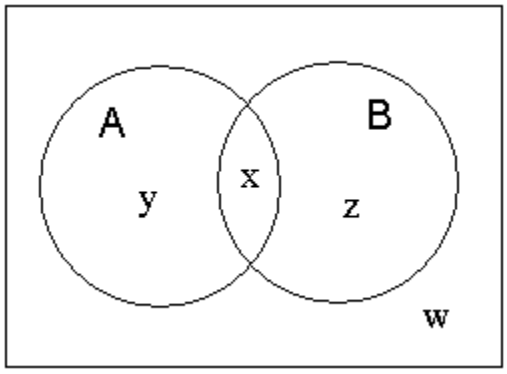
Math M118 Chapter 2 Basic Practice Questions

1. Given $U = \{1,2,3,4,5,6,7,8,9\}$ and subsets $A = \{1,3,5,7,9\}$, $B = \{1,2,3,4,5\}$, and $C = \{1,2,5,8,9\}$

Find:

a. $A \cap B$
b. $B - C$
c. $A \cup B'$
d. $A' \cap C$
e. $B \cap C'$
f. $A \cup A'$
g. $A \cap A'$
h. $B' \cup C$
i. $(A - B)'$
j. $(B \cap C)'$
k. $(B \cup C)'$
l. $B' \cap C'$
m. $B' \cup C'$
n. $(A \cup B \cup C)'$
o. $A' \cap B' \cap C'$
p. $(C - A) \cup B$
q. $A \cup (B \cap C)$
r. $A \cap (B \cup C)$

2. Given the Venn diagram below, which sections (x,y,z,w) would be included in the shaded portion if you shaded each of the following subsets?



a. $A \cup B$
b. $A \cap B$
c. A'
d. B'
e. $(A \cup B)'$
f. $(A \cap B)'$
g. $A' \cup B'$
h. $A' \cap B'$
i. $A - B$
j. $B - A$
k. $(A \cap B) \cup A'$
l. $(B - A)'$
m. $A' \cup B$
n. $A \cup B'$
o. $A' \cap B$
p. $A \cap B'$
q. $(A - B) \cup (B - A)$
r. $(A - B) \cap (B - A)$
s. $(A \cup B) - (A \cap B)$
t. $(A \cup B)' \cup (A \cap B)$

3. 60 students were surveyed. 40 like apples, 48 like bananas, and 30 like both.

How many students like:

a. neither?
b. apples but not bananas?
c. at least one of the two?
d. exactly one of the two?

4. 70 students were surveyed. 46 are taking math, 39 are taking English, and 10 are taking neither.

How many students are taking:

a. both math and English?
b. English but not math?
c. exactly one of the two?

5. Given $n(U) = 90$, $n(A) = 38$, $n(B) = 35$, and $n(A \cap B) = 12$, find:

a. $n(A \cup B)$
b. $n(B - A)$
c. $n(A - B)$
d. $n(B')$
e. $n(A \cup B)'$
f. $n(A' \cap B')$
g. $n(A \cap B)'$
h. $n(A' \cup B')$
i. $n(A' \cup B)$
j. $n(A \cup B')$
k. $n(A' \cap B)$
l. $n(A \cap B')$

6. Given $n(C) = 27$, $n(D) = 48$, $n(C \cup D) = 60$, and $n(D') = 30$, find:

a. $n(C \cap D)$
b. $n(C')$
c. $n(D - C)$
d. $n(C' \cup D')$

7. Given $n(A) = 21$, $n(A') = 24$, $n(A \cap B) = 6$, and $n(A' \cap B') = 14$, find $n(B)$.

Math M118 Chapter 2 Basic Practice Answers

1.

a. {1,3,5}
b. {3,4}
c. {1,3,5,6,7,8,9}
d. {2,8}
e. {3,4}
f. {1,2,3,4,5,6,7,8,9}
g. { }
h. {1,2,5,6,7,8,9}
i. {1,2,3,4,5,6,8}
j. {3,4,6,7,8,9}
k. {6,7}
l. {6,7}
m. {3,4,6,7,8,9}
n. {6}
o. {6}
p. {1,2,3,4,5,8}
q. {1,2,3,5,7,9]
r. {1,3,5,9}

2.

a. x,y,z
b. x
c. z,w
d. y,w
e. w
f. y,z,w
g. y,z,w
h. w
i. y
j. z
k. x,z,w
l. x,y,w
m. x,z,w
n. x,y,w
o. z
p. y
q. y,z
r. none
s. y,z
t. x,w

3. Draw a Venn diagram like in #2, with x = 30, y = 10, z = 18.
Find w = 2, since $= 60 - 30 - 10 - 18 = 2$ **.**

How many students like:

a. neither? 2
b. apples but not bananas? 10
c. at least one of the two? 58
d. exactly one of the two? 28

4. Find how many students are taking both. $x = 46 + 39 + 10 - 70 = 25$ **.**
Draw a Venn diagram like in #2, with x = 25, y = 21, z = 14, and w = 10.

How many students are taking:

a. both math and English? 25
b. English but not math? 14
c. exactly one of the two? 21+14 = 35

5. Draw a Venn diagram like in #2, with x = 12, y = 26, z = 23, and w = 29.

a. 61
b. 23
c. 26
d. 55
e. 29
f. 29
g. 78
h. 78
i. 64
j. 67
k. 23
l. 26

6. Find $n(C \cap D) = 27 + 48 - 60 = 15$.

Draw a Venn diagram like in #2, with x = 15, y = 12, z = 33.
Since $n(D') = 30$, find $w = 30 - 12 = 18$.

a. 15
b. 51
c. 33
d. 63

7. Draw a Venn diagram like in #2, with x = 6, y = 15, w = 14.
Since $n(A') = 24$, find $z = 24 - 14 = 10$.

Notice that 10 is not $n(B)$ but $n(B - A)$.

Find $n(B) = 10 + 6 = 16$.