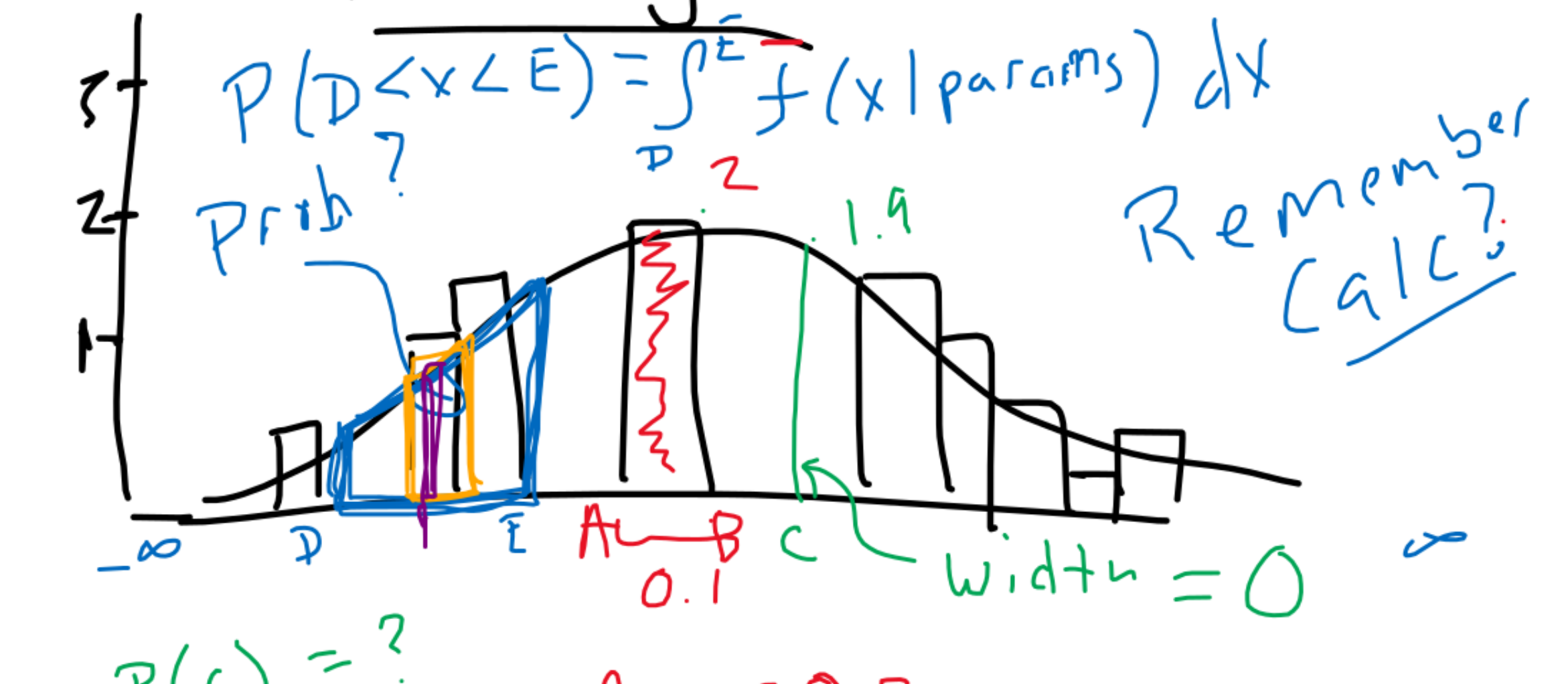
