

Exercise 1

Find the absolute value of the following vectors:

$$\vec{A} = (3, 3), \vec{B} = (1, -3), \vec{C} = (0, 2), \vec{D} = (5, 0), \vec{E} = (-1, -6)$$

Solution

We will use the Pythagorean theorem in order to solve this problem.

$$|\vec{A}| = \sqrt{3^2 + 3^2} = \sqrt{9 + 9} = \sqrt{18} = 3\sqrt{2}$$

$$|\vec{B}| = \sqrt{1^2 + (-3)^2} = \sqrt{1 + 9} = \sqrt{10}$$

$$|\vec{C}| = \sqrt{0^2 + 2^2} = \sqrt{4} = 2$$

$$|\vec{D}| = \sqrt{5^2 + 0^2} = \sqrt{25} = 5$$

$$|\vec{E}| = \sqrt{(-1)^2 + (-6)^2} = \sqrt{1 + 36} = \sqrt{37}$$

Exercise 2

Find the inner product of these two vectors:

$$\vec{A} = (1, 2), \vec{B} = (-2, 6)$$

Solution

$$\vec{A} \cdot \vec{B} = (1, 2) \cdot (-2, 6) = 1 \cdot (-2) + 2 \cdot 6 = -2 + 12 = 10$$

Exercise 3

Given the vectors $\vec{A} = (2, 5)$, $\vec{B} = (-3, 4)$ find:

a) $2\vec{A} + 3\vec{B}$

b) $-2\vec{A} - \frac{1}{2}\vec{B}$

c) $2 \cdot \vec{A} \cdot \vec{B}$