Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

$\kappa(\cdot, \cdot)$ is a kernel and $\phi()$ is the corresponding feature map.

Let $z = \kappa(\mathbf{p}, \mathbf{q}) = (\mathbf{p}^T\mathbf{q})^2$.

(A) **[Ans]** z is scalar.

(B) **[Ans]** z is unique for the given $\kappa()$.

(C) $\phi()$ is unique given the $\kappa()$.

(D) $\phi() \in R^2$.

(E) All the above.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

$\kappa(\cdot, \cdot)$ is a kernel and $\phi()$ is the corresponding feature map.

Let $\kappa() = \sum_{i=1}^{P} \kappa_i()$. Then the $\phi()$ is

(A) $\sum_{i=1}^{P} \phi_i()$

(B) $\Pi_{i=1}^{P} \phi_i()$

(C) **[Ans]** $\phi()$ is obtained by concatenating $\phi_i()$s.

(D) There is no analytical relationship between $\phi()$ and $\phi_i()$s.

(E) None of the above.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

$\kappa(\cdot, \cdot)$ is a kernel and $\phi()$ is the corresponding feature map.

If $\phi(\mathbf{z}) = [z_1^2, z_2^2, \sqrt{2} z_1 z_2]^T$ then $\kappa(\mathbf{p}, \mathbf{q})$ is:

(A) $\mathbf{p}^T \mathbf{q}$

(B) **[Ans]** $(\mathbf{p}^T \mathbf{q})^2$

(C) $(\mathbf{p}^T \mathbf{q})^{\sqrt{2}}$

(D) $(1 + \mathbf{p}^T \mathbf{q})^2$

(E) None of the above.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

$\kappa(\cdot, \cdot)$ is a kernel and $\phi()$ is the corresponding feature map.

If $\phi(\mathbf{z}) = [z_1^2, z_2^2, z_1 z_2, z_2 z_1]^T$ then $\kappa(\mathbf{p}, \mathbf{q})$ is:

(A) $\mathbf{p}^T\mathbf{q}$

(B) **[Ans]** $(\mathbf{p}^T\mathbf{q})^2$

(C) $(\mathbf{p}^T\mathbf{q})^{\sqrt{2}}$

(D) $(1 + \mathbf{p}^T\mathbf{q})^2$

(E) None of the above.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

$\kappa(\cdot, \cdot)$ is a kernel and $\phi()$ is the corresponding feature map.

If $\phi(\mathbf{z}) = [z_1^2, z_2^2, \sqrt{2}z_1 z_2, \sqrt{2}z_1, \sqrt{2}z_2, 1]^T$ then $\kappa(\mathbf{p}, \mathbf{q})$ is:

(A) $\mathbf{p}^T\mathbf{q}$

(B) $(\mathbf{p}^T\mathbf{q})^2$

(C) $(\mathbf{p}^T\mathbf{q})^{\sqrt{2}}$

(D) **[Ans]** $(1 + \mathbf{p}^T\mathbf{q})^2$

(E) None of the above.