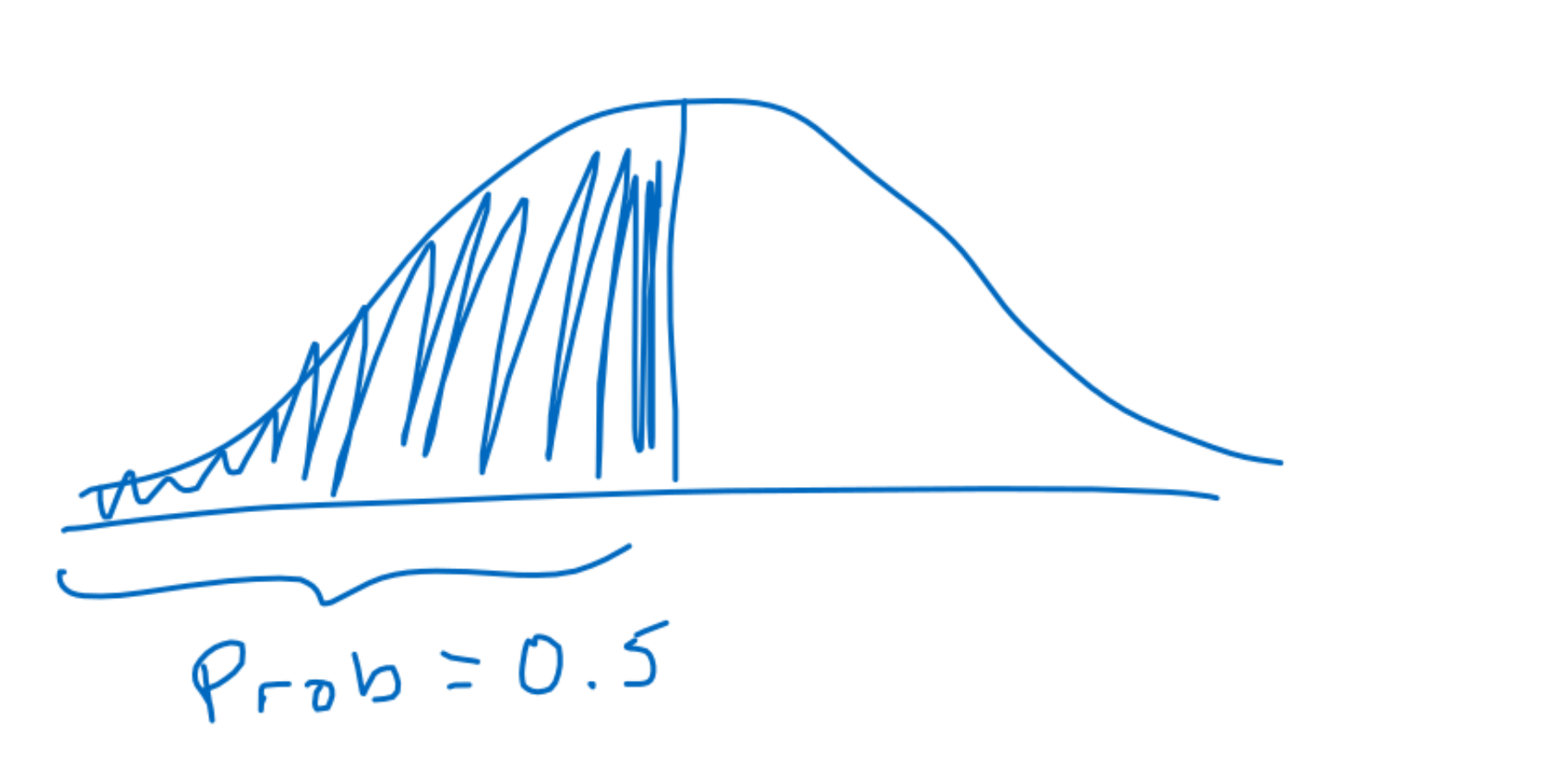
Meeting 7

