## Matrix

A square or rectangular set of numbers, usually written enclosed in a large pair of brackets. There are special rules for adding and multiplying matrices that make them useful for representing linear transformations and linear equations.

For example, the equations

$$
\begin{aligned}
x+2 y+3 z & =1 \\
2 x+5 y+7 z & =2 \\
x+4 y & =3
\end{aligned}
$$

can be represented by the single matrix equation

$$
\mathbf{A x}=\mathbf{B}
$$

where

$$
\mathbf{A}=\left(\begin{array}{lll}
1 & 2 & 3 \\
2 & 5 & 7 \\
1 & 4 & 0
\end{array}\right), \quad \mathbf{x}=\left(\begin{array}{l}
x \\
y \\
z
\end{array}\right), \quad \text { and } \quad \mathbf{B}=\left(\begin{array}{l}
1 \\
2 \\
3
\end{array}\right) .
$$

Matrices can be used to represent many physical quantities which have multiple components in a simple but useful form. For example, the various moments of inertia that a solid has about different axes of rotation can be expressed in a single $3 \times 3$ matrix.

