

Name: \_\_\_\_\_

10. (5 points) Mark each of the following statements as true or false, and provide a correct – and brief – explanation for the validity of each of your answers:

(a) The purpose of `step_size_fn` is to allow step sizes to increase with iteration index `k`, so that `sgd` and `gd` can converge faster.

True  False

Explanation:

(b) If  $\theta = \mathbf{th0}$  were luckily at a local **minimum** of the objective function, then the output of gradient descent `gd` would always be  $\theta$ , independent of `num_steps`.

True  False

Explanation:

(c) If  $\theta = \mathbf{th0}$  were luckily at a local **maximum** of the objective function, then the output of gradient descent `gd` would always be  $\theta$ , independent of `num_steps`.

True  False

Explanation:

(d) If  $\theta = \mathbf{th0}$  were luckily at a local **minimum** of the objective function, then the output of stochastic gradient descent `sgd` would always be  $\theta$ , independent of `num_steps`.

True  False

Explanation:

(e) The gradient produced by `dJ` is a  $d$ -dimensional vector which points in the direction which maximizes the objective function.

True  False

Explanation: