Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

1. Identify the sets:
The integers greater than –5 and less than 1.

a. {-5, -4, -3, -2, -1, 0}
b. {-4, -3, -2, -1, 0}
c. {-4, -3, -2, -1, 0, 1}
d. {-5, -4, -3, -2, -1, 0, 1}

ANSWER: b

2. Identify the sets:
The even natural numbers that are less than 14.

a. {0, 2, 4, 6, 8, 10, 12}
b. {2, 4, 6, 8, 10, 12}
c. {2, 4, 6, 8, 10, 12, 14}
d. {0, 2, 4, 6, 8, 10, 12, 14}

ANSWER: b

3. Use the roster method to write the set of the odd natural numbers less than 21.
ANSWER: {1, 3, 5, 7, 9, 11, 13, 15, 17, 19}

4. Use the roster method to write the set of integers x that satisfy $5x - 4 = 6$.

a. $\{0, 2, 4\}$
b. $\{5, -4, 6\}$
c. $\{5, -4\}$
d. $\{2\}$
e. $\varnothing$

ANSWER: d

5. Indicate whether the following sets are equal.

$A = \{x, f, a, n\}, D = \{x, a, b, y\}$

a. $A \neq D$
b. $A = D$

ANSWER: a

6. Write a description of the set $\{13, 14, 15, 16\}$.

a. The set of all integers between 12 and 17.
b. The set of all integers between 13 and 16.
c. The set of all real numbers between 12 and 17.
d. The set of all real numbers between 13 and 16.
e. The set of all rational numbers between 13 and 16.

ANSWER: a

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

7. Use $\in$ or $\notin$ to indicate whether the given object is an element of the given set.

1 $\{1, 2, 3, 4, 5, 6\}$

a. $1 \in \{1, 2, 3, 4, 5, 6\}$
b. $1 \notin \{1, 2, 3, 4, 5, 6\}$

ANSWER: a

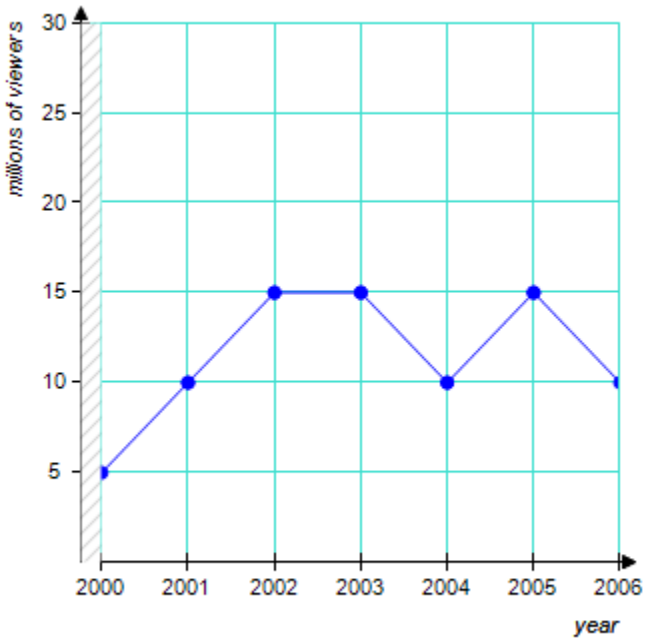
8. Use $\in$ or $\notin$ to indicate whether the given object is an element of the given set.

1 $\varnothing$

a. $1 \in \varnothing$
b. $1 \notin \varnothing$

ANSWER: b

9. Use the graph below, which shows the average number of weekly viewers of a 30-minute television program (in millions of viewers) from 2000 to 2006.



List the set of years such that the average number of weekly viewers was larger than 5 million but less than 15 million.

a. {2000, 2001, 2002, 2003, 2004, 2005, 2006}
b. {2001, 2004, 2006}
c. {2004, 2006}
d. null set
e. {2004}

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

ANSWER: b

10. Find the cardinality of the set $\{15, 30, 60, 120, 240\}$.

a. 465
b. 15
c. 240
d. 5
e. 60

ANSWER: d

11. Find the cardinality of the set $\{4, 10, 16, 22, 28, \ldots, 130\}$.

a. 55
b. 22
c. 23
d. 6
e. 210

ANSWER: b

12. Determine whether sets *A* and *B* are equal but not equivalent, equivalent but not equal, both equal and equivalent, or neither equal nor equivalent.

A is the set of all integers larger than 7 but smaller than 9
B is the set of all whole numbers larger than 7.55 but smaller than 8.35

a. equal but not equivalent
b. both equal and equivalent
c. equivalent but not equal
d. neither equal nor equivalent

ANSWER: b

13. Determine whether sets *A* and *B* are equal but not equivalent, equivalent but not equal, both equal and equivalent, or neither equal nor equivalent.

$A = \{70, 140, 280, 560\}$
$B = \{56, 112, 224, 448\}$

a. equivalent but not equal
b. both equal and equivalent
c. equal but not equivalent
d. neither equal nor equivalent

ANSWER: a

14. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ and $T = \{3, 6, 8\}$. Find T'.

a. $T' = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

b. $T' = \{3, 6, 8\}$

c. $T' = \{1, 2, 4, 5, 7, 9, 10\}$

d. $T' = \{1, 2, 3, 3, 4, 5, 6, 6, 7, 8, 8, 9, 10\}$

ANSWER: c

15. Assume that $A = \{2, 3, 5, 6\}$ and that U is the universal set of natural numbers less than 11. Find A'.

a. {2, 3, 5, 6}
b. {1, 4, 7, 8, 9, 10}
c. {1, 4, 7, 8, 9, 10, 11}
d. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
e. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11}

ANSWER: b

16. If $A = \{a, b, c, d\}$ and $B = \{d, a, c, b\}$, is A a subset of B?

a. Yes
b. No

ANSWER: a

17. Is $A \subseteq B$ if $A = \{2, 6, 7, 15\}$ and $B = \{2, 6, 7, 16, 18, 19\}$?

a. Yes
b. No

ANSWER: b

18. Tell whether each of the following statements is true or false.

a. {Real} ⊂ {Integers}

b. {Naturals} ⊂ {Real}

ANSWER: a. False
b. True

19. Find a subset of the set $\{18, 20, 22, 24, \ldots, 3900\}$.

a. The set of even whole numbers.
b. $\{3897, 3898, 3899, 3900\}$
c. $\{18, 22, 26, 30, \ldots, 3900\}$
d. $\{-18, -16, -14, \ldots, 14, 16, 18\}$
e. The set of positive real numbers between 18 and 3900.

ANSWER: c

20. ***Job growth*** The number of jobs in 2000, the number projected in 2025, and the projected annual growth rate for jobs in some cities are shown in the table below. Consider the following sets.

A = set of cities with at least 2,000,000 jobs in 2000 or in 2025

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

B = set of cities with at least 1,500,000 jobs in 2000
C = set of cities with projected annual growth rate of at least 2.5%

Cities	Jobs in 2000 (thousands)	Projected Jobs in 2025 (thousands)	Annual Rates of Increase (%)
O (Orlando)	1582	1923	0.78
M (Myrtle Beach)	133	256	2.65
A (Atlanta)	2715	4893	2.38
P (Phoenix)	1953	4182	3.09
D (Denver)	233	420	2.38

Which of the following statements is true?

a. A is a subset of B.
b. B is a subset of A.
c. C is a subset of A.
d. A is a subset of C.
e. B is a subset of C.

ANSWER: a

21. Let $U = \{2, 6, 8, 11, 14, 17\}$ and $A = \{2, 6, 11, 17\}$. If $B = \{14, 17\}$, determine the relationship between sets A and B.

a. A is a subset of B.
b. B is a subset of A.
c. B is the complement of A.
d. B is an element of A.
e. B is not a subset of A.

ANSWER: e

22. Given the sets $A = \{1, 2, 3\}$, $B = \{0, 1, 2, 3, \ldots\}$, and $C = \{0, 1, 2\}$, tell which of the following statements are true and which are false.

a. $A \subset C$ **b.** $5 \in B$ **c.** $C \subset A$ **d.** $C \subset B$

a. a. False b. True c. False d. True
b. a. False b. False c. False d. False
c. a. True b. True c. True d. True
d. a. True b. False c. True d. False

ANSWER: a

23. Use $\subseteq$ notation to indicate which of the sets E and F is a subset of the other.

$E = \{z, x, b, c\}, F = \{b, 3, x, c, 6, z\}$

a. $F \subseteq E$
b. $E \subseteq F$
c. $E \supseteq F$

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

d. $F \subseteq E$ and $E \supseteq F$

e. $F \subseteq E$ and $E \subseteq F$

ANSWER: b

24. Use $\subseteq$ notation to indicate which set is a subset of the other.

$A = \{2, 3, 4, 5\}$, $\varnothing$

a. $\varnothing \subseteq A$

b. $A \subseteq \varnothing$

c. $\varnothing \supseteq A$

d. $A \subseteq \varnothing$ and $\varnothing \supseteq A$

e. $A \subseteq \varnothing$ and $\varnothing \subseteq A$

ANSWER: a

25. Given $A = \{60\}$ and $B = \{40, 50, 60, 70, 80\}$, which of the following statements is true?

a. $A \in B$

b. $65 \in B$

c. $40 \subset A$

d. $B \subset A$

ANSWER: a

26. Find all the subsets of the set $\{d\}$.

a. $\varnothing$, $\{d\}$

b. $\{d, b\}$

c. $\{d\}$

d. d

ANSWER: a

27. How many subsets of four elements are contained in the set $\{a, b, c, d, e, f, g, h\}$?

a. 8

b. 28

c. 70

d. 56

ANSWER: c

28. Find the number of subsets of the set $\{12, 17, 22, 27, 32, 37\}$.

ANSWER: 64

29. Find the number of subsets of the given set.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

$\{x \mid x \text{ is an even counting number between 3 and 9}\}$

a. 7
b. 6
c. 8
d. 11

ANSWER: c

30. Find the number of subsets of the set of all vowels in the alphabet.

a. 128
b. 5
c. 32
d. 25

ANSWER: c

31. An Italian food restaurant claims that with the choices of toppings that they offer on their pizzas, you can order about 32768 different types of pizza. How many toppings do they offer?

a. 32768
b. 15
c. 17
d. 16
e. 19

ANSWER: b

32. Find $A \cup B$, the union of sets *A* and *B*.

$A = \{a, e, g, h, o\}$ and $B = \{a, b, c, d\}$

a. $A \cup B = \{e, g, h, o\}$
b. $A \cup B = \{a, b, c, d\}$
c. $A \cup B = \{a, b, c, d, e, g, h, o\}$
d. $A \cup B = \{a, c, d, e, g, h, o\}$
e. $A \cup B = \{a, c, d, e, o\}$

ANSWER: c

33. Find $A \cap B$, the intersection of sets *A* and *B*.

$A = \{2, 3, 4, 5, 6\}$ and
$B = \{4, 6, 8, 10, 12\}$

a. $A \cap B = \{4, 5, 7, 9, 11\}$
b. $A \cap B = \{3, 5\}$

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

c. $A \cap B = \{4, 6, 8, 10, 12\}$

d. $A \cap B = \{2, 3, 4, 5, 6\}$

e. $A \cap B = \{4, 6\}$

ANSWER: e

34. Find $A \cap B$ if $A = \{a, d, g\}$ and $B = \{b, c, d, f\}$
ANSWER: $\{d\}$

35. Assume that

$A = \{1, 2, 3, 5, 8, 7\}$
$B = \{5, 3, 4\}$

and that U is the universal set of natural numbers less than 11. Find $A \cap B'$.

a. $A \cap B' = \{1, 2, 3, 5, 8, 7\}$

b. $A \cap B' = \{2, 3, 5, 6\}$

c. $A \cap B' = \{1, 2, 7, 8\}$

d. $A \cap B' = \{1, 2, 6, 7, 8, 9, 10\}$

e. $A \cap B' = \{5, 3, 4, 9\}$

ANSWER: c

36. Assume that

$A = \{1, 2, 3, 5, 8, 7\}$
$B = \{1, 2, 5, 7, 8\}$

and that U is the universal set of natural numbers less than 11. Find $A' \cap B'$.

a. $A' \cap B' = \{1, 5, 7, 8\}$

b. $A' \cap B' = \{2, 4, 9, 10\}$

c. $A' \cap B' = \{3, 6, 7\}$

d. $A' \cap B' = \{4, 6, 9, 10\}$

e. $A' \cap B' = \{1, 3, 5, 7\}$

ANSWER: d

37. Assume that

$A = \{2, 3, 4, 7\}$
$B = \{1, 2, 5, 7, 8\}$

and that U is the universal set of natural numbers less than 11. Find $(A \cap B)'$.

a. $(A \cap B)' = \{1, 3, 4, 5, 6, 8, 9, 10\}$

b. $(A \cap B)' = \{3, 5, 7, 9\}$

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

c. $(A \cap B)' = \{1, 4, 7, 9, 10\}$

d. $(A \cap B)' = \{2, 4, 6, 7, 9\}$

e. $(A \cap B)' = \{1, 4, 5, 7, 9\}$

ANSWER: a

38. Assume that

$A = \{1, 2, 3, 5, 7, 8\}$
$B = \{5, 3, 4\}$
$C = \{5, 7, 3\}$

and that U is the universal set of natural numbers less than 11. Find $A \cap (B \cup C')$.

a. $A \cap (B \cup C) = \{3, 7\}$

b. $A \cap (B \cup C) = \{3, 5, 7\}$

c. $A \cap (B \cup C) = \{3, 5, 7, 9\}$

d. $A \cap (B \cup C) = \{1, 2, 4, 7, 9\}$

e. $A \cap (B \cup C) = \{1, 3, 7, 9\}$

ANSWER: b

39. Find the intersection of the following sets.

$\{8, 10, 12, 14, 28\} \cap \{1, 2, 3, 8, 11\}$

a. $\{8\}$

b. $\varnothing$

c. $\{1, 2, 3, 8, 10, 11, 12, 14, 28\}$

d. none of these

ANSWER: a

40. If $A = \{5, 4, 10, 19\}$, $B = \{8, 3, 19, 14\}$, and $C = \{5, 3, 10, 19\}$ find $(A \cup C) \cap B$.

a. $\{3, 19\}$

b. $\{5, 4, 10, 19\}$

c. $\{4\}$

d. $\{8, 14\}$

ANSWER: a

41. Assume that

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

and that U is the universal set of natural numbers less than 11. Find $A \cap (B' \cup C')$.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

a. $A \cap (B' \cup C') = \{3, 7\}$

b. $A \cap (B' \cup C') = \{1, 4, 7, 8\}$

c. $A \cap (B' \cup C') = \{3, 4, 7\}$

d. $A \cap (B' \cup C') = \{2, 3, 4, 8\}$

e. $A \cap (B' \cup C') = \{1, 7, 8\}$

ANSWER: c

42. Let $U = \{3, 4, 9, 10, 14, 18, 19, 22\}$, $A = \{3, 4, 10, 18\}$, $B = \{9, 14\}$, and $C = \{10, 18, 22\}$. Find $(A \cup B') \cup (C \cup A')$.

a. $\{9, 14\}$

b. $\{10, 18, 22\}$

c. $\{3, 4, 10, 18\}$

d. $\{3, 4, 9, 10, 14, 18, 19, 22\}$

e. $\varnothing$

ANSWER: d

43. ***Job growth*** The number of jobs in 2000, the number projected in 2025, and the projected annual growth rate for jobs in some cities are shown in the table below. Consider the following sets.

