A review of vectors (Section 1.3)

Column vector: $\vec{u} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$ $\qquad$ $\vec{v} = \begin{bmatrix} 2 \\ 5 \end{bmatrix}$

$$\vec{u} + \vec{v} = \begin{bmatrix} 3 \\ -1 \end{bmatrix} + \begin{bmatrix} 2 \\ 5 \end{bmatrix} = \begin{bmatrix} 5 \\ -4 \end{bmatrix}$$

$$0.5\vec{u} = 0.5\begin{bmatrix} 3 \\ -1 \end{bmatrix} = \begin{bmatrix} 1.5 \\ -0.5 \end{bmatrix}$$

Algebraic properties: $\qquad$ $\vec{u} + \vec{v} = \vec{v} + \vec{u}$ $\qquad$ $c(\vec{u} + \vec{v}) = c\vec{v} + c\vec{u}$
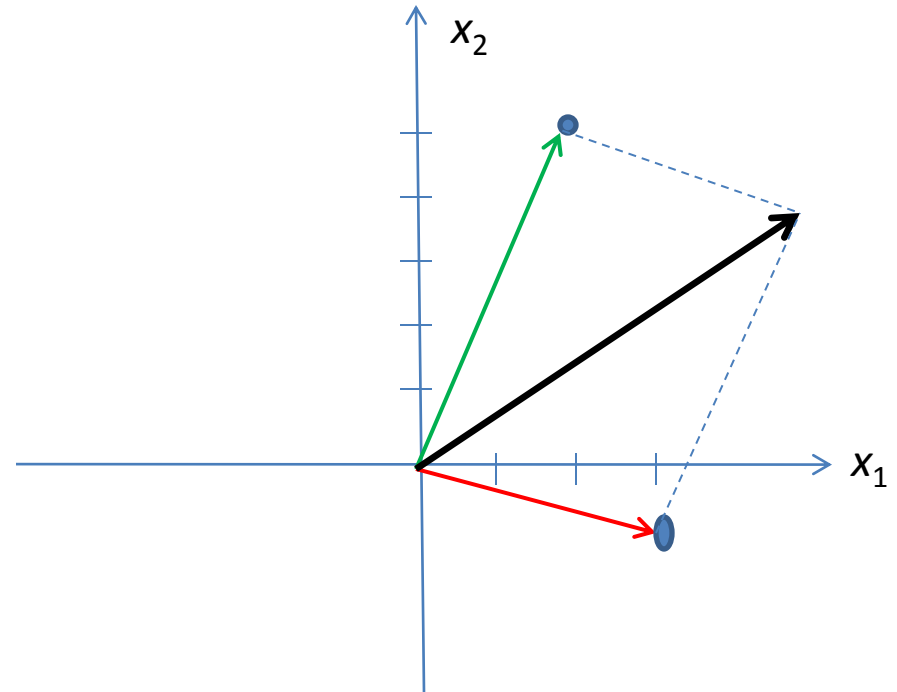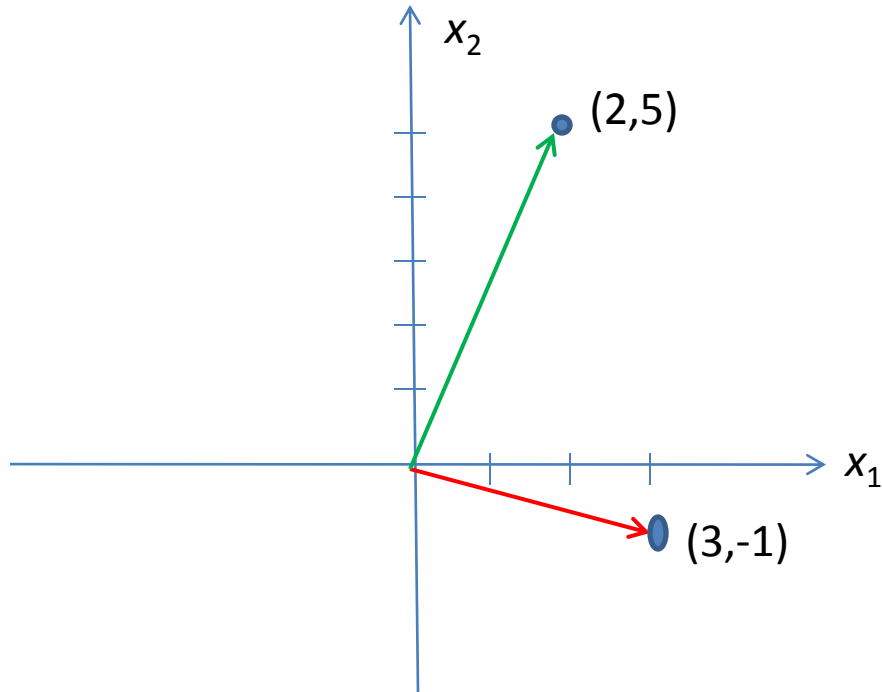
$$(\vec{u} + \vec{v}) + \vec{w} = \vec{u} + (\vec{v} + \vec{w}) \qquad \vec{u} + \vec{0} = \vec{0} + \vec{u} = \vec{u}$$

