

Sets

Determine if the set is the empty set.

1) $\{0, \emptyset\}$ 1) _____
A) Yes, it is the empty set. B) No, it is not the empty set.

2) $\{x \mid x < 6 \text{ and } x > 10\}$ 2) _____
A) Yes, it is the empty set. B) No, it is not the empty set.

Determine whether the statement is true or false.

3) $7 \notin \{1, 2, 3, \dots, 40\}$ 3) _____
A) True B) False

Express the set using the roster method.

4) $\{x \mid x \in \mathbb{N} \text{ and } x \text{ lies between } 0 \text{ and } 4\}$ 4) _____
A) $\{0, 1, 2, 3, 4\}$ B) $\{1, 2, 3, 4\}$ C) $\{0, 1, 2, 3\}$ D) $\{1, 2, 3\}$

Express the set using set-builder notation. Use inequality notation to express the condition x must meet in order to be a member of the set.

5) $A = \{6, 7, 8, 9, 10, \dots\}$ 5) _____
A) $\{x \mid x \in \mathbb{N} \text{ and } x > 6\}$ B) $\{x \mid x \in \mathbb{N} \text{ and } x \geq 10\}$
C) $\{x \mid x \in \mathbb{N} \text{ and } x \leq 6\}$ D) $\{x \mid x \in \mathbb{N} \text{ and } x \geq 6\}$

Find $n(A)$ for the set.

6) $A = \{2, 4, 6, 8, 10\}$ 6) _____
A) $n(A) = 4$ B) $n(A) = 2$ C) $n(A) = 10$ D) $n(A) = 5$

Find the cardinal number for the set.

7) $\{8, 10, 12, \dots, 66\}$ 7) _____
A) 60 B) 30 C) 15 D) 20

8) Determine the cardinal number of the set $\{x \mid x \text{ is a letter of the alphabet}\}$ 8) _____
A) 25 B) 30 C) 23 D) 26

Are the sets equivalent?

9) $A = \{7, 8, 9, 10, 11\}$ 9) _____
 $B = \{6, 7, 8, 9, 10\}$
A) Yes B) No

Use \subset , $\not\subset$, \subseteq , or both \subset and \subseteq to make a true statement.

10) $\{a, b\}$ $\{z, a, y, b, x, c\}$ 10) _____
A) \subset B) $\not\subset$ C) \subset and \subseteq D) \subseteq

11) $\{4, 5, 6\}$ $\{4, 5, 6\}$ 11) _____
A) $\not\subset$ B) \subset and $\not\subset$ C) \subset D) \subseteq

List all the subsets of the given set.

12) {11}

A) {0}, {11}, { }

B) {11}

C) {11}, { }

D) { }

12) _____

Find the number of subsets of the set.

13) {0}

A) 1

B) 4

C) 2

D) 0

13) _____

Calculate the number of subsets and the number of proper subsets for the set.

14) $\left\{\frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}\right\}$

A) 14; 15

B) 15; 16

C) 15; 14

D) 16; 15

14) _____

Place the various elements in the proper regions of the Venn diagram.

15) Let $U = \{8, 9, 10, 11, 12, 13, 14\}$ and $A = \{8, 9, 12\}$. Find A' and place the elements in the proper region.

Find the Cartesian product.

16) $A = \{5, 15, 2\}$

$B = \{6, 10\}$

Find $A \times B$.

A) $\{(5, 6), (5, 10), (15, 6), (15, 10), (2, 6), (2, 10)\}$

B) $\{(5, 6), (15, 10)\}$

C) $\{(6, 5), (6, 15), (6, 2), (10, 5), (10, 15), (10, 2)\}$

D) $\{(5, 6), (15, 2), (2, 6)\}$

16) _____

Find the indicated cardinal number.

17) Find $n(A \times B)$ given that $A = \{2\}$ and $B = \{1, 3\}$.

A) 2

B) 3

C) 4

D) 1

17) _____

Solve the problem.

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

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

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

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

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

18) _____

Let $U = \{1, 2, 4, 5, a, b, c, d, e\}$. Use the roster method to write the complement of the set.

19) $Q = \{2, 4, b, d\}$

A) $\{1, 5, a, e\}$

B) $\{1, 5, a, c, e\}$

C) $\{1, 2, 4, 5, a, b, c, d, e\}$

D) $\{1, 3, 5, a, c, e\}$

19) _____

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

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

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

$C = \{v, w, x, y, z\}$. List the elements in the set.

20) $A \cap B'$

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

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

C) $\{u, w\}$

D) $\{q, s, t, u, v, w, x, y\}$

20) _____

- 21) $(A \cap B)'$ 21) _____
 A) {r, t, u, v, w, x, z} B) {s, u, w}
 C) {q, s, t, u, v, w, x, y} D) {t, v, x}

- 22) $B \cup C$ 22) _____
 A) {q, s, v, w, x, y, z} B) {q, s, u, w, y}
 C) {q, r, s, t, u, v, w, x, y, z} D) {v, w, x, y, z}

- 23) $C' \cap A'$ 23) _____
 A) {r, t} B) {w, y}
 C) {q, r, s, t, u, v, x, z} D) {q, s, u, v, w, x, y, z}

Use sets to solve the problem.

