

**EXERCISE A**

State the dimensions of each matrix.

1)  $\begin{bmatrix} 6 & -1 & 9 \\ -2 & 3 & -4 \end{bmatrix}$

2)  $\begin{bmatrix} 7 \\ 8 \\ 9 \end{bmatrix}$

3)  $\begin{bmatrix} -1 & -2 & -3 \\ 0 & 10 & 11 \\ 15 & -5 & -7 \end{bmatrix}$

Solve each equation (find the value for each variable).

4)  $\begin{bmatrix} 4x & 3y \end{bmatrix} = \begin{bmatrix} 12 & -1 \end{bmatrix}$

5)  $\begin{bmatrix} 4x \\ 5 \end{bmatrix} = \begin{bmatrix} 15 + x \\ 2y - 1 \end{bmatrix}$

6)  $\begin{bmatrix} 2x + y \\ x - 3y \end{bmatrix} = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$

7)  $\begin{bmatrix} 4x - 3 & 3y \\ 7 & 13 \\ x + y + z & -1 \end{bmatrix} = \begin{bmatrix} 9 & -15 \\ 7 & 2z + 1 \\ w & -1 \end{bmatrix}$

Use the following four matrices to do the remaining problems.

$A = \begin{bmatrix} 2 & -6 \\ -3 & 5 \end{bmatrix}$

$B = \begin{bmatrix} 0 & -7 & 1 \\ 7 & -8 & 0 \\ -2 & 13 & 4 \end{bmatrix}$

$C = \begin{bmatrix} 2 & 2 & 2 \\ 3 & -3 & 1 \\ 1 & -8 & -6 \end{bmatrix}$

$D = \begin{bmatrix} 10 & 12 \\ -7 & -5 \\ -2 & 22 \end{bmatrix}$

8)  $B + C$

9)  $C - B$

10)  $A + D$

11)  $-3A$

12)  $0.5D$

13)  $2B + C$

14)  $DA$

15)  $CD$

**EXERCISE B**

Solve each equation (find the value for each variable).

16)  $\begin{bmatrix} 2x & 3 & 3z \end{bmatrix} = \begin{bmatrix} 5 & 3y & 9 \end{bmatrix}$

17)  $\begin{bmatrix} x + 3y \\ 3x + y \end{bmatrix} = \begin{bmatrix} -13 \\ 1 \end{bmatrix}$

18)  $\begin{bmatrix} 2x + y \\ x - 3y \end{bmatrix} = \begin{bmatrix} 5 \\ 13 \end{bmatrix}$

19)  $\begin{bmatrix} 4x - 3 & y^3 \\ 7 & 11 \\ x + z & -1 \end{bmatrix} = \begin{bmatrix} 17 & 8 \\ 7 & 2z + 1 \\ w & -1 \end{bmatrix}$

Use the following four matrices to do the remaining problems.

$$A = \begin{bmatrix} 2 & -6 \\ -3 & 5 \end{bmatrix}$$

$$B = \begin{bmatrix} 0 & -7 & 1 \\ 7 & -8 & 0 \\ -2 & 13 & 4 \end{bmatrix}$$

$$C = \begin{bmatrix} 2 & 2 & 2 \\ 3 & -3 & 1 \\ 1 & -8 & -6 \end{bmatrix}$$

$$D = \begin{bmatrix} 10 & 12 \\ -7 & -5 \\ -2 & 22 \end{bmatrix}$$

20)  $B - C$

21)  $C + D$

22)  $3A + 2C$

23)  $-7A$

24)  $0.5C$

25)  $CD$

26)  $AD$

27)  $BC$

## EXERCISE C

28) Using the matrices above,

a) find:  $DA$

b) Does the commutative property for multiplication apply to matrices? Hint: what was your answer to problem #25?



### ANSWERS:

1)  $2 \times 3$

3)  $3 \times 3$

5)  $(5, 3)$

7)  $(4, 3, -5, 6)$

9)  $\begin{bmatrix} 2 & 9 & 1 \\ -4 & 5 & 1 \\ 3 & -21 & -10 \end{bmatrix}$

11)  $\begin{bmatrix} -6 & 18 \\ 9 & -15 \end{bmatrix}$

13)  $\begin{bmatrix} 2 & -12 & 4 \\ 17 & -19 & 1 \\ -3 & 18 & 2 \end{bmatrix}$

15)  $\begin{bmatrix} 2 & 58 \\ 49 & 73 \\ 78 & -80 \end{bmatrix}$

17)  $(4, -3)$

19)  $(10, 5, -2, 5)$

21) impossible

23)  $\begin{bmatrix} -14 & 42 \\ 21 & -35 \end{bmatrix}$

25) see #15

26) impossible

27)  $\begin{bmatrix} -20 & 13 & -13 \\ -10 & 38 & 8 \\ 39 & -75 & -15 \end{bmatrix}$