

## Problem 1

**c** is the correct answer.

When  $N = 25$ , the expected  $E_{in}$  is .0064. When  $N = 100$ , the expected  $E_{in}$  is .0091. Thus we have our answer.

## Problem 2

**d** is the correct answer.

We are looking to find the correct behavior for  $\text{sign}(\tilde{w}_0 + \tilde{w}_1 x_1^2 + \tilde{w}_2 x_2^2)$ . We have that if  $\tilde{w}_1 < 0$  and  $\tilde{w}_2 > 0$ , then we get a positive sign for large absolute values of  $x_2$  and a negative sign for large absolute values of  $x_1$ . And we can adjust  $\tilde{w}_0$  to achieve the exact behavior we are looking for. Thus we have our answer.

## Problem 3

**c** is the correct answer.

We have that the VC dimension of a linear model in the transformed space  $d_{VC} \leq \tilde{d} + 1$ . And we have that  $\tilde{d} = 14$ , which means that  $d_{VC} \leq 15$ . Thus we have our answer.

## Problem 4

**e**

We just use the chain rule to take the partial derivative of  $E(u, v)$  with respect to  $u$  to get the answer.

## Problem 5

## Problem 6

## Problem 7

## Problem 8

## Problem 9

## Problem 10