A = set of cities with at least 2,000,000 jobs in 2000 or in 2025
B = set of cities with at least 1,500,000 jobs in 2000
C = set of cities with projected annual growth rate of at least 2.5%

Cities	Jobs in 2000 (thousands)	Projected Jobs in 2025 (thousands)	Annual Rates of Increase (%)
O (Orlando)	1539	1923	0.89
M (Myrtle Beach)	133	256	2.65
A (Atlanta)	2715	4893	2.38
P (Phoenix)	1953	3723	2.61
D (Denver)	233	524	3.29

Choose the correct verbal description of $A \cap C$.

a. The set of cities with at least 2,000,000 jobs in 2000 or 2025 and projected annual growth rates of at least 2.5%.
b. The set of cities with at least 1,500,000 jobs in 2000 and projected annual growth rates of at least 2.5%.
c. The set of cities with at least 2,000,000 jobs in 2000 or 2025 and projected annual growth rates of less than 2.5%.
d. The set of cities with at least 2,000,000 jobs in 2000 and projected annual growth rates of at least 2.5%.
e. The set of cities with at least 2,000,000 jobs in 2000 or 2025 or projected annual growth rates of at least 2.5%.

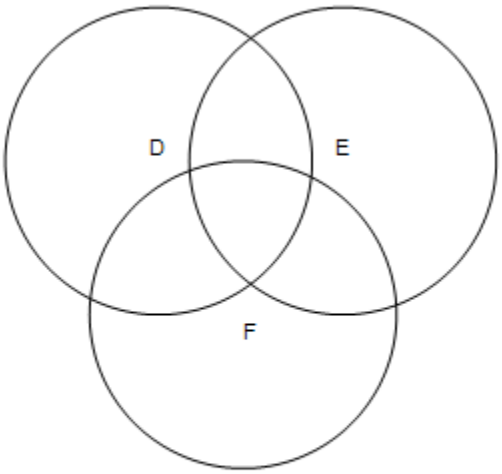
ANSWER: a

44. The circles contain the members of sets *D*, *E*, and *F*, as indicated. Designate the area that shows $E \cap F$.

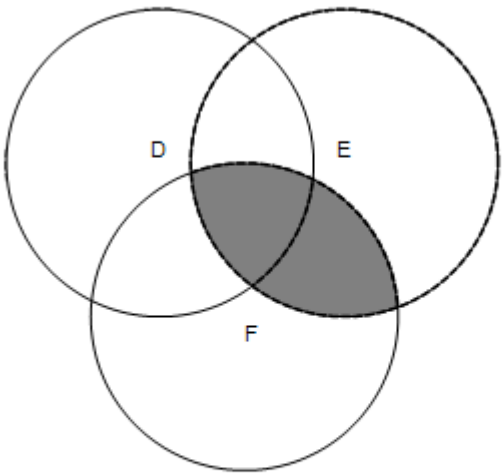
Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1



ANSWER:



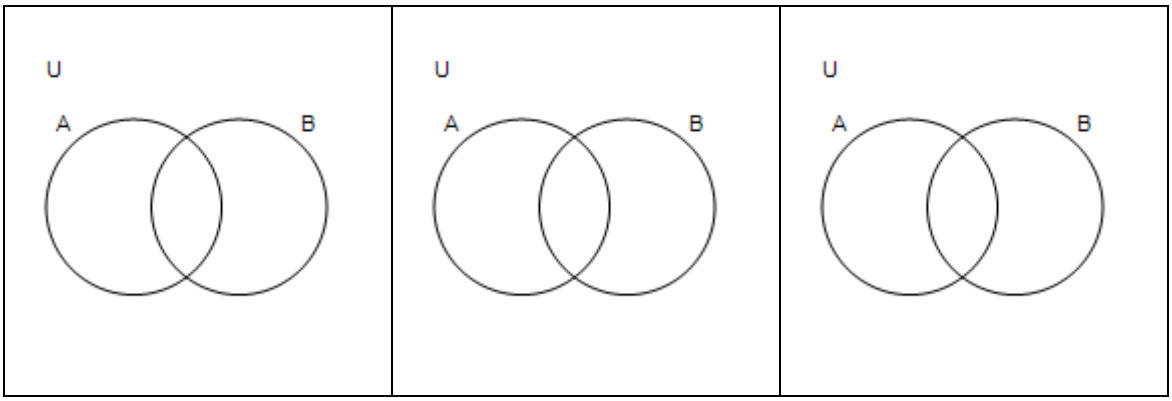
45. Use Venn diagrams to determine which (if any) of the following expressions are equal for all sets A and B.

$A' \cap B$, $A' \cup A$, $B \cup B'$

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1



a. $A' \cap B$, $A' \cup A$

b. $A' \cap B$, $B \cup B'$

c. $A' \cup A$, $B \cup B'$

d. all are equal

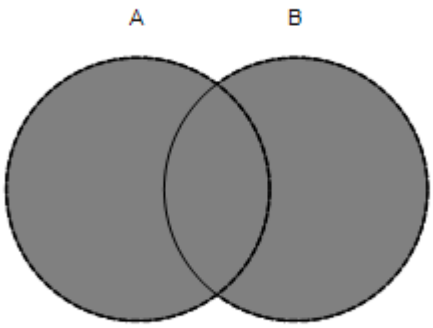
e. none are equal,

ANSWER: c

46. Draw two Venn diagrams to determine whether the following expressions are equal for all sets *A* and *B*.

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

ANSWER:



equal

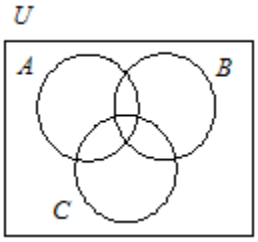
47. Use Venn diagrams to determine which (if any) of the following expressions are equal for all sets *A*, *B* and *C*.

