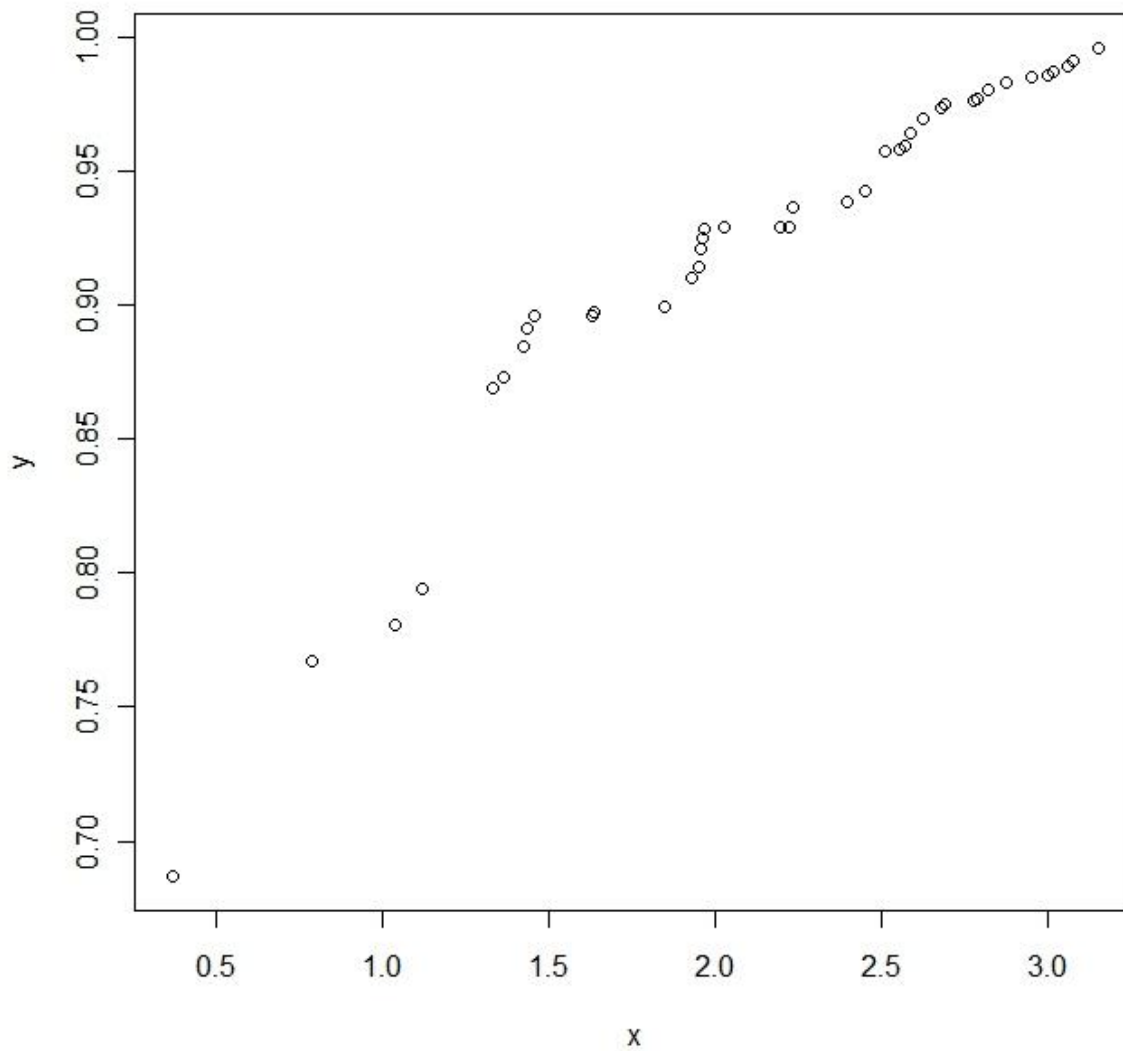
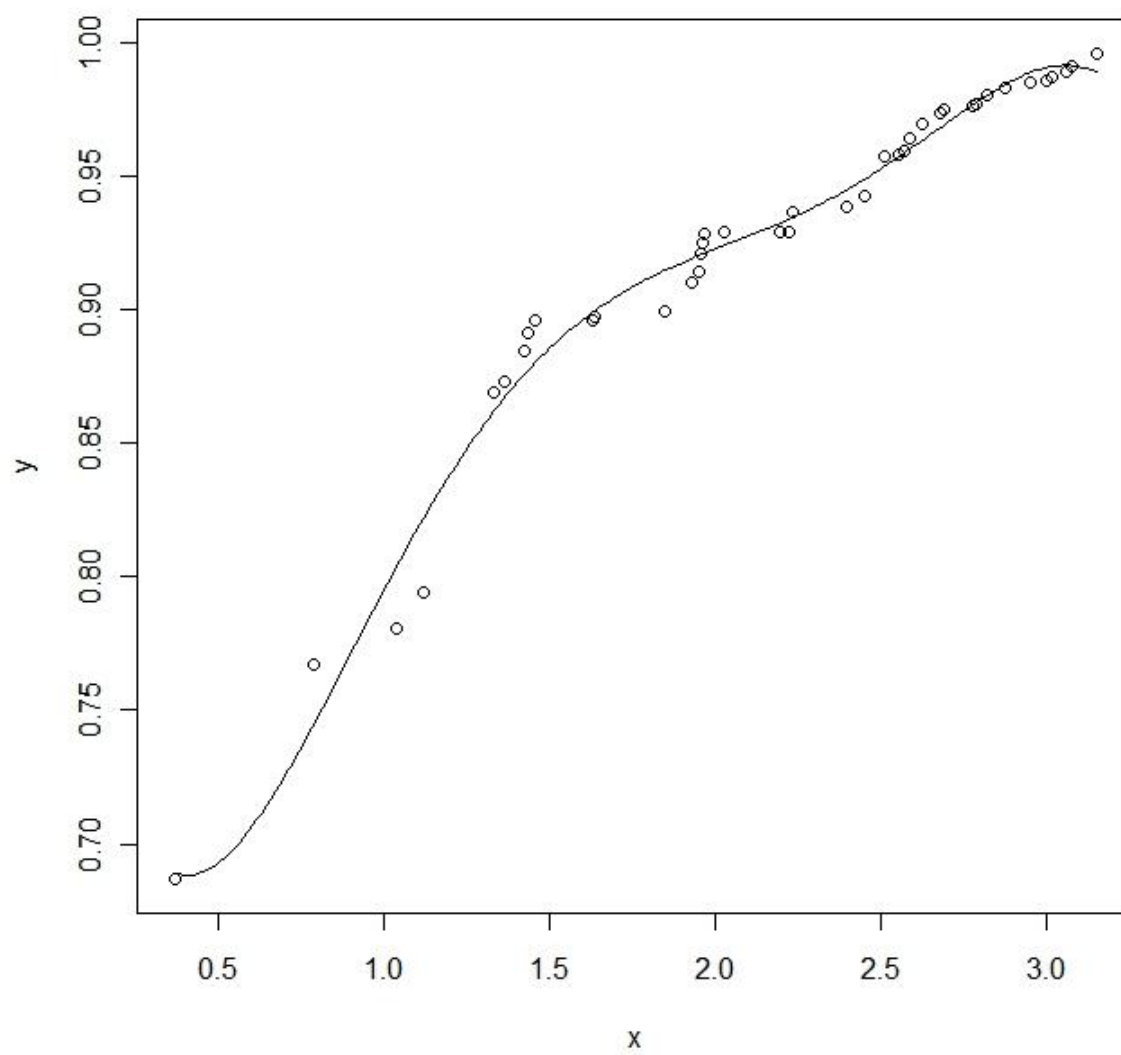


DAY 3 EXERCISE OUTPUT WITH PLOTS

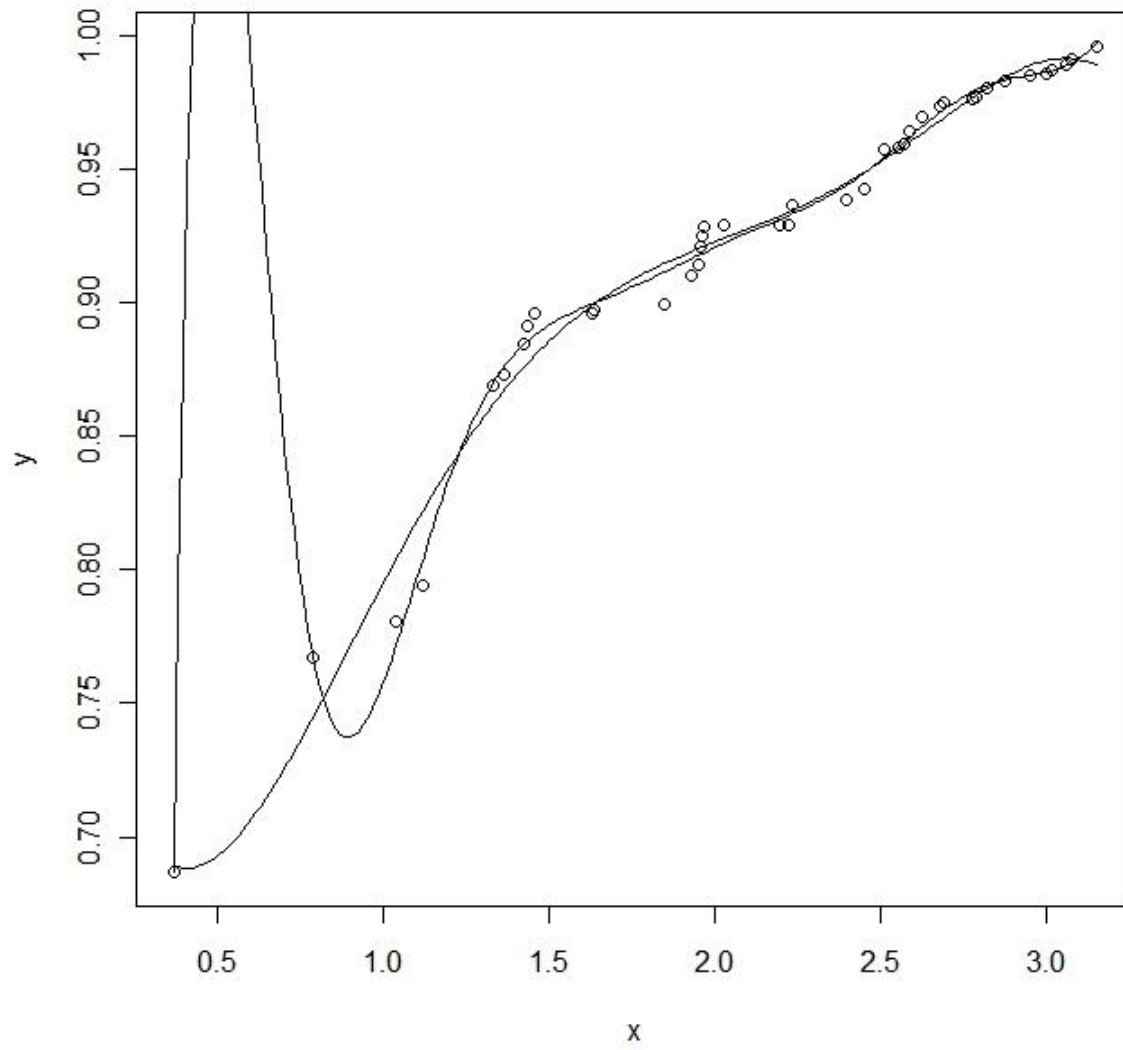
```
