Section 1.7 Adding and Subtracting Matrices

**Before Class:**

- Read the objectives on page 50.
- Complete the exercises:
  1. Describe two different ways to represent a matrix.
  2. A matrix of order $m \times n$ has ________ rows and ________ columns.
  3. Can two matrices be equal if they have different orders?

**During Class:**

- Write your class notes. Neatly write down all examples shown as well as key terms or phrases with definitions. If not applicable or if you were absent, watch the Lecture Series (DVD) for this section and do the same (write down the examples shown as well as key terms or phrases). Insert more paper as needed.

<table>
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<tr>
<th>Class Notes/Examples</th>
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**Answers and References:**
1) Answers may vary, see p. 50.
2) $m; n$
3) no
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<th>Class Notes (continued)</th>
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(Insert additional paper as needed.)
Practice:

☐ Complete any incomplete exercises below. Check and correct your work using the answers and references at the end of this section.

**Review this example:**

1. Let \( A = \begin{bmatrix} 3 & 2 & 0 \\ -4 & -5 & -1/5 \end{bmatrix} \).

   a. What is the order of \( A \)?
   
   b. Identify \( a_{23} \) and \( a_{12} \).

   a. The matrix has 2 rows and 3 columns, so it is of order \( 2 \times 3 \).
   
   b. The element \( a_{23} \) is in the second row and third column; \( a_{23} = -1/5 \). The element \( a_{12} \) is in the first row and second column; \( a_{12} = 2 \).

**Your turn:**

2. a. Give the order of the matrix \( A \).

   b. Identify \( a_{32} \) and \( a_{23} \), or explain why identification is not possible.

   \( A = \begin{bmatrix} 4 & -7 & 5 \\ -6 & 8 & -1 \end{bmatrix} \)

**Review this example:**

3. Perform the indicated matrix operation.

\[
\begin{bmatrix} 0 & 5 & 3 \\ -2 & 6 & -8 \end{bmatrix} + \begin{bmatrix} -2 & 3 & 5 \\ 7 & -9 & 6 \end{bmatrix} = \begin{bmatrix} 0+(-2) & 5+3 & 3+5 \\ -2+7 & 6+(-9) & -8+6 \end{bmatrix} = \begin{bmatrix} -2 & 8 & 8 \\ 5 & -3 & -2 \end{bmatrix}
\]

**Your turn:**

4. Find values for the variables so that the matrices are equal.

\[
\begin{bmatrix} x & 2y \\ z & 9 \end{bmatrix} = \begin{bmatrix} 4 & 12 \\ 3 & 9 \end{bmatrix}
\]

Section 1.7 Adding and Subtracting Matrices

Review this example:

5. Perform the indicated matrix operation.

\[
\begin{bmatrix}
-6 & 7 \\
2 & -3
\end{bmatrix}
-\begin{bmatrix}
-5 & 6 \\
0 & -4
\end{bmatrix}
\]

\[
\begin{bmatrix}
-6 & 7 \\
2 & -3
\end{bmatrix}
-\begin{bmatrix}
-5 & 6 \\
0 & -4
\end{bmatrix}
= \begin{bmatrix}
-6-( -5) & 7-6 \\
2-0 & -3-( -4)
\end{bmatrix}
= \begin{bmatrix}
-1 & 1 \\
2 & 1
\end{bmatrix}
\]

Your turn:

6. Let \( A = \begin{bmatrix} 
1 & 3 \\
3 & 4 \\
5 & 6
\end{bmatrix} \) and \( B = \begin{bmatrix}
2 & -1 \\
3 & -2 \\
0 & 1
\end{bmatrix} \).

Find the following matrices:

a. \( A + B \)

b. \( A - B \)

Next, insert your homework. Make sure you attempt all exercises asked of you and show all work, as in the exercises above. Check your answers if possible. Clearly mark any exercises you were unable to correctly complete so that you may ask questions later. DO NOT ERASE YOUR INCORRECT WORK. THIS IS HOW WE UNDERSTAND AND EXPLAIN TO YOU YOUR ERRORS.