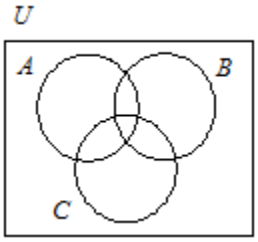
$A' \cup (C \cup B)$, $A' \cup (C' \cap B)$, $(A \cup C') \cap B$

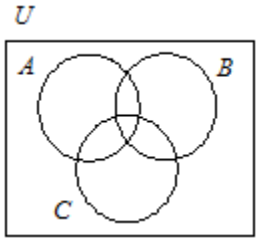
Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1







a. $A' \cup (C \cup B)$, $A' \cup (C' \cap B)$

b. $A' \cup (C \cup B)$, $(A \cup C') \cap B$

c. none are equale

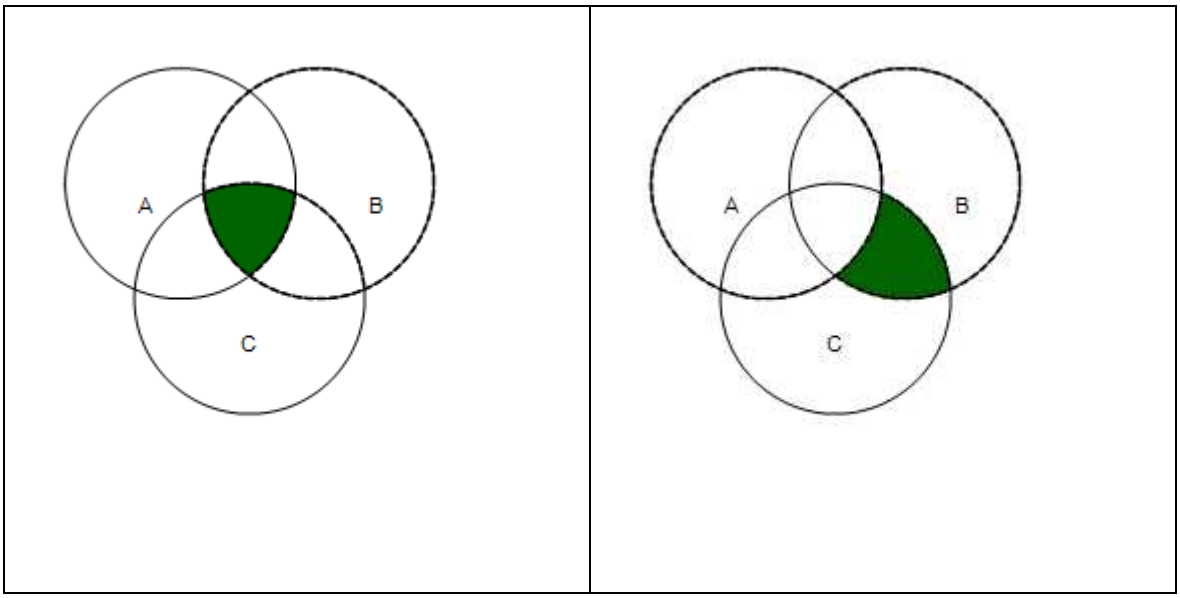
d. all are equale

e. $A' \cup (C' \cap B)$, $(A \cup C') \cap B$

ANSWER: c

48. Which Venn diagrams represent $(A' \cap B) \cup C \neq (A' \cup C) \cap (A' \cap B)$?

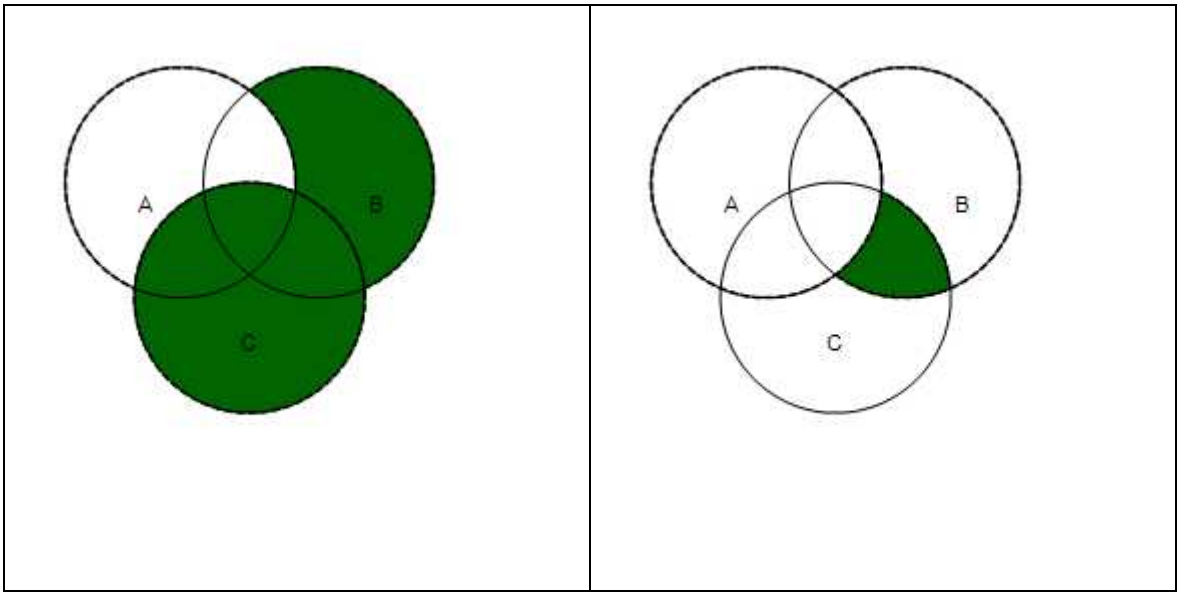
a.



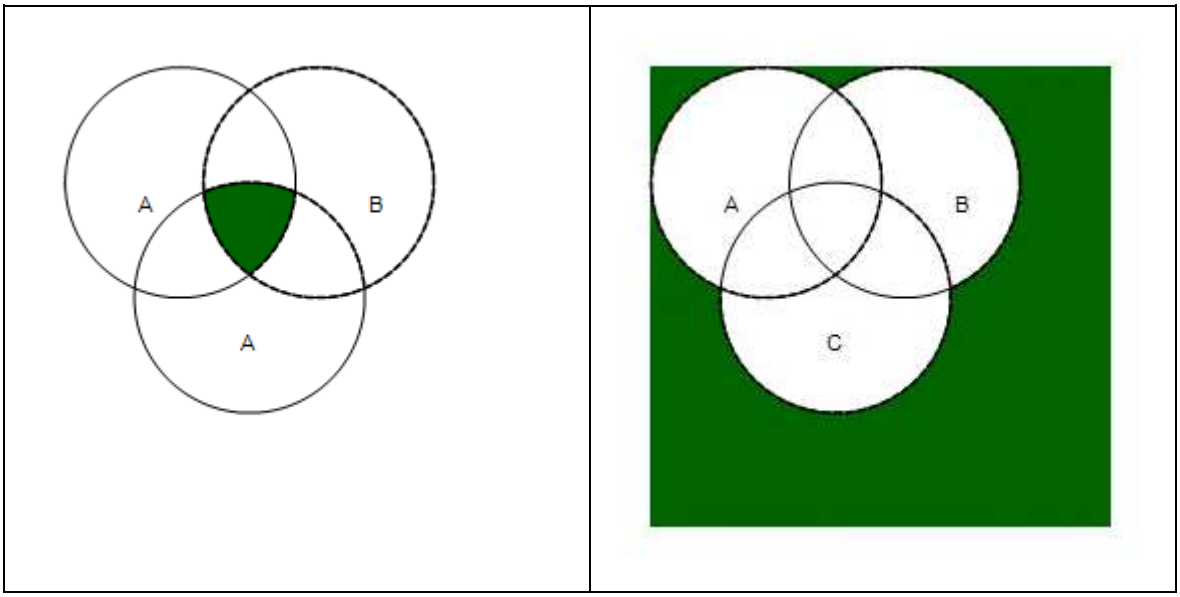
b.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1



c.

