## Congratulations! You passed!

**Grade received** 90% **Latest Submission Grade** 90% **To pass** 80% or higher

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**1.** Which of the following are true? (Check all that apply.) **1 / 1 point**

- [ ] $X$ is a matrix in which each row is one training example.
- [ ] $a^{[2](12)}$ denotes activation vector of the $12^{th}$ layer on the $2^{nd}$ training example.
- [x] $a_4^{[2]}$ is the activation output by the $4^{th}$ neuron of the $2^{nd}$ layer

  ✓ Correct

- [x] $a^{[2](12)}$ denotes the activation vector of the $2^{nd}$ layer for the $12^{th}$ training example.

  ✓ Correct

- [x] $X$ is a matrix in which each column is one training example.

  ✓ Correct

- [ ] $a_4^{[2]}$ is the activation output of the $2^{nd}$ layer for the $4^{th}$ training example
- [x] $a^{[2]}$ denotes the activation vector of the $2^{nd}$ layer.

  ✓ Correct

Expand

✓ Correct
Great, you got all the right answers.

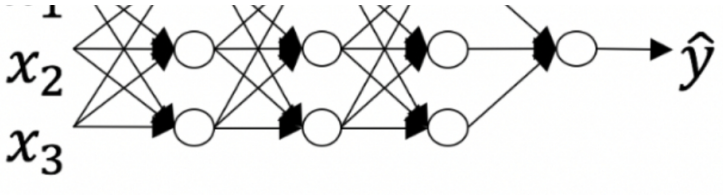
**2.** In which of the following cases is the linear (identity) activation function most likely used? **1 / 1 point**

- ○ For binary classification problems.
- ○ As activation function in the hidden layers.
- ○ The linear activation function is never used.
- ◉ When working with regression problems.

Expand

✓ Correct
Yes. In problems such as predicting the price of a house it makes sense to use the linear activation function as output.

**3.** Which of the following represents the activation output of the second neuron of the third layer applied to the fourth example? **1 / 1 point**




- $a_2^{[3](4)}$
- $a_2^{[4](3)}$
- $a_4^{[3](2)}$
- $a_3^{[4]2}$

Expand

**Correct**
Yes. The superscript in brackets indicates the layer number, the superscript in parenthesis represents the number of examples, and the subscript the number of the neuron.

**4.** You are building a binary classifier for recognizing cucumbers (y=1) vs. watermelons (y=0). Which one of these activation functions would you recommend using for the output layer? **1 / 1 point**

- tanh
- sigmoid
- Leaky ReLU
- ReLU

Expand

**Correct**
Yes. Sigmoid outputs a value between 0 and 1 which makes it a very good choice for binary classification. You can classify as 0 if the output is less than 0.5 and classify as 1 if the output is more than 0.5. It can be done with tanh as well but it is less convenient as the output is between -1 and 1.

**5.** Consider the following code: **1 / 1 point**

#+begin_src python

x = np.random.rand(3, 2)

y = np.sum(x, axis=0, keepdims=True)

#+end_src

What will be y.shape?

- (2,)
- (3,)
- (3, 1)
- (1, 2)

Expand

Correct
Yes. By choosing the axis=0 the sum is computed over each column of the array, thus the resulting array is a row vector with 2 entries. Since the option keepdims=True is used the first dimension is kept, thus (1, 2).

6. Suppose you have built a neural network with one hidden layer and tanh as activation function for the hidden layer. You decide to initialize the weights to small random numbers and the biases to zero. The first hidden layer's neurons will perform different computations from each other even in the first iteration. True/False? 1 / 1 point

- (•) True Yes. Since the weights are most likely different, each neuron will do a different computation.
- ( ) False No. Since the weights are most likely different, each neuron will do a different computation.

Expand

Correct

7. A single output and single layer neural network that uses the sigmoid function as activation is equivalent to the logistic regression. True/False 1 / 1 point

- ( ) False
- (•) True

Expand

Correct
Yes. The logistic regression model can be expressed by $\hat{y} = \sigma\,(W\,x + b)$. This is the same as $a^{[1]} = \sigma(W^{[1]}\,X + b)$.

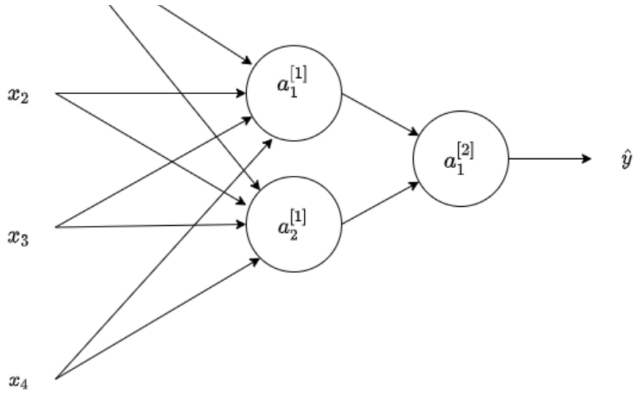
8. Which of the following is true about the ReLU activation functions? 1 / 1 point

- (•) They are the go to option when you don't know what activation function to choose for hidden layers.
- ( ) They are increasingly being replaced by the tanh in most cases.
- ( ) They are only used in the case of regression problems, such as predicting house prices.
- ( ) They cause several problems in practice because they have no derivative at 0. That is why Leaky ReLU was invented.

Expand

Correct

9. Consider the following 1 hidden layer neural network: 0 / 1 point




Which of the following statements are True? (Check all that apply).

- [x] $W^{[2]}$ will have shape (1, 2)

  ✓ **Correct**
  Yes. The number of rows in $W^{[k]}$ is the number of neurons in the k-th layer and the number of columns is the number of inputs of the layer.

- [x] $W^{[1]}$ will have shape (4, 2).

  ! **This should not be selected**
  No. The number of rows in $W^{[k]}$ is the number of neurons in the k-th layer and the number of columns is the number of inputs of the layer.

- [ ] $b^{[1]}$ will have shape (4, 2)
- [x] $b^{[1]}$ will have shape (2, 1).

  ✓ **Correct**
  Yes. $b^{[k]}$ is a column vector and has the same number of rows as neurons in the k-th layer.

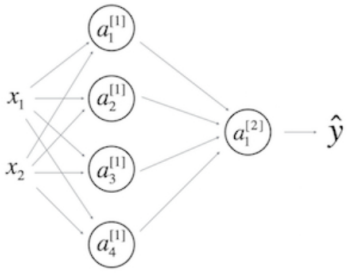
- [ ] $W^{[2]}$ will have shape (2, 1)
- [ ] $W^{[1]}$ will have shape (2, 4).

Expand

⊗ **Incorrect**
You didn't select all the correct answers

**10.** What are the dimensions of $Z^{[1]}$ and $A^{[1]}$?

**1 / 1 point**




- ( ) $Z^{[1]}$ and $A^{[1]}$ are (4,1)
- ( ) $Z^{[1]}$ and $A^{[1]}$ are (1,4)
- (•) $Z^{[1]}$ and $A^{[1]}$ are (4,m)

- $Z^{[1]}$ and $A^{[1]}$ are (4,2)

Expand

Correct