Question 1: Graphically, how can we tell if a function is convex?

Question 2: What is the rate of convergence for gradient descent on a strongly convex function?

Question 3: What is the condition number of a problem?

Answer Question 1: A function is convex if line segments drawn between any two points in the graph of the function will always lie above the curve.

Answer Question 2: For strongly convex functions, gradient descent converges exponentially quickly to the optimum. This is called “convergence at a linear rate.”

Answer Question 3: The condition number indicates how hard a strongly convex problem is to solve. Larger condition numbers result in slower convergences of the gradient descent, meaning more iterations are required to get close to the optimum.