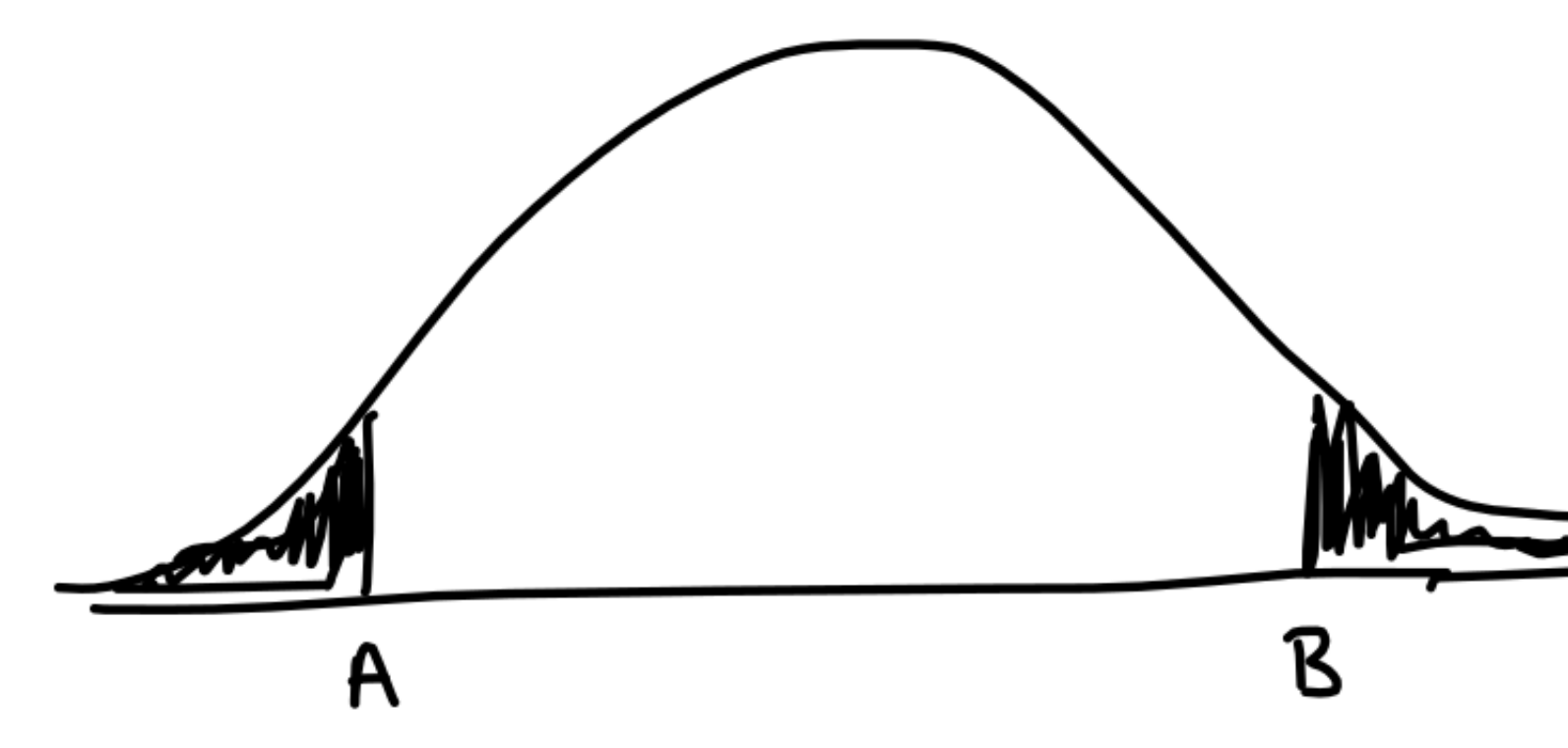
$P(D < x < E) = \int^{E} f(x \mid params)\,dx$