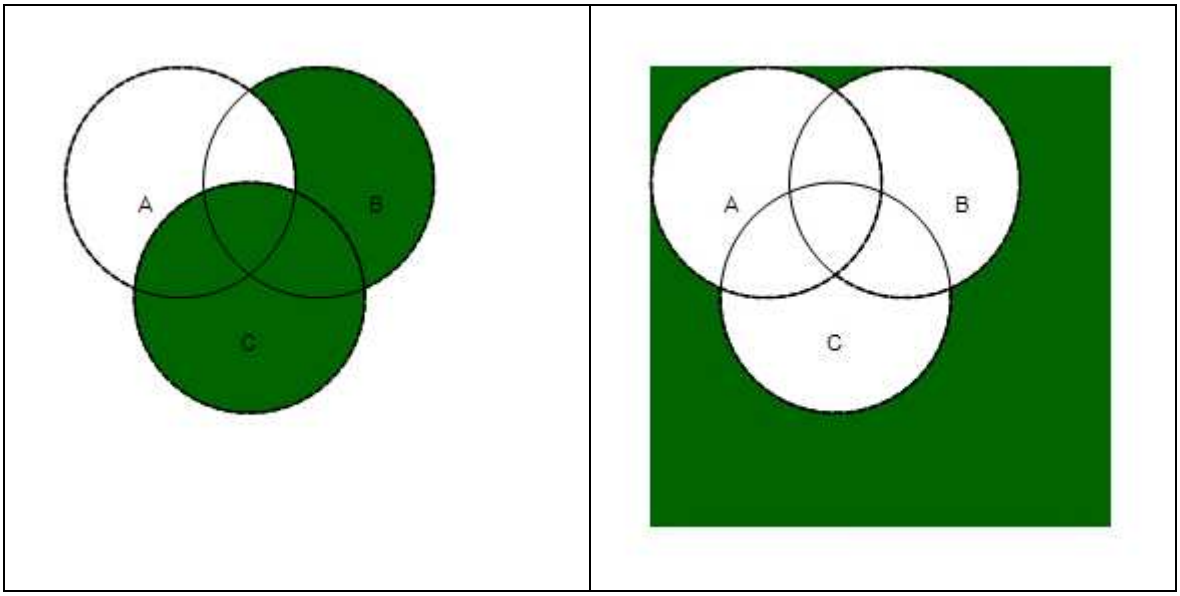


d.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

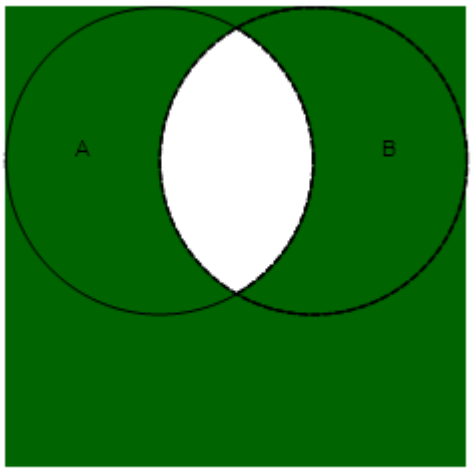
Section 2.1



ANSWER: b

49. Choose the Venn diagram that correctly represents the following sets $(A \cap B)'$

a.

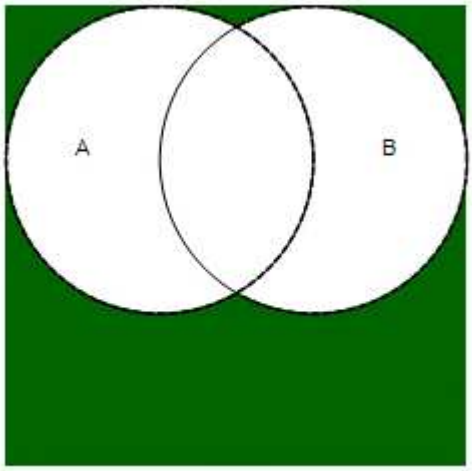


Copyright Cengage Learning. Powered by Cognero.

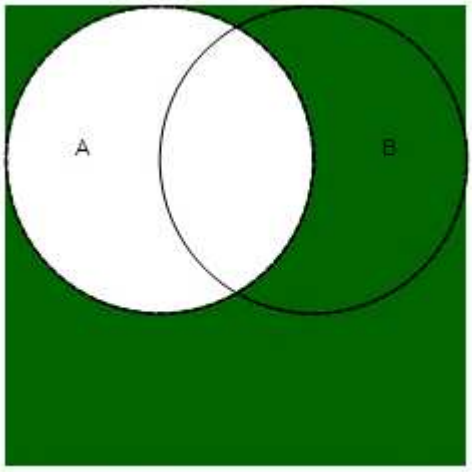
Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

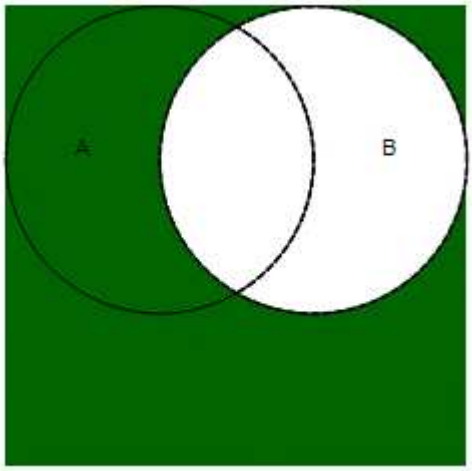
b.



c.



d.



ANSWER: a

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

50. Determine whether $(A \cap B) \cap C = A \cap (B \cap C)$ for all sets A, B, and C.

a. Yes, by the Commutative property of intersection.
b. Yes, by the Associative property of intersection.
c. Yes, by the Associative property of union.
d. No, $(A \cap B) \cap C \neq A \cap (B \cap C)$

ANSWER: b

51. Find $A - B$ if the universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

$A = \{1, 2, 3, 6, 9\}$
$B = \{1, 2, 5, 6, 7\}$

a. $A - B = \emptyset$
b. $A - B = \{2, 3, 7\}$
c. $A - B = \{1, 4, 5\}$
d. $A - B = \{5, 7, 8\}$
e. $A - B = \{3, 9\}$

ANSWER: e

52. Let $U = \{3, 5, 9, 12, 13, 17\}$, $A = \{3, 5, 12, 17\}$, and $B = \{9, 13\}$. Find $A - B$.

a. $A - B = \{3, 5, 12, 17\}$
b. $A - B = \{9, 13\}$
c. $A - B = \{3, 5, 12\}$
d. $A - B = \{3\}$
e. $\emptyset$

ANSWER: a

53. Let $A = \{3, 4, 11, 17\}$ and $B = \{14, 17\}$. Find $n(A \cup B)$.

a. $n(A \cup B) = 6$
b. $n(A \cup B) = 2$
c. $n(A \cup B) = 4$
d. $n(A \cup B) = 5$
e. $n(A \cup B) = 3$

ANSWER: d

54. Let $A = \{2, 4, 10, 17\}$, $B = \{7, 15\}$, and $C = \{10, 17, 22\}$. Find $n(A \cap B \cap C)$.

a. $n(A \cap B \cap C) = 1$
b. $n(A \cap B \cap C) = 0$

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

c. $n(A \cap B \cap C) = 2$

d. $n(A \cap B \cap C) = 3$

e. $n(A \cap B \cap C) = 4$

ANSWER: b

55. If $n(A \cup B) = 38$, $n(A \cap B) = 3$, and $n(B) = 19$ find $n(A)$.

a. 19
b. 22
c. 57
d. 35

ANSWER: b

56. If $n(A) = 17$, $n(B) = 11$, and $n(A \cap B) = 6$ find $n(A \cup B)$.

ANSWER: 22

57. If $n(A \cup B) = 29$, $n(A \cap B) = 3$, and $n(A) = 15$ find $n(B)$.

a. 14
b. 17
c. 44
d. 26

ANSWER: b

58. If $n(A) = 15$, $n(B) = 25$, and $n(A \cup B) = 35$ find $n(A \cap B)$.

a. 4
b. 5
c. 7
d. 8

ANSWER: b

59. A large soft drink company conducted a poll of 1,000 families to determine how many had seen its television and newspaper advertisements. The results are shown in the diagram.

