

Math 2550
HW 1 - Part 1
Vectors

1. Find the norm / length of each vector.

(a) $\vec{v} = \langle 4, -3 \rangle$

(b) $\vec{v} = \langle 2, 3 \rangle$

(c) $\vec{v} = \langle -5, 0 \rangle$

(d) $\vec{v} = \langle 2, 2, 2 \rangle$

(e) $\vec{v} = \langle -7, 2, -1 \rangle$

(f) $\vec{v} = \langle 0, 6, 0 \rangle$

2. Compute the following.

(a) Let $\vec{u} = \langle 2, -3 \rangle$ and $\vec{v} = \langle -1, 5 \rangle$ and $\alpha = 1/2$.

Calculate: $\vec{u} + \vec{v}$, $\vec{u} - \vec{v}$, $\alpha\vec{v}$, $\alpha\vec{u}$

(b) Let $\vec{u} = \langle 1, 1, -1/2 \rangle$ and $\vec{v} = \langle 0, 5, 2 \rangle$ and $\alpha = -2$.

Calculate: $\vec{u} + \vec{v}$, $\vec{u} - \vec{v}$, $\alpha\vec{u}$, $\alpha\vec{v}$

3. Compute $\vec{u} \cdot \vec{v}$ for the following vectors.

(a) $\vec{u} = \langle 2, 3 \rangle$ and $\vec{v} = \langle 5, -7 \rangle$

(b) $\vec{u} = \langle -6, -2 \rangle$ and $\vec{v} = \langle 4, 0 \rangle$

(c) $\vec{u} = \langle 1, -5, 4 \rangle$ and $\vec{v} = \langle 3, 3, 3 \rangle$

(d) $\vec{u} = \langle -2, 2, 3 \rangle$ and $\vec{v} = \langle 1, 7, -4 \rangle$

4. Compute the norm / length of the following vectors.

(a) $\vec{v} = \langle 1, 5, -1, 0, \pi \rangle$

(b) $\vec{w} = \langle 0, 2, 1/2, -1 \rangle$

5. Compute $\vec{u} + 2\vec{v}$ and $\frac{1}{2}\vec{u} - \vec{v}$ where $\vec{u} = \langle 2, 0, 8, -4, 10 \rangle$ and $\vec{v} = \langle 0, 1/2, 3, 10, -1 \rangle$.

6. Compute $\vec{u} \cdot \vec{v}$ where

(a) $\vec{u} = \langle 1, 0, 2, -1, 5 \rangle$ and $\vec{v} = \langle -1, \pi, \sqrt{2}, 13, -2 \rangle$

(b) $\vec{u} = \langle 1, 2, 3, 4, 5, 6, 7 \rangle$ and $\vec{v} = \langle -7, -6, -5, -4, -3, -2, -1 \rangle$

7. List 5 elements from the set

$$S = \{ t\langle 1, -1 \rangle \mid t \in \mathbb{R} \}$$

8. List 5 elements from the set

$$S = \{ t\langle 3, 1 \rangle + s\langle -1, 5 \rangle \mid s, t \in \mathbb{R} \}$$

9. List 5 elements from the set

$$S = \{ c_1\langle 1, 1 \rangle + c_2\langle 0, -1 \rangle + c_3\langle -2, 1 \rangle \mid c_1, c_2, c_3 \in \mathbb{R} \}$$

10. List 5 elements from the set

$$S = \{ a\langle 1, 1, 1 \rangle + b\langle 0, 0, 5 \rangle \mid a, b \in \mathbb{R} \}$$