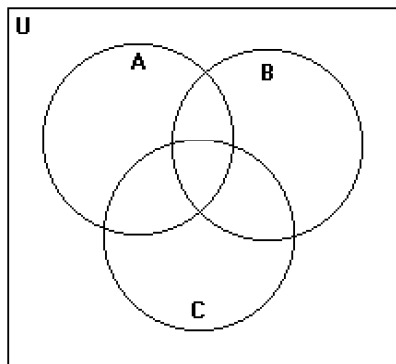
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the Cartesian product .

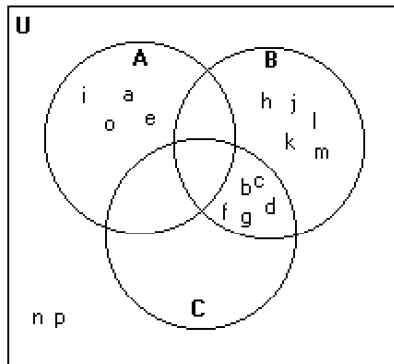
- 12)  $A = \{0\}$  12) \_\_\_\_\_  
 $B = \{18, 28, 38\}$   
Find  $B \times A$ .  
A)  $\{(0, 18), (0, 28), (0, 38)\}$  B)  $\{(18, 0), (28, 0), (38, 0)\}$   
C)  $\{0\}$  D)  $\{0, 0, 0\}$

For the given sets, construct a Venn diagram and place the elements in the proper region.

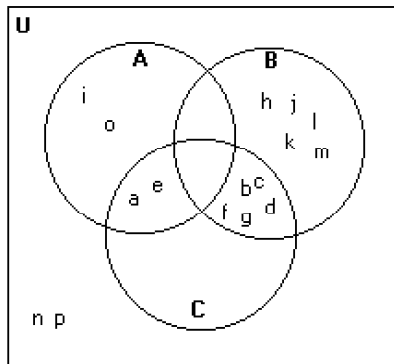
- 13)  $U = \{a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p\}$  13) \_\_\_\_\_  
 $A = \{a, e, i, o\}$   
 $B = \{b, c, d, f, g, h, j, k, l, m\}$   
 $C = \{a, b, c, d, e, f, g\}$



A)



B)



The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

<u>Alabama</u>	<u>Arkansas</u>	<u>Louisiana</u>
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let  $U$  be the smallest possible universal set that includes all of the crops listed, and let  $A$ ,  $K$  and  $L$  be the sets of five crops in Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

14)  $A \cap K \cap L$

A)  $\{n, p, s\}$

C)  $\{s\}$

B)  $\{c, h, n, p, r, s, t, w\}$

D)  $\{n, p\}$

14) \_\_\_\_\_

List the elements in the set .

Let  $U = \{q, r, s, t, u, v, w, x, y, z\}$

$A = \{q, s, u, w, y\}$

$B = \{q, s, y, z\}$

$C = \{v, w, x, y, z\}$ .

15)  $A \cup (B \cap C)$

A)  $\{q, y, z\}$

C)  $\{q, s, u, w, y, z\}$

B)  $\{q, w, y\}$

D)  $\{q, r, w, y, z\}$

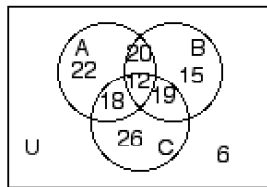
15) \_\_\_\_\_

Draw an appropriate Venn diagram and use the given information to fill in the number of elements in each region.

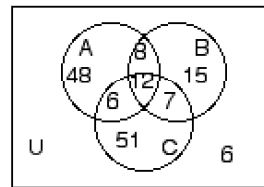
16)  $n(A) = 48, n(B') = 60, n(C) = 51, n(A \cap B) = 20, n(B \cap C) = 19, n(A \cap C) = 18,$   
 $n(A \cap B \cap C) = 12, n(A \cup B) = 70$

16) \_\_\_\_\_

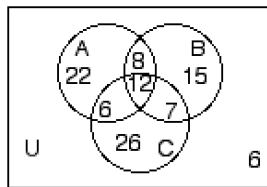
A)



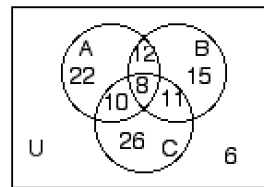
B)



C)



D)



Find the cardinal number of the indicated set. Use the cardinal number formula.

17) If  $n(A) = 20, n(A \cup B) = 58,$  and  $n(A \cap B) = 16,$  find  $n(B).$

17) \_\_\_\_\_

A) 53

B) 38

C) 55

D) 54

Determine whether the sets are equal, equivalent, both, or neither.

18)  $\{1/10, 2/10, 3/10\}$  and  $\{0.1, 0.2, 0.3\}$

18) \_\_\_\_\_

A) Both

B) Neither

C) Equivalent

D) Equal

Find the cardinal number of the set.

19)  $\{x \mid x \text{ is a real number between } 1.1 \text{ and } 1.2\}$

19) \_\_\_\_\_

A)  $\aleph_0$

B)  $c$

C) 0

D) 10

A one-to-one correspondence between the set of counting numbers and the given set has been established. Find an expression for the  $n$ th term of the given set that corresponds to the counting number  $n$ .

20)

20) \_\_\_\_\_

$\{-3, -8, -13, -18, \dots, \square, \dots\}$

$\updownarrow \quad \updownarrow \quad \updownarrow \quad \updownarrow \quad \updownarrow \quad \updownarrow$

$\{1, 2, 3, 4, \dots, n, \dots\}$

A)  $5n + 2$

B)  $-5n - 2$

C)  $5n - 2$

D)  $-5n + 2$

## Answer Key

Testname: CHAPTER 2 TEST D

- 1) FALSE
- 2) D
- 3) B
- 4) D
- 5) A
- 6) D
- 7) B
- 8) A
- 9) B
- 10) A
- 11) TRUE
- 12) B
- 13) B
- 14) C
- 15) C
- 16) C
- 17) D
- 18) A
- 19) B
- 20) D

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Let  $p$  represent the statement, "Jim plays football", and let  $q$  represent the statement "Michael plays basketball". Convert the compound statement into symbols.

- 1) Jim plays football and Michael plays basketball. 1) \_\_\_\_\_  
A)  $p \vee \sim q$       B)  $\sim p \wedge q$       C)  $p \wedge q$       D)  $p \vee q$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Decide whether the statement is true or false.

- 2) There exists a rational number that is an integer. 2) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Decide whether or not the following is a statement.

- 3)  $4 + 5 = 10$  3) \_\_\_\_\_  
A) Not a statement      B) Statement

Write a negation of the inequality. Do not use a slash symbol.

- 4)  $x < 76$  4) \_\_\_\_\_  
A)  $x \geq 76$       B)  $x > 76$       C)  $x < -76$       D)  $x = 76$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Decide whether the statement is true or false.

- 5) For some real number  $x$ ,  $x^2 + 5x - 6 = 0$  and  $|x - 5| > 3$ . 5) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Let  $p$  represent  $7 < 8$ ,  $q$  represent  $2 < 5 < 6$ , and  $r$  represent  $3 < 2$ . Decide whether the statement is true or false.

- 6)  $(\sim p \wedge q) \vee \sim r$  6) \_\_\_\_\_  
A) False      B) True

Let  $p$  represent a true statement, while  $q$  and  $r$  represent false statements. Find the truth value of the compound statement.

- 7)  $(p \wedge \sim q) \wedge r$  7) \_\_\_\_\_  
A) True      B) False