1. We mentioned the AIDS detection problem in the Bayesian decision theory. Use the Bayes theorem to confirm the given answer (i.e., 9%). To answer this problem, you need to distinguish two different conditions:
   - False positive is a conditional probability P(reagent is negative | patient is infected). Same argument for false negative.
   - When a patient is given a positive test result, it is actually P(patient is infected | reagent is positive)

2. We mentioned an example to use Naïve Bayesian classifier for classifying colored squares and circles in the lecture. Following the example, which class will ⬤ be assigned to?

3. Below are scatterplots of Gaussian random points. Among these three plots, which one has the smallest correlation coefficient, and which one has the largest correlation coefficient? Is there any plot corresponding to negative correlation coefficient? Explain your answers.

(a)   (b)   (c)
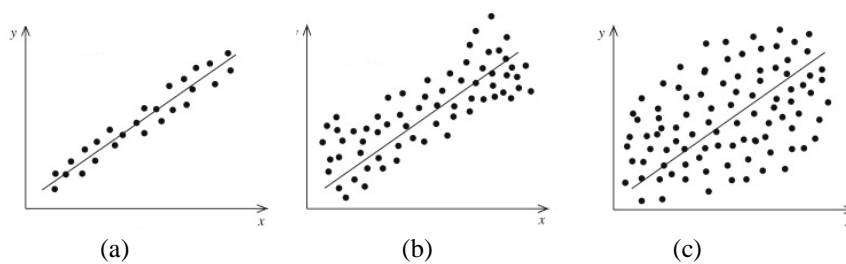
4. We mentioned the MLE in the lecture. Follow the lecture notes to write a program to draw the curve of probability with respect to $\theta = P(\{H\})$ for the coin sequence of $\{H,T,T,T,H,H,H\}$. Based on the curve, what is $\hat{\theta}$, the ML estimate of θ.

5. Use the Naïve Bayesian classifier (Note: Use GaussianNB because the features are continuous numbers) to classify the Iris dataset and compare the relative accuracy between this approach and the k-NN approach (in problem 4, HW #1).