

## Quiz 5

February 24, 2015

1. Suppose that 1 in 200 people carry defective gene that causes inherited colon cancer. We select a sample of 1000 individuals and look at the number of people carrying the defective gene.

- (a) (2 points) How many people carrying the defective gene do we expect to see in this sample?

The expected value is

$$\mu = \frac{1000}{200} = 5.$$

- (b) (2 points) Approximate the probability that between 5 and 8 people (inclusively) carry the gene.

We have

$$\begin{aligned} P(5 \leq X \leq 8) &= P(X \leq 8) - P(X \leq 4) \\ &= 0.932 - 0.440 = 0.492 \end{aligned}$$

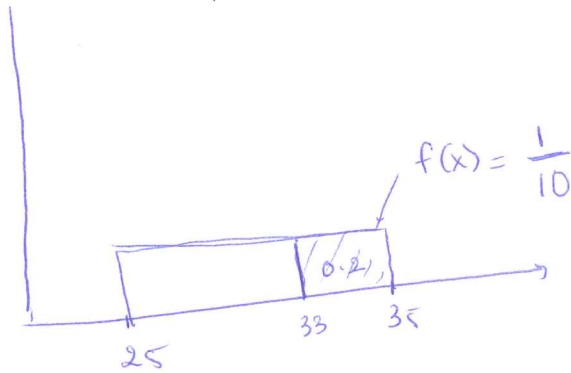
- (c) (2 points) Approximate the probability that at least 8 carry the gene.

We have

$$\begin{aligned} P(X \geq 8) &= 1 - P(X \leq 7) \\ &= 1 - 0.867 = 0.133 \end{aligned}$$

2. Suppose  $X$  has a uniform distribution on the interval  $[25, 35]$ .

(a) (2 points) Determine the pdf of  $X$  and sketch the curve.



(b) (2 points) What is the chance that  $X > 33$ .

$$P(X > 33) = \int_{33}^{35} \frac{1}{10} dx = \frac{x}{10} \Big|_{33}^{35} = \frac{2}{10} = 0.2$$