U = the set of families polled
T = the set of families who saw the television ad
N = the set of families who saw the newspaper ad

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann



Based on the facts in the diagram, which is a valid conclusion?

a. 543 families saw neither the television ad nor the newspaper ad.
b. Only 222 saw the television ad.
c. 287 families saw at least 1 of the ads.
d. 98 families saw both the television ad and the newspaper ad.

ANSWER: d

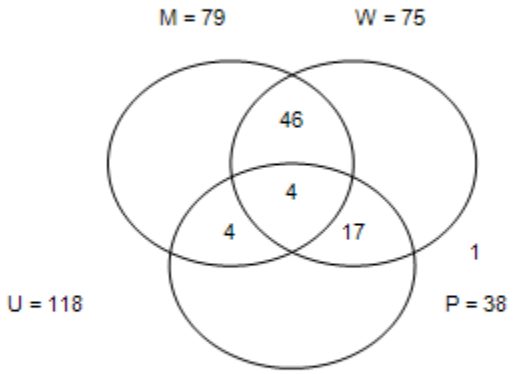
60. The Venn diagram displays the results of a survey of 119 families regarding kitchen appliances.

M represents the number of families with a microwave.
P represents the number of families with a pasta maker.
W represents the number of families with a dishwasher.
U represents all the families surveyed.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1



How many families have a microwave and a dishwasher?

a. 50
b. 4
c. 46
d. 42

ANSWER: a

61. Ms. Teller surveyed the 35 students in her class about their families. 29 students have a brother or a sister, 15 students have a brother, and 9 students have both a brother and a sister. How many students have only a sister?

a. 17
b. 26
c. 23
d. 25

ANSWER: c

62. **Survey analysis** In a survey of the dining preferences of 110 dormitory students at the end of the spring semester, the following facts were discovered about Adam's Lunch (AL), Pizza Tower (PT), and the Dining Hall (DH).

4 liked AL but not PT
19 liked AL only
42 liked AL
55 liked PT
29 liked DH
14 liked PT and AL but not DH
24 liked PT and DH

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

How many liked PT or DH?

a. 37
b. 19
c. 20
d. 18
e. 60

ANSWER: e

63. **Survey analysis** In a survey of the dining preferences of 110 dormitory students at the end of the spring semester, the following facts were discovered about Adam's Lunch (AL), Pizza Tower (PT), and the Dining Hall (DH).

27 liked AL but not PT
13 liked AL only
43 liked AL
41 liked PT
59 liked DH
4 liked PT and AL but not DH
13 liked PT and DH

How many liked all three?

a. 61
b. 41
c. 28
d. 31
e. 4

ANSWER: e

64. **Survey analysis** In a survey of the dining preferences of 110 dormitory students at the end of the spring semester, the following facts were discovered about Adam's Lunch (AL), Pizza Tower (PT), and the Dining Hall (DH).

4 liked AL but not PT
19 liked AL only
42 liked AL
55 liked PT
29 liked DH
14 liked PT and AL but not DH
24 liked PT and DH

How many liked only DH?

a. 5
b. 23
c. 4
d. 19
e. 1

ANSWER: e

65. ***Advertising*** Suppose that a survey of 100 advertisers in *U.S. News*, *These Times*, and *World* found the following.

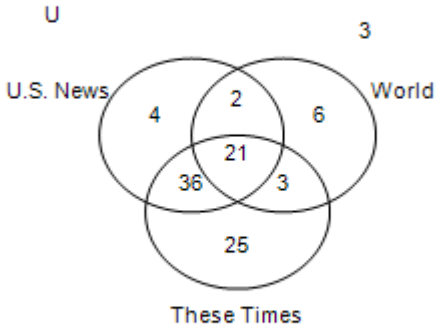
Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

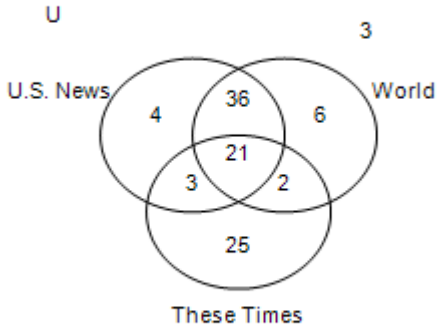
Section 2.1

21 advertised in all three
24 advertised in *These Times* and *U.S. News*
57 advertised in *World* and *U.S. News*
23 advertised in *World* and *These Times*
51 advertised in *These Times*
64 advertised in *U.S. News*
65 advertised in *World*
Which is the correct Venn diagram representing this information?

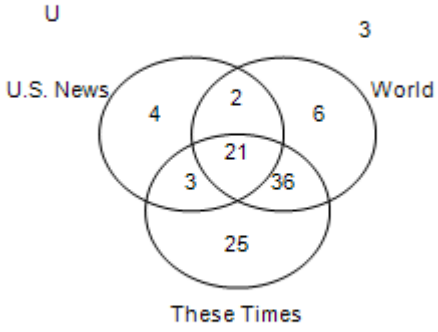
a.



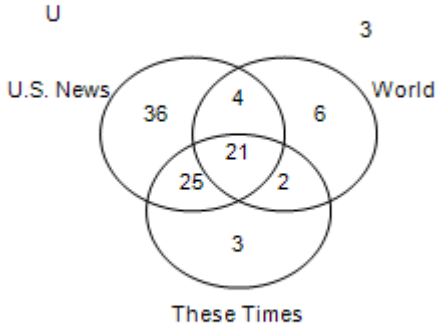
b.



c.



d.

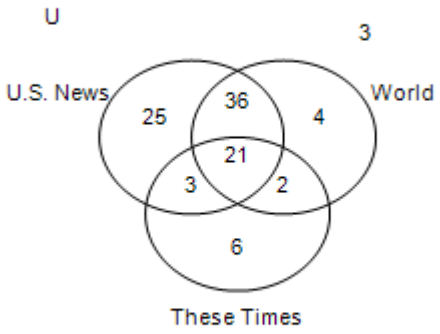


Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

e.



ANSWER: b

66. ***National health care*** Suppose that the table below summarizes the opinions of various groups on the issue of national health care.

Opinion	Whites		Nonwhites		Total
	Rep.	Dem.	Rep.	Dem.	
Favor	100	250	90	80	520
Oppose	200	50	90	140	480
Total	300	300	180	220	1000

Identify the number of individuals in the set of Whites who oppose national health care.

a. 480
b. 600
c. 250
d. 450
e. 700

ANSWER: c

67. ***National health care*** Suppose that the table below summarizes the opinions of various groups on the issue of national health care.

Opinion	Whites		Nonwhites		Total
	Rep.	Dem.	Rep.	Dem.	
Favor	150	250	70	100	570
Oppose	100	100	120	110	430
Total	250	350	190	210	1000

Identify the number of individuals in the set of Whites or those who oppose national health care.

a. 600

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.1

b. 430
c. 830
d. 350
e. 230

ANSWER: c

68. Given that set *A* has 46 elements, set *B* has 14 elements, and set *C* has 12 elements, determine the maximum possible number of elements in $A \cup B \cup C$ and the minimum possible number of elements in $A \cup B \cup C$.

a. maximum: 46
minimum: 12

b. maximum: 48
minimum: 44

c. maximum: 72
minimum: 46

d. maximum: 72
minimum: 12

e. maximum: 46
minimum: 14

ANSWER: c

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.2

1. Use an Euler diagram and all of the premises in the following argument to determine a valid conclusion for the argument.

