Example 1

Prove that the vectors $\vec{a} = \{5; 15\}$ and $\vec{b} = \{3; -1\}$ are orthogonal.

Example 2

Are the vectors $\vec{a} = \{4; -3\}$ and $\vec{b} = \{5; 8\}$ orthogonal?

Example 3

Find the value of n where the vectors a = $\{3; 2\}$ and b = $\{n; 4\}$ are orthogonal.

Example 4

Prove that the vectors a = $\{4; 2; -1\}$ и b = $\{2; -2; 4\}$ is orthogonal.

Example 5

Are the vectors a = $\{-5; 2; 4\}$ and b = $\{10; 7; 1\}$ orthogonal?

Answer 1

Calculate the dot product of these vectors:

$\vec{a} \cdot \vec{b}$ = 5 · 3 + 15 · (-1) = 15 - 15 = 0, since the dot product is zero, the vectors $\vec{a}$ and $\vec{b}$ are orthogonal.

Answer 2

Calculate the dot product of these vectors:

$\vec{a} \cdot \vec{b}$ = 4 · 5 + (-3) · 8 = 20 - 24 = -4, since the dot product is not zero, the vectors $\vec{a}$ and $\vec{b}$ are not orthogonal.

Answer 3

Calculate the dot product of these vectors:

$\vec{a} \cdot \vec{b}$ = 3 · n + 4 · 2 = 3n + 8

2n + 8 = 0

2n = -8

n = -4, vectors $\vec{a}$ and $\vec{b}$ are orthogonal when n = -4.

Answer 4

Calculate the dot product of these vectors:

$\vec{a} \cdot \vec{b}$ = 4 · 2 + 2 · (-2) + (-1) · 4 = 8 − 4 - 4 = 0

since the dot product is zero, the vectors $\vec{a}$ and $\vec{b}$ are orthogonal.

Answer 5

Calculate the dot product of these vectors:

$\vec{a} \cdot \vec{b}$ = (-5) · 10 + 2 · 7 + 4 · 1 = -50 + 14 + 4 = -32, since the dot product is not zero, the vectors $\vec{a}$ and $\vec{b}$ are not orthogonal.