##### CHAPTER 3 QUESTION #1
## polynomial fits
## create some data:
> set.seed(1)
> x <- sort(runif(40)*10)^.5
> y <- sort(runif(40))^0.1
> xx <- seq(min(x),max(x),length=200)
> plot(x,y)
```



```
> b <- lm(y~poly(x,5))  
> lines(xx,predict(b,data.frame(x=xx)))
```



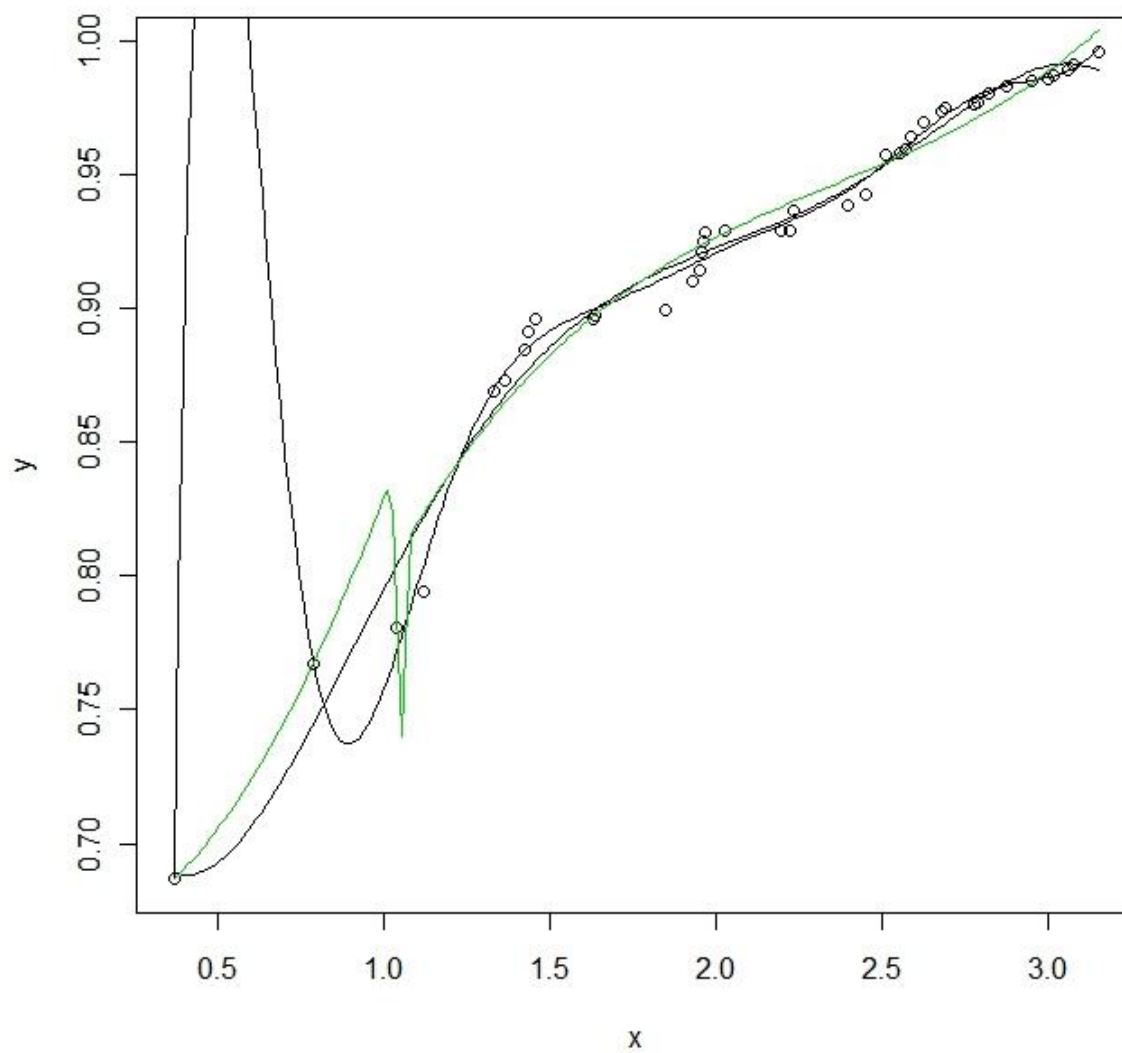
```
> b10 <- lm(y~poly(x,10))  
