

## Working With Matrices

**Question 1.** Determine the order of each of the following matrices.

$$A = \begin{bmatrix} 1 & -4 & 8 \\ 2 & 10 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 4 & -20 \\ -1 & 0 \\ 0 & 0 \end{bmatrix} \quad C = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

**Question 2.** Add or subtract the following matrices, if possible, to determine the matrices  $A + B$ ,  $A + C$ ,  $C + D$ ,  $B - A$  and  $D - B$ .

$$A = \begin{bmatrix} 2 & 4 \\ -3 & 5 \end{bmatrix} \quad B = \begin{bmatrix} -3 & 10 \\ 0 & 2 \end{bmatrix}$$

$$C = \begin{bmatrix} 1 & 1 & 0 \\ 2 & -3 & 8 \end{bmatrix} \quad D = \begin{bmatrix} 2 & -1 & 7 \\ 4 & -9 & 11 \end{bmatrix}$$

**Question 3.** If  $A$  is a  $2 \times 2$  matrix,  $B$  is a  $3 \times 3$  matrix,  $C$  is a  $3 \times 2$  matrix and  $D$  is a  $2 \times 3$  matrix, determine whether you can multiply the following matrices and, if so, give the order of the resulting matrix.

- |         |         |
|---------|---------|
| a) $AD$ | d) $DC$ |
| b) $AB$ | e) $DA$ |
| c) $CD$ | f) $DB$ |

**Question 4.** Multiply the following matrices by a scalar to determine the matrices  $2A$ ,  $-3B$ ,  $10C$  and  $2B$ .

$$A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \\ -2 & 5 \end{bmatrix} \quad B = \begin{bmatrix} 0 & -4 \\ 1 & 1 \\ 2 & -3 \end{bmatrix} \quad C = \begin{bmatrix} 3 & 10 \\ -2 & 5 \end{bmatrix}$$

**Question 5.** Multiply the following matrices, if possible, to determine the matrices  $AB$ ,  $BA$ ,  $AC$ ,  $BD$ ,  $CD$  and  $DC$ .

$$A = \begin{bmatrix} 0 & 2 \\ 0 & -3 \end{bmatrix} \quad B = \begin{bmatrix} 5 & 7 \\ 0 & 0 \end{bmatrix}$$

$$C = \begin{bmatrix} 1 & -2 & 3 \\ 0 & 2 & 5 \end{bmatrix} \quad D = \begin{bmatrix} 0 & 1 & 4 \\ -6 & 2 & -5 \\ 1 & 1 & 0 \end{bmatrix}$$

You can check your answers on page 274.