Topic: Vector operations

Question: Find the sum $\vec{a} + \vec{b}$.

$$\vec{a} = (-2,3)$$

$$\vec{b} = (4, -1)$$

Answer choices:

A $\vec{a} + \vec{b} = (2,2)$

B $\vec{a} + \vec{b} = (1,3)$

C $\vec{a} + \vec{b} = (-6,4)$

D $\vec{a} + \vec{b} = (6, -4)$

Solution: A

To find the sum of the vectors, we just add the corresponding components.

$$\vec{a} + \vec{b} = (-2,3) + (4, -1)$$

$$\vec{a} + \vec{b} = (-2 + 4,3 - 1)$$

$$\vec{a} + \vec{b} = (2,2)$$

Topic: Vector operations

Question: Find the difference $\vec{a} - \vec{b}$.

$$\vec{a} = (-2,3)$$

$$\vec{b} = (4, -1)$$

Answer choices:

A $\vec{a} - \vec{b} = (2,2)$

B $\vec{a} - \vec{b} = (1,3)$

C $\vec{a} - \vec{b} = (-6,4)$

D $\vec{a} - \vec{b} = (6, -4)$

Solution: C

To find the difference of the vectors, we just subtract the corresponding components.

$$\vec{a} - \vec{b} = (-2,3) - (4, -1)$$

$$\vec{a} - \vec{b} = (-2 - 4,3 - (-1))$$

$$\vec{a} - \vec{b} = (-6,4)$$

Topic: Vector operations

Question: Find the sum $2\vec{c} + 3\vec{a} - \vec{d} + 4\vec{b}$.

$$\vec{a} = (-2,3)$$

$$\vec{b} = (4, -1)$$

$$\vec{c} = (-1,1)$$

$$\vec{d} = (3, -2)$$

Answer choices:

A $2\vec{c} + 3\vec{a} - \vec{d} + 4\vec{b} = (-5, -9)$

B $2\vec{c} + 3\vec{a} - \vec{d} + 4\vec{b} = (5, -9)$

C $2\vec{c} + 3\vec{a} - \vec{d} + 4\vec{b} = (-5,9)$

D $2\vec{c} + 3\vec{a} - \vec{d} + 4\vec{b} = (5,9)$

Solution: D

To find the sum of the vectors, we'll first apply the scalars to the vectors individually.

$$2\overrightarrow{c} + 3\overrightarrow{a} - \overrightarrow{d} + 4\overrightarrow{b} = 2(-1,1) + 3(-2,3) - (3,-2) + 4(4,-1)$$

$$2\overrightarrow{c} + 3\overrightarrow{a} - \overrightarrow{d} + 4\overrightarrow{b} = (-2,2) + (-6,9) - (3,-2) + (16,-4)$$

We'll combine the vectors one by one.

$$2\overrightarrow{c} + 3\overrightarrow{a} - \overrightarrow{d} + 4\overrightarrow{b} = (-8,11) - (3,-2) + (16,-4)$$

$$2\overrightarrow{c} + 3\overrightarrow{a} - \overrightarrow{d} + 4\overrightarrow{b} = (-8-3,11-(-2)) + (16,-4)$$

$$2\overrightarrow{c} + 3\overrightarrow{a} - \overrightarrow{d} + 4\overrightarrow{b} = (-11,13) + (16,-4)$$

$$2\overrightarrow{c} + 3\overrightarrow{a} - \overrightarrow{d} + 4\overrightarrow{b} = (-11+16,13-4)$$

$$2\overrightarrow{c} + 3\overrightarrow{a} - \overrightarrow{d} + 4\overrightarrow{b} = (5,9)$$