> lines(xx,predict(b10,data.frame(x=xx)))
```



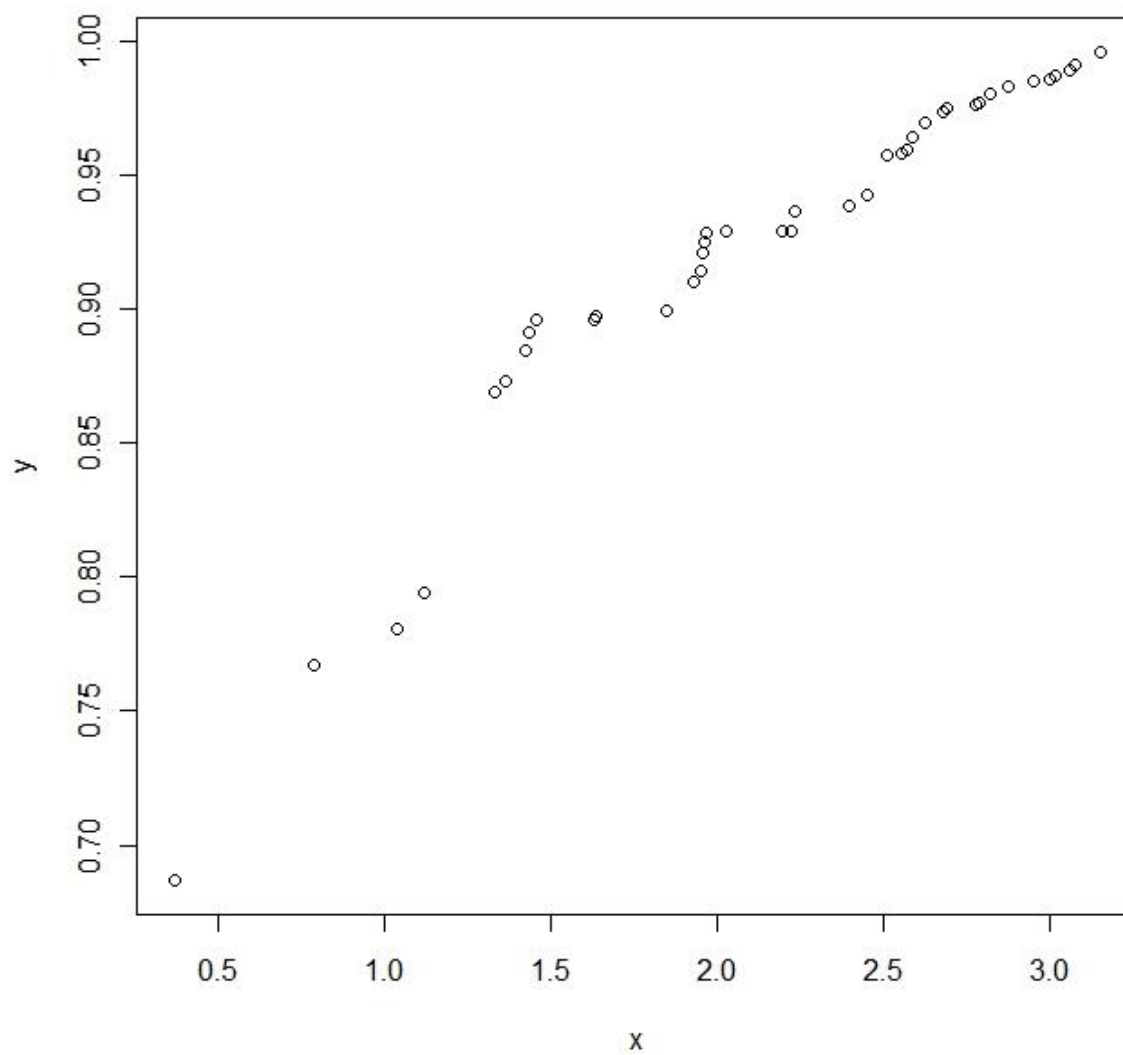
```

> sb <- function(x,xk) { abs(x-xk)^3}
> q <- 11
> xk <- ((1:(q-2)/(q-1))*10)^.05
