

# The Polynomial Kernel

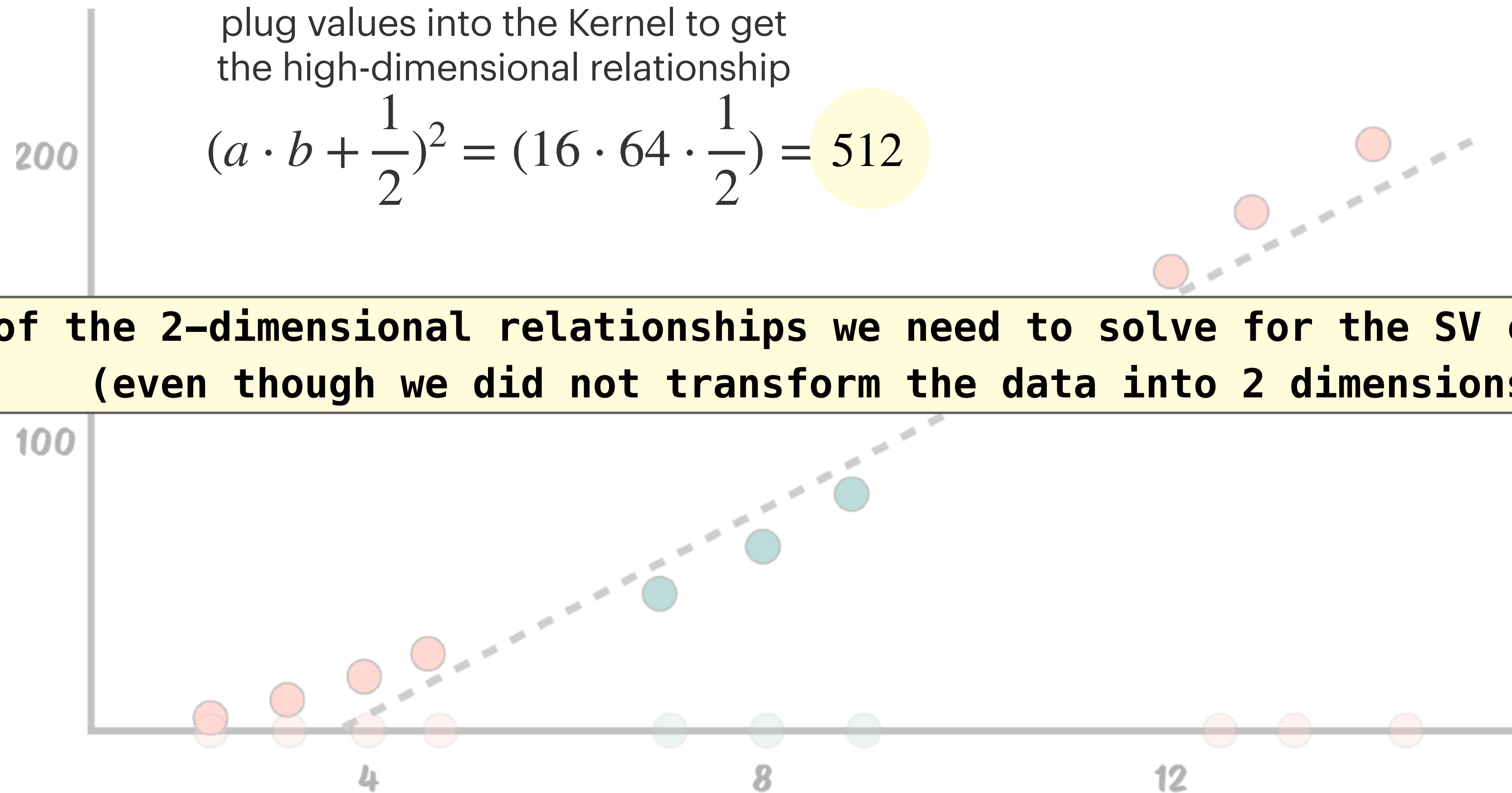
A function that computes the relationship between vectors in multiple dimensions  
(without actually having to calculate the coordinates for those dimensions)

example:  $a = 4$ ,  $b = 8$

plug values into the Kernel to get  
the high-dimensional relationship

$$(a \cdot b + \frac{1}{2})^2 = (16 \cdot 64 \cdot \frac{1}{2}) = 512$$

one of the 2-dimensional relationships we need to solve for the SV classifier  
(even though we did not transform the data into 2 dimensions)



# The Radial Kernel (RBF)

The **Radial Kernel**

$$K(a, b) = e^{-\gamma(a - b)^2}$$

projects to **infinite dimensional** space  
works similar to nearest neighbors classifier