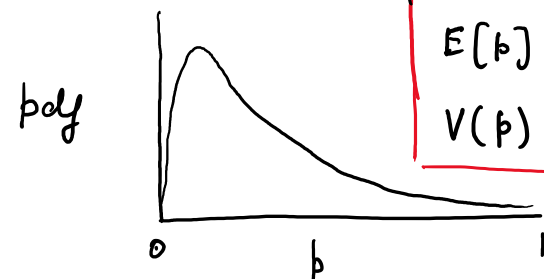


$p = \%$  green in the bag

experts:  $\begin{matrix} .01 & .05 & .1 \\ \frac{2}{5} & \frac{2}{5} & \frac{1}{5} \end{matrix}$

I would like



**Fact about Beta distribution**

If  $p \sim \text{Beta}(a, b)$  then

$$E[p] = \frac{a}{a+b} = m$$

$$V(p) = \frac{ab}{(a+b)^2(a+b+1)} = v$$

For this, we need a 'family of curves'

One such family is that of 'Beta distribution'

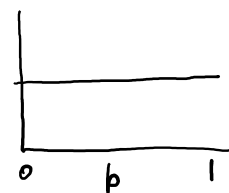
The pdf for  $\text{Beta}(a, b)$  is given by

$$f(p) \propto p^{a-1} (1-p)^{b-1} \quad \begin{matrix} p \in (0, 1) \\ a > 0 \quad b > 0 \end{matrix}$$

Notation: Recall  $X \sim N(\mu, \sigma^2)$

Note:  $f(p) = \frac{p^{a-1} (1-p)^{b-1}}{\int_0^1 p^{a-1} (1-p)^{b-1} dp}$

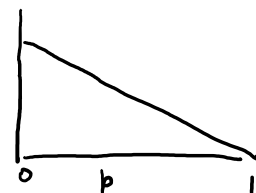
(a)  $a=1, b=1$



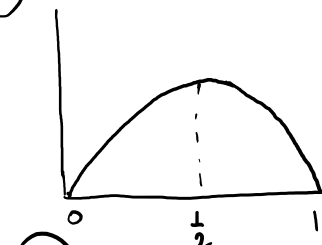
(b)  $a=2, b=1$



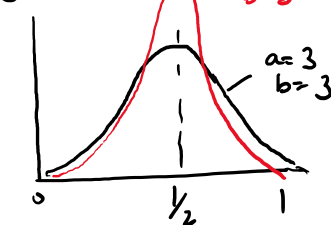
(c)  $a=1, b=2$



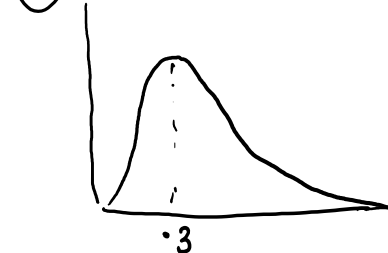
(d)  $a=2, b=2$



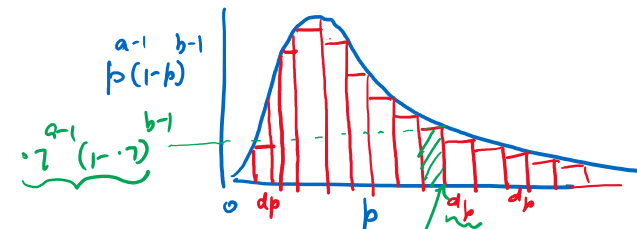
(e)  $a=3, b=3$



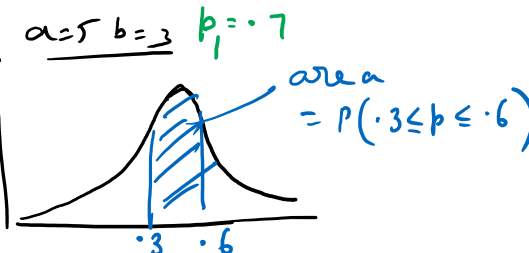
(f)  $a=3, b=7$



heuristic



(g)



(h)

