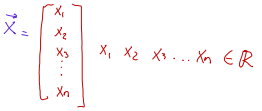
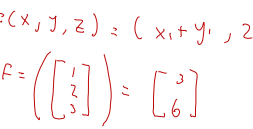
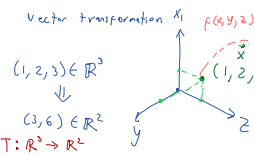
Vector Transformation

f : X ---> Y







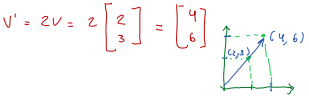
Example:
Definition

Vector transformations refers to operations that map vectors from one space to another, often changing their magnitude, direction, or both. These transformation are typically described using matrices and are fundamental in various fields, including physics, engineering, computer graphics, and data science.

Examples

1) Scaling

Scaling is a transformation that changes the magnitude of the vectors while keeping their direction same.

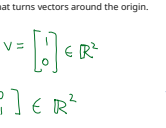


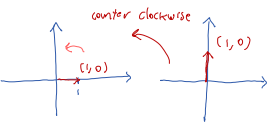
Uses:

1) Data normalization
2) Computer graphic to resize objects => Paint => Image => Resize

2) Rotation

Transformation that turns vectors around the origin.





Showing a 90 degree rotation counter clockwise

Example :

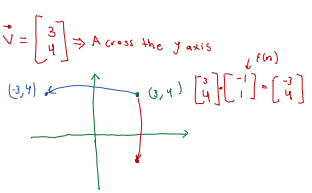
Rotation will be wise in Image procesing => Rotating Image

Robotics => Adjusting Robot Orientation

3D graphics => Rotating Objects

3) Reflection

Transformation that flips vectors over a specified axis or plane.



1) Mirroring Image
Analyzing wave reflections.

2) Shearing