All mathematicians are Hawaiians.
No Hawaiians are comedians.
$\therefore$?

a. No comedians are mathematicians.
b. All Hawaiians are mathematicians.
c. No comedians are Hawaiians.
d. All mathematicians are comedians.
e. No mathematicians are comedians.

ANSWER: e

2. Study the information given below. If a valid conclusion is given, select that conclusion.

All beachcombers are swimmers.
All swimmers wear swimsuits.
John is wearing a swimsuit.

a. Therefore John cannot swim.
b. Therefore John is a beachcomber.
c. Therefore John can swim.
d. no valid conclusion given

ANSWER: d

3. Select a valid conclusion for the following argument.
All turtles have shells.
Some pets are turtles.

a. Some pets have shells.
b. No turtles have shells.
c. No pets are turtles.
d. All pets are turtles.

ANSWER: a

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.3

1. Determine which sentence is a proposition.

a. Was George Boole born in Lincoln, England?
b. Was George Boole a mathematician?
c. George Boole was the best mathematician of his time.
d. George Boole was born in 1815.

ANSWER: d

2. Determine a sentence that is a proposition.

a. How many odd integers are there between 25 and 103?
b. Be sure to round your answers to the nearest 100th.
c. If x is a number, then x^3 is even.
d. Natural numbers are better than whole numbers.
e. Please work the first 15 problems for homework.

ANSWER: c

3. Write the symbolic proposition $r \wedge r$ in words using p, q, r and s as defined below.

p: I want a hamburger.
q: I want a steak.
r: I want to go to a restaurant.
s: I want to go to a park.

a. I do not want to go to a restaurant, and I do not want to go to a restaurant.
b. I want to go to a restaurant, and I want to go to a restaurant.
c. I want to go to a park, and I want to go to a park.
d. I do not want to go to a park, and I do not want to go to a park.
e. I do not want a hamburger, and I want a hamburger.

ANSWER: b

4. Use the following propositions to construct a disjunction.
This month is June.
Next month is not August.

a. This month is June and next month is not August.
b. This month is June or next month is not August.
c. Either this month is not June or next month is not August.
d. If this month is not June then next month is August.

ANSWER: b

5. Find the negation of the quantified proposition below. Then determine the negation's truth value.
All boys like math.

a. Every boy likes math.; True
b. Some boys like math.; True
c. Some boys like math.; False

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

d. Every boy likes math.; False

ANSWER: b

6. Determine a true proposition.

a. $-8 > 6$ or 25 is a prime number.

b. $6 \leq 11$ and $\frac{1}{4}$ is an irrational number.

c. 0 is a natural number and 0 is a whole number.

d. $6 \leq 11$ or $-8 < 6$

e. $6 \leq 11$ and $-8 > 6$

ANSWER: d

7. Determine a true proposition.

a. $4 > 10$ or 15 is a prime number.

b. $7 \leq 12$ and $\frac{1}{10}$ is an irrational number.

c. 0 is a natural number and 0 is a whole number.

d. $12 \leq 7$ or $4 > 10$

e. $7 \leq 12$ and $10 > 4$

ANSWER: e

8. Which compound proposition is true?

a. a pentagon has 3 sides and $5 - 4 = 1$

b. $4 \geq 5$ and a pentagon has 3 sides

c. $5 > 4$ and a pentagon has 5 sides

d. $4 \geq 5$ and a pentagon has 5 sides

ANSWER: c

9. Determine whether propositions p, q, and r each need to be true or false to make the proposition below false.

$(p \wedge r) \vee [(\sim q \wedge \sim r) \vee q]$

a. p: true
q: false
r: true

b. p: false
q: true
r: true

c. p: false
q: false
r: false

d. p: false
q: false

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.3

r: true

e. p: true
q: true
r: false

ANSWER: d

10. Which shows a truth table that has been completed correctly?

a.

p	q	$\sim q$	$p \wedge \sim q$
T	T	T	T
T	F	F	T
F	T	F	T
F	F	T	T

b.

p	q	$\sim q$	$p \wedge \sim q$
T	T	F	F
T	F	T	T
F	T	F	F
F	F	T	F

c.

p	q	$\sim q$	$p \wedge \sim q$
T	T	T	T
T	F	F	F
F	T	T	T
F	F	F	T

d.

p	q	$\sim q$	$p \wedge \sim q$
T	T	F	T
T	F	F	T
F	T	F	T
F	F	F	F

ANSWER: b

11. Is $\sim(p \vee q)$ equivalent to $\sim p \wedge \sim q$? Back up your answer with truth tables.

ANSWER: Yes

p	q	$\sim(p \vee q)$
T	T	F
T	F	F
F	T	F
F	F	T

p	q	$\sim p \wedge \sim q$
T	T	F

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.3

T	F	F
F	T	F
F	F	T

12. Determine which of the following three propositions are equivalent.

(a) $r \vee (p \wedge q)$

(b) $(r \vee p) \wedge (r \vee q)$

(c) $(r \wedge p) \vee (r \wedge q)$

a. (a) and (b)
b. (a) and (c)
c. (b) and (c)
d. all three are equivalent

ANSWER: a

13. Use De Morgan's laws to choose an equivalent form of the following sentence. It is not true that penguins and bears live in the Antarctic.

a. Penguins do not live in the Antarctic.
b. Bears do not live in the Antarctic.
c. It is not true that penguins or bears live in the Antarctic.
d. Penguins do not live in the Antarctic or bears do not live in the Antarctic.

ANSWER: d

14. How many rows should the truth table for 3 simple propositions contain if it is supposed to be in standard form?

a. 8
b. 9
c. 7
d. 3

ANSWER: a

15. Which is the antecedent of the following conditional proposition?
If a number is a perfect square then it has a square root that is an integer.

a. The square root of a number is not an integer.
b. A number is a perfect square.
c. If a number is a perfect square then it has a square root that is an integer.
d. The square root of a number is an integer.

ANSWER: b

16. Which is the consequent of the following conditional proposition?
If two numbers are both odd, then the sum of the numbers is odd.

a. The sum of two numbers is even.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

b. The sum of two numbers is odd.
c. If two numbers are both odd, then the sum of the numbers is odd.
d. Two numbers are odd.

ANSWER: b

17. Determine which of the following propositions are true.

(a) If 2 > –3, then 4 = 4.
(b) If $x > -3$, then $x + 2 < 8$.
(c) If 2 is even, then 8 is even.

a. (a)
b. (b)
c. (c)
d. (a) and (c)
e. (a) and (b)

ANSWER: d

18. Construct a truth table for $(\sim p \vee \sim q) \rightarrow \sim(p \wedge q)$.

ANSWER:

p	q	$\sim p$	$\sim q$	$p \wedge q$	$\sim(p \wedge q)$	$\sim p \vee \sim q$	$(\sim p \vee \sim q) \rightarrow \sim(p \wedge q)$
T	T	F	F	T	F	F	T
T	F	F	T	F	T	T	T
F	T	T	F	F	T	T	T
F	F	T	T	F	T	T	T

19. Which shows an equivalent proposition?
If Abe auditions for the part, he will act in the school play.

a. Abe does not audition for the part and he will not act in the school play.
b. Abe does not audition for the part or he would act in the school play.
c. If Abe does not audition for the part, he will not act in the school play.
d. Abe does not audition for the part.

