```
p=seq(0.05,0.95,0.1)
prior=c(1,5.2,8,7.2,4.6,2.1,0.7,0.1,0,0)
prior=prior/sum(prior)
plot(p,prior,type="h",ylab="Prior Probability")

--------------------------------------------------------

library(LearnBayes);library(lattice)
data=c(11,16)
post=pdisc(p,prior,data)
round(cbind(p,prior,post),2)
PRIOR=data.frame("prior",p,prior)
POST=data.frame("posterior",p,post)
names(PRIOR)=c("Type","P","Probability")
names(POST)=c("Type","P","Probability")
data=rbind(PRIOR,POST)
xyplot(Probability~P|Type,data=data,layout=c(1,2), type="h",lwd=3,col="black")
postmean=sum(p*post);priormean=sum(p*prior)
postmean;priormean

--------------------------------------------------------<

quantile2=list(p=.9,x=.5)
quantile1=list(p=.5,x=.3)
beta.select(quantile1,quantile2)

--------------------------------------------------------

a=3.26;b=7.19;s=11;f=16
curve(dbeta(x,a+s,b+f),from=0,to=1,xlab="p", ylab="Density",lty=1,lwd=4)
curve(dbeta(x,s+1,f+1),add=TRUE,lty=2,lwd=4)
curve(dbeta(x,a,b),add=TRUE,lty=3,lwd=4)
legend(.7,4,c("Prior","Likelihood","Posterior"),lty=c(3,2,1),lwd=c(3,3,3))

--------------------------------------------------------

1-pbeta(0.5, a+s, b+f)
qbeta(c(0.05, 0.95), a + s, b + f )
ps=rbeta(1000,a+s,b+f)
 hist(ps,xlab="p",main="")
sum(ps>=0.5)/1000
set.seed(22); ps=rbeta(1000,a+s,b+f)
sum(ps>=0.5)/1000
set.seed(22); ps=rbeta(1000,a+s,b+f); mean(ps)
 (a+s)/(a+s+b+f)
quantile(ps,c(0.05,0.95))
 quantile(ps,c(0.025, 0.975))
 quantile(ps,c(0.02,0.92))

----------------------------------------------------------------

p=seq(0.05,0.95,.1)
prior= c(1,5.2,8,7.2,4.6,2.1,0.7,0.1,0,0)
prior=prior/sum(prior);m=20;ys=0:20
```

```
pred=pdiscp(p,prior,m,ys)
round(cbind(0:20,pred),3)


----------------------------------------------------------------

ab=c(3.26,7.19)
m=20;ys=0:20
pred=pbetap(ab,m,ys)
ab=c(3.26,7.19)
m=20;ys=0:20
pred=pbetap(ab,m,ys)



----------------------------------------------------------------
p=rbeta(1000,3.26,7.19)
y=rbinom(1000,20,p)
table(y)
freq=table(y)
ys=as.integer(names(freq))
predprob=freq/sum(freq)
plot(ys,predprob,type="h",xlab="y", ylab="Predictive Probability")

----------------------------------------------------------------

alpha=16;beta=15174
 yobs=1; n=66
 y=0:10
lam=alpha/beta
 py=dpois(y,lam*n)*dgamma(lam,alpha,beta)/dgamma(lam,alpha+y,beta+n)
 cbind(y,round(py,3))
 lambdaA=rgamma(1000,alpha+yobs,beta+n)
 par(mfrow=c(2,1));hist(lambdaA);boxplot(lambdaA)
 summary(lambdaA)

----------------------------------------------------------------

n=1767; yobs=4; y=0:10
 py=dpois(y,lam*n)*dgamma(lam,alpha,beta)/dgamma(lam,alpha+y,beta+n)
 cbind(y,round(py,3))
 lambdaB=rgamma(1000,alpha+yobs,beta+n)

----------------------------------------------------------------

par(mfrow=c(2,1))
plot(density(lambdaA),main="HOSPITAL A",xlab="lambdaA",lwd=3)
curve(dgamma(x,alpha,beta),add=TRUE)
legend("topright",legend=c("prior","posterior"),lwd=c(1,3))
plot(density(lambdaB),main="HOSPITAL B",xlab="lambdaB",lwd=3)
curve(dgamma(x,alpha,beta),add=TRUE)
legend("topright",legend=c("prior","posterior"),lwd=c(1,3))

----------------------------------------------------------------

pbinom(5,20,0.5)
```

```
n=20;y=5;a=10;p=0.5
m1=dbinom(y,n,p)*dbeta(p,a,a)/dbeta(p,a+y,a+n-y)
lambda=dbinom(y,n,p)/(dbinom(y,n,p)+m1)
lambda
pbetat(p,.5,c(a,a),c(y,n-y))
```