

Q6

$$y = 0.$$

$$MAE(y, 0.) = \frac{1}{N} \sum_i^N |y - 0.|$$

$$\Rightarrow \frac{\partial MAE(y, 0.)}{\partial 0.} = \frac{1}{N} \sum_i^N \frac{\partial |y - 0.|}{\partial 0.}$$

$$\therefore \frac{\partial |x|}{\partial x} = \text{sign}(x)$$

$$\Rightarrow \frac{\partial MAE}{\partial 0.} = \frac{1}{N} \sum_i^N \text{sign}(y - 0.)$$

$$\Rightarrow \text{to find the min} \Rightarrow \frac{\partial MAE}{\partial 0.} = 0$$

$$\Rightarrow \sum_i^N \text{sign}(y - 0.) = 0$$

This is equal to zero only when the number of positive items equal the number of negative, which happens when

$$0. = \text{Median}\{y_1, y_2, \dots, y_N\}$$