



Suppose a particle is under the influence of a force  $F = i + 5j$ .

Compare the work done by the force along the path  $O \rightarrow A \rightarrow C$  with that along the path  $O \rightarrow C$ .

- A)  $W_{OAC} < W_{OC}$ .
- B)  $W_{OAC} = W_{OC}$ .
- C)  $W_{OAC} > W_{OC}$ .

*Explanation:*

For both cases, the work done is given by  $W = \int_{path} \vec{F} \cdot d\vec{s}$ .

For a constant force  $F$  the work in going from  $O$  to  $C$  is given by  $W_{OC} = F \cdot OC \cos \alpha$  (see sketch).

On the other hand to evaluate the work from  $O$  to  $A$  and then to  $C$ , one has:  $W_{OAC} = F_x \cdot OA + F_y \cdot AC$ .

The dot-product identity implies  $W_{OAC} = W_{OC}$ .

Answer **B**.