

### Ejercicio 1

$$z = -(x-2)^2 - (y-3)^2 + 4$$

$$\nabla z = \frac{\partial z}{\partial x} i + \frac{\partial z}{\partial y} j = -2(x-2)i - 2(y-3)j$$

$$\nabla z = (-2(x-2), -2(y-3)) = \vec{0} \Rightarrow -2(x-2) = 0, -2(y-3) = 0$$
$$\Rightarrow \boxed{x=2, y=3}$$

$z$  tiene un máximo en  $(2,3)$  y su valor es:

$$z(2,3) = -(2-2)^2 - (3-3)^2 + 4 = \boxed{4}$$



$$(X, Y) = (1, 1)$$

$$g(1, 1) = (2, 4)$$

learning rate = 0,5

$$X = 1 + 0,5 \cdot 2, \quad Y = 1 + 0,5 \cdot 4$$

$$X = 2$$

$$Y = 3$$

$$g(2, 3) = 0 \quad \checkmark$$

$$\Rightarrow \text{Maximo: } (X, Y) = (2, 3)$$