Unit 5 Lesson 1 Homework Set

For exercises 1-2,

a. State the order of each matrix.
b. If $A = [a_{ij}]$, identify a_{32}, and a_{23}, or explain why identification is not possible.

1. $\begin{bmatrix} 4 & -7 & 5 \\ -6 & 8 & -5 \end{bmatrix}$

2. $\begin{bmatrix} 1 & -5 & \pi & e \\ 0 & 7 & -6 & -\pi \\ -2 & \frac{1}{2} & 11 & -\frac{1}{5} \end{bmatrix}$

In exercises 3-4, find values for the variables so that the matrices in each exercise are equal.

3. $\begin{bmatrix} x \\ 4 \end{bmatrix} = \begin{bmatrix} 6 \\ y \end{bmatrix}$

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

In exercises 5-8, find the following matrices **by hand**.

a. $\boldsymbol{A + B}$ **b.** $\boldsymbol{A - B}$ **c.** $\boldsymbol{-4A}$ **d.** $\boldsymbol{3A + 2B}$

5. $A = \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 9 \\ 0 & 7 \end{bmatrix}$

6. $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -1 \\ 3 & -2 \\ 0 & 1 \end{bmatrix}$

7. $A = \begin{bmatrix} 2 \\ -4 \\ 1 \end{bmatrix}$, $B = \begin{bmatrix} -5 \\ 3 \\ -1 \end{bmatrix}$

8. $A = \begin{bmatrix} 2 & -10 & -2 \\ 14 & 12 & 10 \\ 4 & -2 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 6 & 10 & -2 \\ 0 & -12 & -4 \\ -5 & 2 & -2 \end{bmatrix}$

In exercises 9-13, let $A = \begin{bmatrix} -3 & -7 \\ 2 & -9 \\ 5 & 0 \end{bmatrix}$ *and* $B = \begin{bmatrix} -5 & -1 \\ 0 & 0 \\ 3 & -4 \end{bmatrix}$ and solve each for *X*. **by hand**.

9. $X - A = B$

10. $2X + A = B$

11. $3X + 2A = B$

12. $B - X = 4A$

13. $4A + 3B = -2X$

In exercises 14-15, perform the indicated matrix operations given that $A, B, and\ C$ are defined as follows. If an operation is not defined, state the reason.

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

14. $4B - 3C$

15. $A - C$

[From Algebra and Trigonometry, by Robert Blitzer, Pearson Education, 2007]

16. The Metropolitan Opera is planning its last cross-country tour. It plans to perform *Carmen* and *La Traviata* in Atlanta in May. The person in charge of logistics wants to make plane reservations for the two troupes. *Carmen* has 2 stars, 25 other adults, 5 children, and 5 staff members. *La Traviata* has 3 stars, 15 other adults, and 4 staff members. There are 3 airlines to choose from. Redwing charges round-trip fares to Atlanta of $630 for first class, $420 for coach, and $250 for youth. Southeastern charges $650 for first class, $350 for coach, and $275 for youth. Air Atlanta charges $700 for first class, $370 for coach, and $150 for youth. Assume stars travel first class, other adults and staff travel coach, and children travel for the youth fare.

    Find the total cost for each opera troupe with each airline by hand *without using matrices*. Bring your answers with you to our residential weekend this Saturday.

[From New Topics For Secondary School Mathematics, by the NCSSM Mathematics Department, NCTM, 1998]