Lesson 15 (Parameters) Answer the following questions about the parameters of neural networks.

(a) A three layer, fully-connect (dense) network is to be trained to predicting iris species (setosa, versicolor or virginica) from sepal length and width and petal length and width. The first and second layers of the network have 6 and 5 nodes (outputs) respectively. Assume a labeled data set of 150 iris plants, 50 from each species, is available to train the network. Specify the dimensions of the quantities listed in the table below.

quantity	dimensions
$\mathbf{X}$	
$\mathbf{W}_0$	
$\mathbf{Z}_1$	
$\mathbf{A}_1$	
$\mathbf{W}_1$	
$\mathbf{Z}_2$	
$\mathbf{A}_2$	
$\mathbf{W}_2$	
$\hat{\mathbf{Y}}$	
$\hat{\mathbf{P}}$	

(b) How many trainable parameters are there in the network described above? Note that a matrix that is 2×3 has $2 \cdot 3 = 6$ parameters.

(c) Load the dataset `Iris-cleaned.csv` and use Kera's `.summary()` method to check your answers to parts (a) and (b).

(d) Which feedforward network has more trainable parameters for an input of 100 features.
(i) a network of 10 layers each with 10 nodes (outputs).
(ii) a network consisting of a single 100 node (output) layer.

Justify your answer.