A close up of text on a whiteboard

Description automatically generated

2. A picture containing object

Description automatically generated

No, it is not necessary, we can find the reason through following example.

The blue one is A drawing of a person

Description automatically generated.

The red one is A close up of a logo

Description automatically generatedand it is not convexity because there is a blue line has 3 points of intersection which makes the curve does not meet convexity requirements, but we can find out that we can still use gradient descent on this function. Thus, convexity is not necessary condition for gradient descent to successfully train a model.