

Math 1303 - Math in the Liberal Arts

Exam 2

Assigned: 2020.09.30, 12:01 AM

Due: 2020.09.30 at 11:59 PM

Instructions: Work on this by yourself, if you feel you need to ask a question for clarification purposes, you may email the instructor. You are allowed to use the internet to research information required to work on a given problem, but not on the process required to solve the problem, for problems 1, 2, and 6. Please cite your research, if used. For each problem be sure to show all of your work and write every step down in a clear and concise manner. When finished, upload this front sheet and all of your work, as a pdf or jpg to Blackboard. Do not write your answers on the exam itself.

Agreement: Please read the following statement and then write it above the 'Printed Name' line:

"I hereby swear that all the work that appears on this exam is completely my own, and I have not discussed any portion of this exam with any one else besides the instructor."

Printed Name: _____

Signature: _____

Date: _____

1. Consider the following set, R , expressed in set-builder notation:

$$R = \{x \mid x \text{ is a current United States Representative from Oklahoma.}\}$$

(a) Express the set R in roster notation:

(b) What is $n(R)$?

2. C is defined in roster as follows:

$$C = \{ \text{Oden Grube, Steve Brittingham, Jerry Tomlinson, Mike Morris, Danny Sherrer} \}$$

(a) Express the set C in set builder notation.

(b) Compute $n(C)$.

3. Describe in a full English sentence the follow set: $P = \{2, 3, 5, 7, 11, 13, 17, 19\}$

4. Let $A = \{1, 2, 3, \{1, 2\}, \{1\}\}$. Determine if each of the following statements are true or false.

(a) $1 \in A$

(b) $\{1\} \in A$

(c) $\{1, 2\} \in A$

(d) $\{1, 2\} \subseteq A$

(e) $\{\{1, 2\}\} \subseteq A$

(f) $3 \in A$

(g) $3 \subseteq A$

(h) $\{\} \in A$

(i) $\{\} \subseteq A$

5. Compute all possible subsets of $L = \{\square, \diamond, \triangle\}$

6. For this problem, the sets O , C , and L will be defined as follows:

$$O = \{x \mid x \text{ is a city in Oklahoma.}\}$$

$$C = \{x \mid x \text{ is a capital of a state in the USA.}\}$$

$$L = \{x \mid x \text{ is a city in with at least 500,000 people.}\}$$

Answer the following questions. Please cite where you obtained your information from to answer them.

(a) Compute $O \cap C$.

(b) Compute $C \cap L$.

(c) Compute $O \cap L$.

(d) Relate $O \cap C$ to $C \cap L$ using \subseteq or $=$. Also relate $O \cap C$ to $O \cap L$ using \subseteq or $=$.

(e) What would the population in the definition of L need to be so that $C \subset L$?

7. Let $A = \{0, 1, 2, \dots\}$, and $B = \{10, 20, 30, \dots\}$. Is $n(A) < n(B)$, $n(A) = n(B)$, or $n(A) > n(B)$?

8. Let the sets A and B be defined as

$$A = \{x \mid x \text{ is a student in Math 1303 who studied for the exam using their notes.}\}$$

$$B = \{x \mid x \text{ is a student in Math 1303 who studied for the exam using the textbook.}\}$$

There are 33 students enrolled in our course. Of those, 14 students stated that they used the textbook to study for the exam, while 17 used their notes to study. Of those polled, 7 said that they did not study at all for the exam.

(a) Construct a Venn diagram for the sets A and B .

(b) How many students used both their notes and the textbook to study for the exam?

(c) How many students did not use the textbook to study for the exam?

(d) How many students did not use both their notes and the textbook to study?

9. Students were interviewed and asked about three facets of their student experience: if they lived on campus, were a student athlete, and belonged to the Honors program. Here were the results:

73 were student athletes only.

45 were Honors students.

32 were Honors students only.

533 lived on campus.

102 student athletes lived on campus.

4 lived on campus, were student athletes, and were Honors students.

12 were Honors students living on campus.

261 interviewed were none of the three.

(a) Construct a three set Venn diagram for the given information.

(b) How many total students were interviewed?

(c) How many students were in the Honors program, and were also student athletes, but did not live on campus?

(d) How many students did not live on campus?

(e) How many students belonged to exactly two of the given groups?