and more.

R^2 vector set (space)

Geometric view of vectors in R^2

Column vector: $\vec{u} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$ $\qquad$ $\vec{v} = \begin{bmatrix} 2 \\ 5 \end{bmatrix}$

Vectors in R^n

Column vector in R^3:
$$\vec{w} = \begin{bmatrix} 2 \\ 3 \\ -1 \end{bmatrix}$$

Column vector in R^n:
$$\vec{u} = \begin{bmatrix} u_1 \\ u_2 \\ \cdot \\ \cdot \\ \cdot \\ u_n \end{bmatrix}$$

Algebraic properties of R^n:

$$\vec{u} + \vec{v} = \vec{v} + \vec{u} \qquad c(\vec{u} + \vec{v}) = c\vec{v} + c\vec{u}$$

$$(\vec{u} + \vec{v}) + \vec{w} = \vec{u} + (\vec{v} + \vec{w}) \qquad \vec{u} + \vec{0} = \vec{0} + \vec{u} = \vec{u}$$

and more.
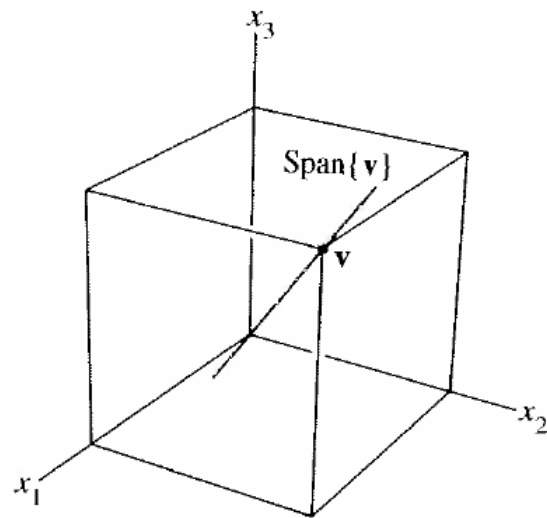
Geometric view of linear combination

FIGURE 10   Span {**v**} as a line through the origin.

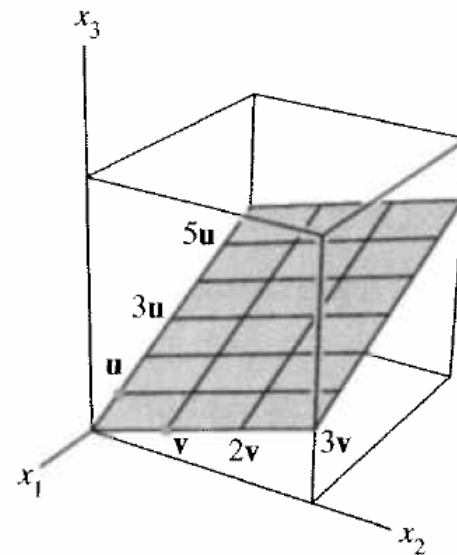**FIGURE 11**   Span {**u**, **v**} as a plane through the origin.

From Section 1.3.