Linjär Algebra
Vektorer

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Vector Operations:

For problems 1-8, graph the relevant vectors (i.e., the ones that are being added or subtracted), alongside the resulting vector, in an xy-coordinate system.

1.
Given vectors $\mathbf{A} = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$, $\mathbf{B} = \begin{bmatrix} -3 \\ 4 \end{bmatrix}$, and a scalar $k = 2$, compute $k\mathbf{A} + 3\mathbf{B}$.

2.
For vectors $\mathbf{C} = \begin{bmatrix} 4 \\ -2 \end{bmatrix}$, $\mathbf{D} = \begin{bmatrix} -1 \\ m \end{bmatrix}$, and $m = 3$, find $4\mathbf{C} - 2\mathbf{D}$.

3.
Given vectors $\mathbf{E} = \begin{bmatrix} 1 \\ 5 \end{bmatrix}$, $\mathbf{F} = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$, and $n = -2$, compute $3\mathbf{E} + 5\mathbf{F} - n\mathbf{E}$.

4.
For vectors $\mathbf{G} = \begin{bmatrix} 3 \\ -4 \end{bmatrix}$, $\mathbf{H} = \begin{bmatrix} -1 \\ 2 \end{bmatrix}$, calculate $-2\mathbf{G} + 4\mathbf{H}$.

5.
Determine $\mathbf{I} = \begin{bmatrix} -q \\ q \end{bmatrix}$, $\mathbf{J} = \begin{bmatrix} 3 \\ -5 \end{bmatrix}$, and $q = 4$, then solve for $\frac{3}{2}\mathbf{I} + 2\mathbf{J} - \frac{1}{2}\mathbf{I}$.

6.
Given vectors $\mathbf{K} = \begin{bmatrix} 4 \\ -3 \end{bmatrix}$, $\mathbf{L} = \begin{bmatrix} -2 \\ 6 \end{bmatrix}$, compute $3\mathbf{K} - 2\mathbf{L} + \mathbf{K}$.

7.
For vectors $\mathbf{M} = \begin{bmatrix} -5 \\ 2 \end{bmatrix}$, $\mathbf{N} = \begin{bmatrix} 1 \\ -4 \end{bmatrix}$, and $s = 2$, find $2\mathbf{M} + \mathbf{N} - \frac{3\mathbf{M}}{s}$.

8.
Determine $\mathbf{O} = \begin{bmatrix} t \\ -t \end{bmatrix}$, $\mathbf{P} = \begin{bmatrix} -t \\ t \end{bmatrix}$, and $t = -4$, then solve for $-\frac{1}{2}\mathbf{O} + 2\mathbf{P} - \frac{3}{2}\mathbf{O}$.

For problems 9-10, just compute what's asked. No need to plot it on an xyz-coordinate system - unless you'd like to of course.

9.

Given vectors $\mathbf{Q} = \begin{bmatrix} u^2 \\ 4 \\ 3 \end{bmatrix}$, $\mathbf{R} = \begin{bmatrix} -3 \\ 2 \end{bmatrix}$, and $u = 2$, compute $4\mathbf{Q} + \frac{1}{2}\mathbf{R} - \mathbf{R}$.

10.

For vectors $\mathbf{S} = \begin{bmatrix} 3 \\ -1 \\ v \end{bmatrix}$, $\mathbf{T} = \begin{bmatrix} -2 \\ 5 \\ v \end{bmatrix}$, and $v = -2$, find $\frac{1}{2}\mathbf{S} - 3\mathbf{T} + 2\mathbf{S}$.

For problem 1-10, now also compute the length of the resulting vector.