ANSWER: b

20. Which could be the negation of a conditional proposition?

a. I complete my project and I will not be able to submit it in the science fair.
b. I cannot go to France in the summer.
c. I join the French club or I cannot go to France in the summer.
d. I complete my project or I will not be able to submit it in the science fair.

ANSWER: a

21. Determine which of the following three propositions are equivalent.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.3

(a) $p \rightarrow \sim q$
(b) $q \rightarrow \sim p$
(c) $\sim q \rightarrow \sim p$

a. (a) and (b)
b. (a) and (c)
c. (b) and (c)
d. all three are equivalent

ANSWER: a

22. Identify the converse of the conditional proposition.
If it is appropriate, then I eat out.

a. If I eat out, then it is appropriate.
b. If it is appropriate, then I do not eat out.
c. If it is not appropriate, then I do not eat out.
d. If I do not eat out, then it is not appropriate.

ANSWER: a

23. Write the converse of the given proposition.

$p \rightarrow \sim q$

a. $p \rightarrow \sim q$
b. $\sim q \rightarrow p$
c. $\sim p \rightarrow q$
d. $q \rightarrow \sim p$
e. $\sim q \rightarrow \sim p$

ANSWER: b

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.4

1. Choose the right premise for the given statement and conclusion.

Red Herring Fallacy

Employee: I would like to request a salary increase.
Director: There is no vacant position to promote you.

Conclusion: The director cannot increase the salary.

a. Premise: There is no vacant position for promotion.
b. Premise: The director cannot promote you.
c. Premise: There is no position with a higher salary.
d. Premise: The director cannot increase your salary.

ANSWER: a

2. Choose the right conclusion for the given statement and premise.

Straw Man Fallacy

My dad said when he was little he could not play basketball. I did not know that my dad was bad at sports.

Premise: Dad could not play basketball when he was little.

a. Conclusion: Dad cannot play basketball.
b. Conclusion: Dad can play basketball.
c. Conclusion: Dad was bad at sports.
d. Conclusion: Dad is bad at sports.

ANSWER: c

3. Choose the right premise for the given statement and conclusion.

Ad Hominem (Personal Attack) Fallacy

My physics teacher has not made any significant discoveries, so what can he teach us?

Conclusion: My teacher cannot educate us.

a. Premise: The physics teacher has not made any significant discoveries.
b. Premise: The physics teacher cannot teach us.
c. Premise: The physics teacher cannot make any significant discovery.
d. Premise: The physics teacher cannot educate kids.

ANSWER: a

4. Choose the right premise for the given statement and conclusion.

Appeal to Popularity Fallacy

This medicine helped my mother to cure a migraine, so it will help you.

Conclusion: The medicine will help you.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.4

a. Premise: My mum cured a migraine.
b. Premise: My mum had a migraine.
c. Premise: The medicine helped my mother to cure a migraine.
d. Premise: My mum took a medicine.

ANSWER: c

5. Choose the right premise for the given statement and conclusion.

Appeal to Ignorance Fallacy

There is no evidence that the man is innocent, so he must be guilty.

Conclusion: The man is guilty.

a. Premise: The man is not innocent.
b. Premise: There is no evidence of his innocence.
c. Premise: The man cannot prove his innocence.
d. Premise: The man must prove his innocence.

ANSWER: b

6. Choose the right premise for the given statement and conclusion.

Appeal to Authority Fallacy

My dad said if I ate a lot of sweets, my teeth would fall out.

Conclusion: The teeth will fall out because of sweets.

a. Premise: Dad said eating too many sweets would lead to tooth loss.
b. Premise: Dad said that my teeth would fall out.
c. Premise: Dad said that I couldn't eat too many sweets.
d. Premise: I eat a lot of sweets.

ANSWER: a

7. Choose the right conclusion for the given statement and premise.

Appeal to Emotion Fallacy

To become a happy family, it is necessary to buy a house in this neighborhood.

Premise: A family wants to be happy.

a. Conclusion: You should buy a house.
b. Conclusion: A happy family should have a house.
c. Conclusion: Every happy family has a house in this neighborhood.
d. Conclusion: It should buy a house in this neighborhood.

ANSWER: d

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.4

8. Choose the right conclusion for the given statement and premise.

Appeal to Common Practice Fallacy

Everyone has seen this movie, so you should watch it as well.

Premise: Everyone has seen this movie.

a. Conclusion: You should watch the movie.
b. Conclusion: You do not have a reason to watch the movie.
c. Conclusion: You can watch the movie.
d. Conclusion: You have watched the movie.

ANSWER: a

9. Choose the right conclusion for the given statement and premise.

Post Hoc (False Cause) Fallacy

Yesterday it was raining, and today my car has broken down. Therefore, the rain caused the damage.

Premise: Yesterday it was raining, and today my car has broken down.

a. Conclusion: The rain was strong enough to break the car.
b. Conclusion: The car can break down because of rain.
c. Conclusion: The rain caused the damage.
d. Conclusion: The car broke down yesterday.

ANSWER: c

10. Choose the right conclusion for the given statement and premise.

Black-or-White (False Dilemma) Fallacy

We must follow a map or we will get lost.

Premise: Either we follow a map or we get lost.

a. Conclusion: We will not get lost if we follow a map.
b. Conclusion: We must always follow a map.
c. Conclusion: A map will not let us get lost.
d. Conclusion: We will get lost.

ANSWER: a

11. Choose the right type of fallacy for the given statement, premise and conclusion.

If you keep eating sweets, you will gain excess weight that can lead to heart problems.

Premise: Excess weight can lead to heart problems.
Conclusion: Eating sweets can lead to heart problems.

a. Post Hoc (False Cause) Fallacy

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.4

b. Appeal to Common Practice Fallacy
c. Slippery Slope Fallacy
d. Appeal to Emotion Fallacy

ANSWER: c

12. Choose the right type of fallacy for the given statement, premise and conclusion.

I follow the rules from the book because that is what the book says.

Premise: The book says to follow its rules.
Conclusion: I follow the rules from the book.

a. Circular Reasoning
b. Appeal to Common Practice Fallacy
c. Slippery Slope Fallacy
d. Red Herring Fallacy

ANSWER: d

13. Choose the right type of fallacy for the given statement, premise, and conclusion.

My friend's dog became cleverer after their trip to the mountains. Therefore, I should take my dog to the mountains.

Premise: Trip to mountains makes dogs cleverer.
Conclusion: I should take my dog to the mountains to make it cleverer.

a. Circular Reasoning
b. Hasty Generalization Fallacy
c. Slippery Slope Fallacy
d. Red Herring Fallacy

ANSWER: b

14. Choose the right type of fallacy for the given statement, premise, and conclusion.

Wife: I need a new coat for this season.
Husband: Last year it was not so cold at this time.

Premise: Last year it was not so cold at this time.
Conclusion: Therefore, you do not need a new coat.

a. Circular Reasoning
b. Hasty Generalization Fallacy
c. Slippery Slope Fallacy
d. Red Herring Fallacy

ANSWER: d

15. Choose the right type of fallacy for the given statement, premise, and conclusion.

You must have excellent grades at school or you will not succeed in life.

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann

Section 2.4

Premise: Either you will have excellent grades at school or you will not succeed in life.
Conclusion: Having excellent grades at school will make you successful in life.

a. Circular Reasoning
b. Appeal to Ignorance Fallacy
c. Appeal to Popularity Fallacy
d. Black-or-White (False Dilemma) Fallacy

ANSWER: d

Copyright Cengage Learning. Powered by Cognero.

Access Complete Test Bank for Discovering Mathematics A Quantitative Reasoning Approach 1st Aufmann