

MAT 230 Module One Homework

**General:**

- Before beginning this homework, be sure to read the textbook sections and the material in Module One.
- Type your solutions into this document and be sure to show all steps for arriving at your solution. Just giving a final number may not receive full credit.
- You may copy and paste mathematical symbols from the statements of the questions into your solution. This document was created using the Arial Unicode font.
- These homework problems are proprietary to SNHU COCE. They may not be posted on any non-SNHU website.
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- 1) Suppose  $C = \{\text{red, blue, white, black}\}$ . For a) and b) below, fill in two values that make the statement true (more than one solution is possible).

a) \_\_\_\_\_  $\in C$

b) \_\_\_\_\_  $\notin C$

This problem is similar to Example 1 and to Exercises 1 and 2 in Section 1.1 of your SNHU MAT230 textbook.

- 2) List the elements of the set  $\{x \mid x \in \mathbb{Z} \text{ and } x^2 < 30\}$ .

This problem is similar to Example 5 and to Exercise 4 in Section 1.1 of your SNHU MAT230 textbook.

- 3) Consider  $U = \{2, 5, \text{blue, apple, \$}\}$ ,  $A = \{2, \text{blue, \$}\}$ , and  $B = \{5, \$\}$ . Complete parts a) and b) below.

a) Is  $A \subseteq U$ ? Explain why or why not.

b) Is  $B \subseteq A$ ? Explain why or why not.

This problem is similar to Examples 6 and 8 and to Exercises 15–17 in Section 1.1 of your SNHU MAT230 textbook.

- 4) Consider the following sets  $U$ ,  $A$ ,  $B$ , and  $C$ .

$U = \{\text{mathematics, history, marketing, geography, psychology, English, finance, statistics, sociology}\}$

$A = \{\text{marketing, geography, English, statistics}\}$

$B = \{\text{mathematics, geography, psychology, English}\}$

$C = \{\text{mathematics, marketing, geography, psychology, sociology}\}$

Compute each of the following:

a)  $A \cup C =$

b)  $C \cap B =$

c)  $\overline{A \cap B} =$

d)  $A \cup B - C =$

e)  $A \oplus B =$

This problem is similar to Examples 1–6 and to Exercises 1–4 in Section 1.2 of your SNHU MAT230 textbook.

- 5) The records of 100 SNHU students show the following courses taken:

- 53 students took History
- 41 students took Marketing
- 48 students took Writing
- 18 students took History and Marketing
- 21 students took Marketing and Writing
- 7 students took all 3 courses
- 9 students took none of these courses

Answer the following questions. Show how you obtained your solution.

- a) How many students took Marketing and Writing, but not History?
- b) How many students took only History?

This problem is similar to Example 10 and to Exercises 25–28 in Section 1.2 of your SNHU MAT230 textbook.

- 6) Consider the sequence defined by  $a_n = (n^2 - n) / 2$ .

- a) Is this a recursive or explicit equation? Explain why.
- b) Using the formula, list the first 4 terms of the sequence (starting with  $n=1$ ).

This problem is similar to Examples 4–7 and to Exercises 7–14 in Section 1.3 of your SNHU MAT230 textbook.

- 7) Consider the sequence defined by  $a_1 = 3$  and  $a_n = 5 - 2a_{n-1}$ .

- a) Is this a recursive or explicit equation? Explain why.
- b) Using the formula, list the first 4 terms of the sequence (starting with  $n=1$ ).

This problem is similar to Examples 4–7 and to Exercises 7–14 in Section 1.3 of your SNHU MAT230 textbook.

8) Consider the following sets.

$U = \{\text{pink, purple, red, blue, gray, orange, green, yellow, indigo, violet}\}$

$A = \{\text{purple, red, orange, yellow, violet}\}$

$B = \{\text{blue, gray, orange, green}\}$

$C = \{\text{pink, red, blue, violet}\}$

Represent each of the following sets by an array of zeros and ones. Explain your reasoning.

a)  $A \cup C$ .

b)  $A \cap B$ .

c)  $\overline{B \cup C}$

This problem is similar to Examples 12 and 13 and to Exercises 26 and 27 in Section 1.3 of your SNHU MAT230 textbook.

9) Find  $a$ ,  $b$ , and  $c$  to solve the equation below:

$$\begin{bmatrix} -2 & 5 \\ a+b & 4 \\ 7 & a+c \end{bmatrix} = \begin{bmatrix} -2 & 5 \\ -8 & a-b \\ 7 & 3 \end{bmatrix}$$

This problem is similar to Example 4 and to Exercises 3 and 4 in Section 1.5 of your SNHU MAT230 textbook.

10) Use the following matrices for the computations below.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ -2 & -1 & 0 \end{bmatrix} \quad B = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 3 & -2 \\ 5 & 0 & -1 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 1 & -2 \\ 0 & -1 & 4 \end{bmatrix}$$

a) Compute  $A + C$ .

b) Compute  $AB$ . If this product is undefined, explain why.

c) Compute  $BA$ . If this product is undefined, explain why.

This problem is similar to Examples 5 and 7 and to Exercise 5 in Section 1.5 of your SNHU MAT230 textbook.