DEEP LEARNING 1

INTRODUCTION

In this assignment you will first need to watch the video posted online, then you can complete the question below.

QUESTIONS

In this assignment, I would like you to replicate and extend the video above.

1) Simulate a non-linear relationship of some kind that would be hard to model with linear modeling methods (think sin, cosin, inverse, etc).
    a. Only have one input (x)
    b. Add some error into the model, then calculate Y
    c. Make a graph of x versus y with points to visualize the relationship
2) Fit a 'shallow' neural network with only one single hidden layer and evaluate its fit.
    a. Be sure to standardize your input
    b. You can start with a small number of epochs (300 ish)
    c. Plot the history of the lost function across epochs
    d. Plot the history of another metric that is not the loss function across epochs
    e. Predict a new range of X's as a line along with the original data as dots to understand how well your model fits.
3) Expand your neural network to have more capacity and try to get a better fit to your function. You can add layers (make it deeper), or add more units per layer (make it wider), add more epochs, etc…
    a. Plot the history of the loss function and one more model metric across epochs
    b. Predict a new range of X's as a line along with the original data as dots to understand how well your model fits.