

Graded Homework #2
Due: Sept 23rd

Name _____
Section 503 or 504 Seat # _____

1. Which of the following are well-defined sets?
 - a. The set of good football teams.
 - b. The set of all students in this class with a GPA ≥ 3.0 .
 - c. The set of all states in the United States that begin with the letter M.
 - d. The set of interesting authors in the US, since 1950.
2. Use set builder notation to describe the following set: The set of natural numbers which are multiples of five.

Answer: $A = \{x \mid x = 5a, a \in \mathbb{N}\}$

Let $A = \{4, 6, 8\}$, $B = \{a + 2b \mid a = 1 \text{ or } 2, \text{ and } b = 1, 2 \text{ or } 3\}$, $C = \{x \mid x \in \mathbb{W}, x < 6\}$

3. Which of the sets above are equivalent to set $D = \{a, b, c, d, e, f\}$?

Answer: $B \sim D$, $C \sim D$

4. Which of the sets above are proper subsets?

Answer: $A \subset B$

5. Which of the sets above are subsets?

Answer: $A \subseteq B$

Use the following sets for questions #6-8.

$G = \{x \mid x \text{ is a letter in the word } \textit{gala}\}$

$H = \{x \mid x \text{ is a letter in the word } \textit{along}\}$

$L = \{x \mid x \text{ is a letter in the word } \textit{loan}\}$

$N = \{x \mid x \text{ is a letter in the word } \textit{analog}\}$

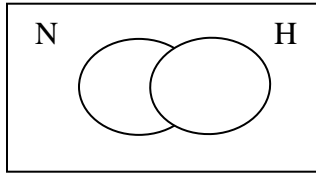
6. How many 1-1 correspondences are possible between sets G and L?

Answer: None, the sets are not equivalent.

7. Circle all of the following statements which are true:

a. $G \sim L$ b. $H \subset N$ c. $L \subseteq H$ d. $N = H$

8. Draw a Venn diagram illustrating sets G, H, N and L.



9. Show with a truth table that the negation of $p \vee \sim q$ is equivalent to which of the following:

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

- a) $p \wedge q$ b) $p \wedge \sim q$ c) $\sim p \vee q$ d) $\sim p \wedge q$ e) none of these

10. Write the negation of each of the following.

- a. Some of the recipes in this cookbook are not very good.

All of the recipes in this cookbook are very good.

- b. No rain is expected.

Some rain is expected.

- c. All puppies are playful.

Some puppies are not playful.

11. Suppose two sets exist in U such that $n(K) = 6$ and $n(L) = 15$. What is the maximum number of elements in $K \cup L$?

21

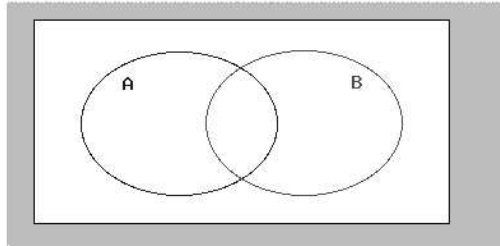
12. Find the n^{th} term in the arithmetic sequence: -7, -2, 3, ...

Answer: $a_n = 5n - 12$

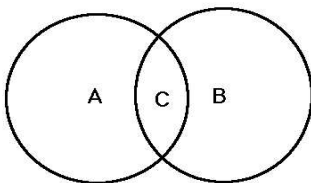
13. How many subsets are there for the set $P = \{a, b, c, d, e, f, g\}$?

Answer: $2^7 = 128$

14. Shade in the region $(A \cap B) \cup \overline{(A \cup B)}$.



15. or false: $A \cap \overline{B} = A - B$. (Ignore the C label in the drawing.)



16. One hundred students were polled and asked their blood types, A, B, AB or O as well as whether their Rh factor was positive or negative. The results were as follows. How many were classified O negative?

Rh Factor	A	O	B	AB
Positive	62	14	10	2
Negative	4	6	2	0

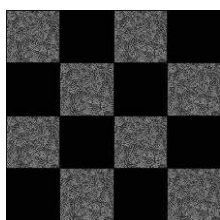
# Samples	Antigen in Blood
4	A and Rh -
2	B and Rh-
14	Rh +
0	A, B, and Rh-
62	A and Rh +
10	B and Rh +
2	A, B, and Rh +

6 were O negative.

17. Fourteen people attended the conference and shake hands with each person before the lectures begin. How many handshakes took place if each person shook hands only once with each person?

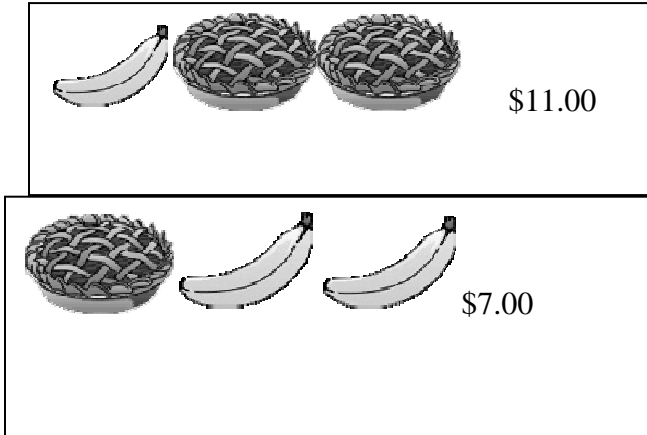
91 handshakes

18. How many squares of any size are on this checkerboard?



30 squares

19. What is the price of one cherry pie? Explain to a young student how to get the answer.



\$18 buys 3 pies and 3 bananas so
\$6 will buy 1 pie and 1 banana

Since the first shopping cart has one pie more than 1 pie and 1 banana, and it costs \$11, then one pie costs \$5.00.

20. Fill in the magic square below:

8	1	6
3	5	7
4	9	2