- 24) Results of a survey of fifty students indicate that 30 like red jelly beans, 29 like green jelly beans, and 17 like both red and green jelly beans. How many of the students surveyed like red or green jelly beans? 24) _____
 A) 17 B) 42 C) 13 D) 25

Use the formula for the cardinal number of the union of two sets to solve the problem.

- 25) Set A contains 9 letters and 9 numbers. Set B contains 12 letters and 9 numbers. Three letters and 2 numbers are common to both sets A and B. Find the number of elements in set A or set B. 25) _____
 A) 23 B) 44 C) 34 D) 39

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

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

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

$C = \{v, w, x, y, z\}$. List the elements in the set.

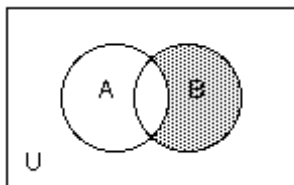
- 26) $A \cup (B \cap C)$ 26) _____
 A) {q, w, y} B) {q, r, w, y, z} C) {q, y, z} D) {q, s, u, w, y, z}

- 27) $A \cap (B \cup C)$ 27) _____
 A) {q, r, w, y, z} B) {q, s, w, y} C) {q, y, z} D) {q, s, u, w, y, z}

- 28) $(A \cup B) \cap (A \cup C)$ 28) _____
 A) {q, s, u, w, y, z} B) {r, t, v, x} C) {q, s, u, w, y} D) {q, s, w, y}

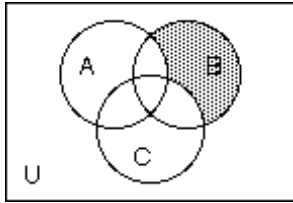
Use set notation to identify the shaded region.

- 29) 29) _____



- A) $B - \bar{A}$ B) $B \cap \bar{A}$ C) $A - B$ D) $A \cap \bar{B}$

30)



A) $B' \cap (A \cup B)$

B) $A \cap B \cap C$

C) $A' \cap C' \cap B$

D) $B \cap (A \cap C)'$

30) _____

Use a Venn diagram to answer the question.

31) A local television station sends out questionnaires to determine if viewers would rather see a documentary, an interview show, or reruns of a game show. There were 950 responses with the following results:

285 were interested in an interview show and a documentary, but not reruns;

38 were interested in an interview show and reruns, but not a documentary;

133 were interested in reruns but not documentaries or interviews;

228 were interested in an interview show but not a documentary;

95 were interested in a documentary and reruns;

57 were interested in an interview show and reruns;

76 were interested in none of the three.

How many are interested in exactly one kind of show?

A) 436

B) 456

C) 446

D) 466

31) _____

Solve the problem.

32) A survey of 280 families showed that

107 had a dog;

82 had a cat;

37 had a dog and a cat;

105 had neither a cat nor a dog nor a parakeet;

9 had a cat, a dog, and a parakeet.

How many had a parakeet only?

A) 33

B) 23

C) 38

D) 28

32) _____

33) A survey of a group of 112 tourists was taken in St. Louis. The survey showed the following:

63 of the tourists plan to visit Gateway Arch;

44 plan to visit the zoo;

9 plan to visit the Art Museum and the zoo, but not the gateway Arch;

14 plan to visit the Art Museum and the Gateway Arch, but not the zoo;

16 plan to visit the Gateway Arch and the zoo, but not the Art Museum;

7 plan to visit the Art Museum, the zoo, and the Gateway Arch;

14 plan to visit none of the three places.

How many plan to visit the Art Museum only?

A) 14

B) 32

C) 98

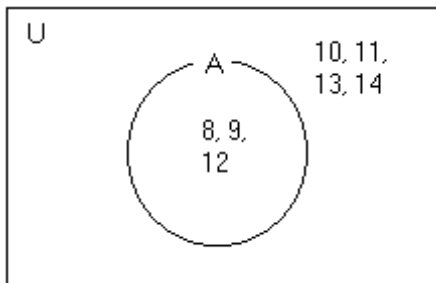
D) 44

33) _____

Answer Key

Testname: PRACTICE01

- 1) B
- 2) A
- 3) B
- 4) D
- 5) D
- 6) D
- 7) B
- 8) D
- 9) A
- 10) C
- 11) D
- 12) C
- 13) C
- 14) D
- 15) $A' = \{10, 11, 13, 14\}$



- 16) A
- 17) A
- 18) B
- 19) B
- 20) C
- 21) A
- 22) A
- 23) A
- 24) B
- 25) C
- 26) D
- 27) B
- 28) A
- 29) B
- 30) C
- 31) B
- 32) B
- 33) A