

Identify the dimensions of each of the following matrices.

1. $A = \begin{bmatrix} 2 & -3 & 0 \end{bmatrix}$
 1×3

2. $B = \begin{bmatrix} 2 & 5 & -1 \\ -3 & 0 & 6 \\ 7 & 1 & -2 \end{bmatrix}$
 3×3

3. $C = \begin{bmatrix} 9 & 6 & -3 \\ 1 & -5 & 4 \end{bmatrix}$
 2×3

4. $D = \begin{bmatrix} -3 & 0.5 & 6 \\ 1 & -2 & 4 \\ \frac{2}{3} & 5 & 0 \\ -4 & 3 & 2 \end{bmatrix}$
 4×3

Using the matrices above, identify each of the following.

5. The element in row 3, column 2 of matrix B 1
 6. The element in row 1, column 3 of matrix A 0
 7. The element in row 1, column 2 of matrix C 6
 8. The element in row 3, column 1 of matrix D 2/3

Solve each matrix equation for the variables.

9. $\begin{bmatrix} 10 & -3y \\ 6 & 13 \end{bmatrix} = \begin{bmatrix} 10 & -15 \\ 6x & 13 \end{bmatrix}$
 $b = 6x$ $x = 1$ $y = 5$ $-3y = -15$
 $1 = x$ $y = 5$

10. $\begin{bmatrix} \frac{2}{3}x & -18 \\ \frac{z}{2} & 1 \end{bmatrix} = \begin{bmatrix} 12 & y-7 \\ 5 & 1 \end{bmatrix}$
 $x = 18$ $y = -11$ $z = 10$
 $\frac{3}{2} \cdot \frac{2}{3}x = 12 \cdot \frac{3}{2}$ $-18 = y - 7$ $\frac{z}{2} = 5$
 $x = \frac{36}{2}$ $-11 = y$ $z = 10$

11. $\begin{bmatrix} 2x-3 & \frac{1}{2}y+2 \\ 23 & 4z-1 \end{bmatrix} = \begin{bmatrix} 5x+1 & 3 \\ 8-5w & 5+6z \end{bmatrix}$
 $2x-3 = 5x+1$ $\frac{1}{2}y+2 = 3$ $23 = 8-5w$ $4z-1 = 5+6z$
 $-3x = 4$ $\frac{1}{2}y = 1$ $15 = -5w$ $-6 = 2z$
 $x = -\frac{4}{3}$ $y = 2$ $-3 = w$ $-3 = z$

12. $\begin{bmatrix} 4x & 5-3y \\ -6 & z+3 \\ 8 & 2 \end{bmatrix} = \begin{bmatrix} x-2 & -10 \\ 3a & \frac{1}{2}z \\ 2a+3b & 2 \end{bmatrix}$
 $4x = x-2$ $5-3y = -10$ $z+3 = \frac{1}{2}z$ $-6 = 3a$ $8 = 2a+3b$
 $3x = -2$ $-3y = -15$ $(-2)3 = \frac{1}{2}z(-2)$ $-2 = a$ $8 = 2(-2)+3b$
 $x = -\frac{2}{3}$ $y = 5$ $-6 = z$ $12 = 3b$
 $4 = b$