Scalar by Vector Multiplication

A scalar by vector multiplication is also defined by multiplying the vector entry by entry.

If

$\alpha \in R$

and

$$\vec{x} = \begin{bmatrix} a_1 \\ a_2 \\ a_3 \\ \vdots \\ a_n \end{bmatrix} \in \mathbb{R}^n$$

then

$$\vec{y} = \alpha\vec{x} = \begin{bmatrix} \alpha a_1 \\ \alpha a_2 \\ \alpha a_3 \\ \vdots \\ \alpha a_n \end{bmatrix} \in \mathbb{R}^n$$

Equation 5

(Notice that each element of the vector is multiplied by the same scalar alpha).

Ask yourself, what happens graphically to the vector when multiplied by a scalar?

We will explore this in the next quiz.