Area = 0.2
Prob of being between A and B

Area under curve = P (density)





Area in black?

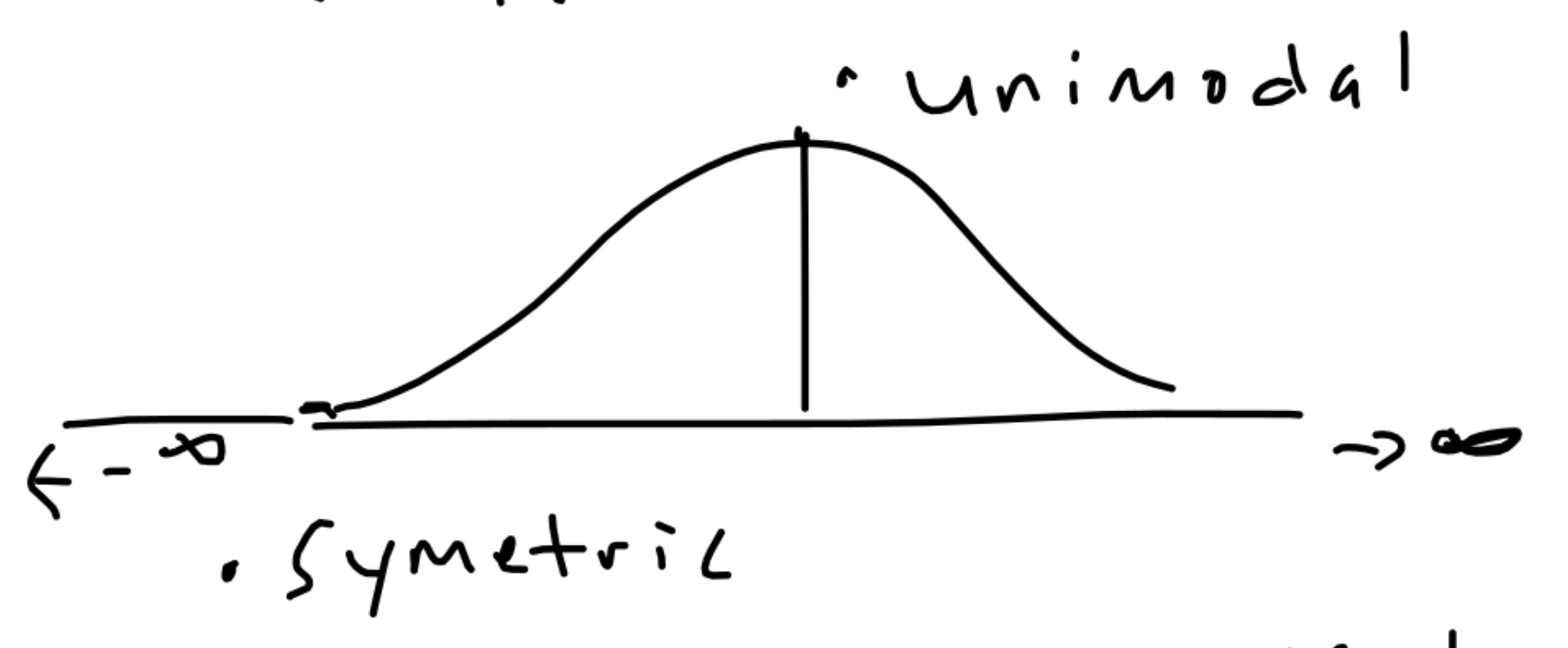
1. $1 - \int_A^B f(x)\,dx$
2. $\int_{-\infty}^{A} f(x)\,dx + \int_{B}^{\infty} f(x)\,dx$

Important Dist'ns

Binomial - see week 6

Normal Dist'n

- continuous
- defined from $-\infty$ to $+\infty$ (support of a dist'n)
- unimodal



- symetric
- Mean = Median = Mode
- Prob density function

$$f(x \mid \mu, \sigma) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

mu sigma
"given" parameters

where μ = mean
σ = standard deviation

- As observation depart from the mean, they become less likely

Negative Binomial

- What is the prob of needing N trials to observe X successes, with prob of success = P.
- Discrete dist'n
- Density function

$$P(N \mid X, P) = \binom{N-1}{X-1} P^X (1-P)^{N-X}$$

Number of combos of X-1 success in N-1 trials
unique
same as Binomial

- Where have we seen this?
  → How many coin tosses need to get to 100 heads?
- Counts -
  How many trap nights need for X photos of bobcats?

Poisson Dist'n

- Discrete dist'n
- Whats the probability of observing some count?
- Density function

$$P(X \mid \lambda) = \frac{e^{-\lambda} \lambda^X}{X!}$$

- Mean number of eggs in a nest is = 3 → $\lambda = 3$
- Make λ a function
  → $\lambda = f(\lambda, T)$

$$P(X \mid \lambda, T) = \frac{e^{-(\lambda T)} (\lambda T)^X}{X!}$$

- Prob of observing X, when you expect X at some rate λT.

Normal - AUC

Where are 95% of values?