# Module 4: Answers

1. What type of Machine Learning has unlabeled data, but the system learns from feedback on its actions?

**Reinforcement Learning**

1. A machine learning model produces 40 true positives, 10 false positives, and 30 true negatives on 100 training examples. What is the precision and recall?

* **Precision: .8**
* **Recall: .66**

1. A model has an accuracy of 95% on training data, but only 55% accuracy on test data. Qualitatively, what is the bias (high/low) and variance (high/low)?

**Low Bias, High Variance**

1. What are some relevant features for building a model that predicts where someone will enjoy a movie?

**Any of the following would be acceptable**

* **How many friends of the person enjoyed the movie**
* **Number of actors in the movie that the person likes**
* **Whether the person likes the genre of that movie**
* **Critics rating of the movie**

1. Consider a fully-connected Neural Network with 10 input neurons, two hidden layers each with 30 neurons, and an output layer with 3 neurons. How many weights are in this Neural Network (ignore any bias terms)?

**10 x 30 x 30 x 3 = 27,000**

1. Consider a Neural Network that receives a 10 by 10 image and applies a convolution layer with 7 filters, a kernel size of 3, and a stride of 1. Assume that network pads the image with zeros, and that each of these zeros is included in the multiplications. How many individual multiplication operations are applied?

**(10 x 10) x (3 x 3) x 7 = 6,300**

1. What is an example of an activation function for a Neural Network?

**Any of the following are acceptable:**

* **Rectified Linear Activation (ReLU)**
* **Hyperbolic Tanger (tanh)**
* **Sigmoid**

1. What is Gradient Descent used for in Neural Networks?

**Gradient Descent is used to minimize the error of the Neural Network during training.**

1. What syntax is used to specify model definitions in Caffe?

**Protocol Buffer**

1. In Caffe, what layers are used for training a Neural Network that are not used in the deployed Neural Network?

* **data layers (perform cropping and subtraction of image means)**
* **accuracy layer**
* **loss layer**