a) $\Phi(A) = (1^2, 2^2, \sqrt{2}\cdot 1\cdot 2, \sqrt{2}\cdot 1, \sqrt{2}\cdot 2, 1)$

$= (1, 4, 2\sqrt{2}, \sqrt{2}, 2\sqrt{2}, 1)$

b) $\Phi(B) = (2^2, 4^2, \sqrt{2}\cdot 2\cdot 4, \sqrt{2}\cdot 2, \sqrt{2}\cdot 4, 1)$

$= (4, 16, 8\sqrt{2}, 2\sqrt{2}, 4\sqrt{2}, 1)$

c) $\Phi(A)\,\Phi(B) = 1\cdot 4 + 4\cdot 16 + 2\sqrt{2}\cdot 8\sqrt{2} + \sqrt{2}\cdot 2\sqrt{2} + 2\sqrt{2}\cdot 4\sqrt{2}$
$+ 1\cdot 1$

$= 4 + 64 + 32 + 4 + 16 + 1$

$= 68 + 36 + 17$

$= \underline{121}$

d) $A\cdot B = 1\cdot 2 + 2\cdot 4 = 10$

$K(A,B) = (A\cdot B + 1)^2 = (10+1)^2 = \underline{121}$