> form <- paste("sb(x,xk[",1:(q-2),"])",sep=" ",collapse="+")
> form <- paste("y~x+",form)
> bform <- lm(formula(form))
> lines(xx,predict(bform,data.frame(x=xx)),col=3)

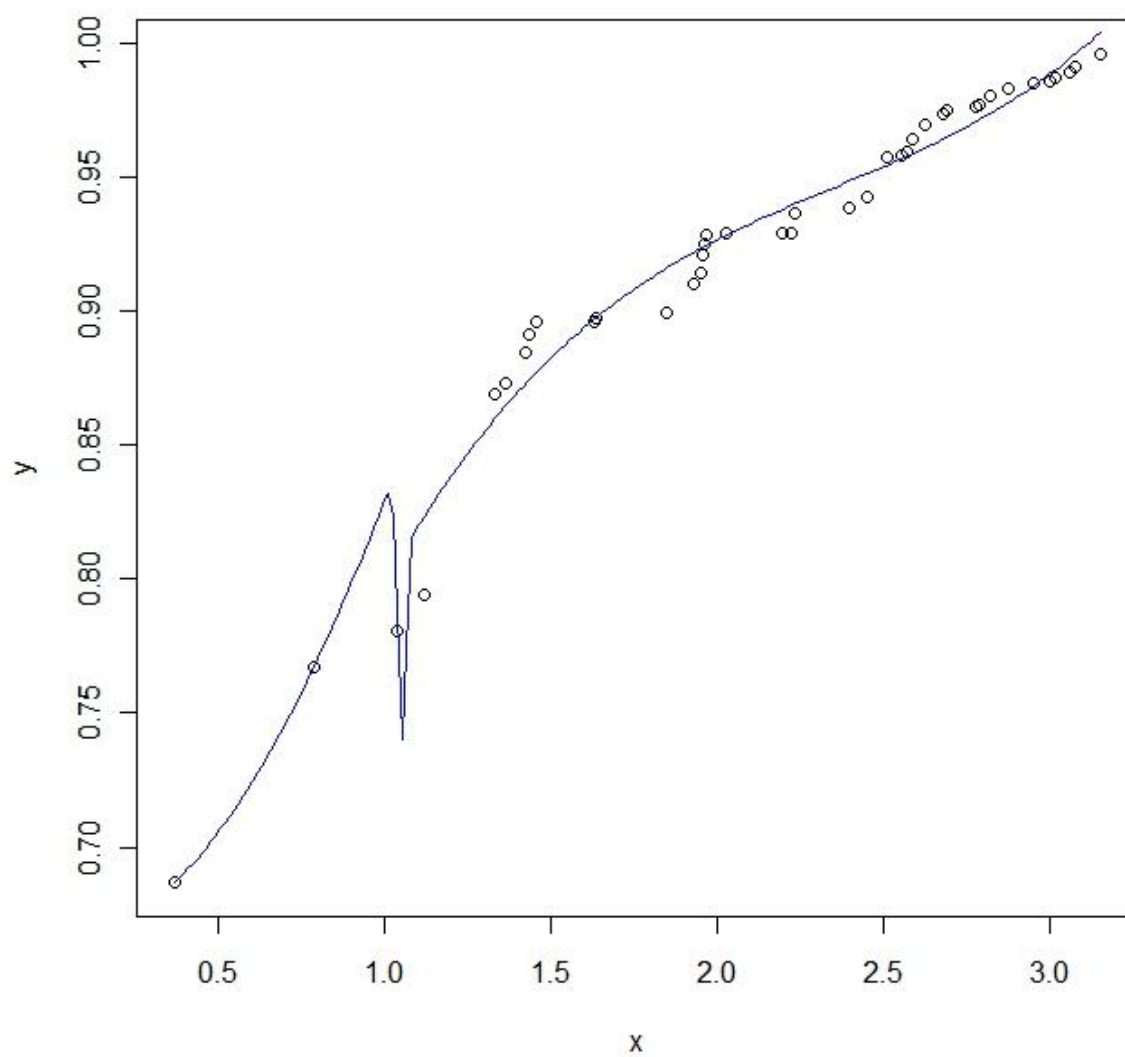
```



```
#####  
## QUESTION #2  
## x,y, and xx from previous question  
> b1 <- lm(form)  
> plot(x,y)
```



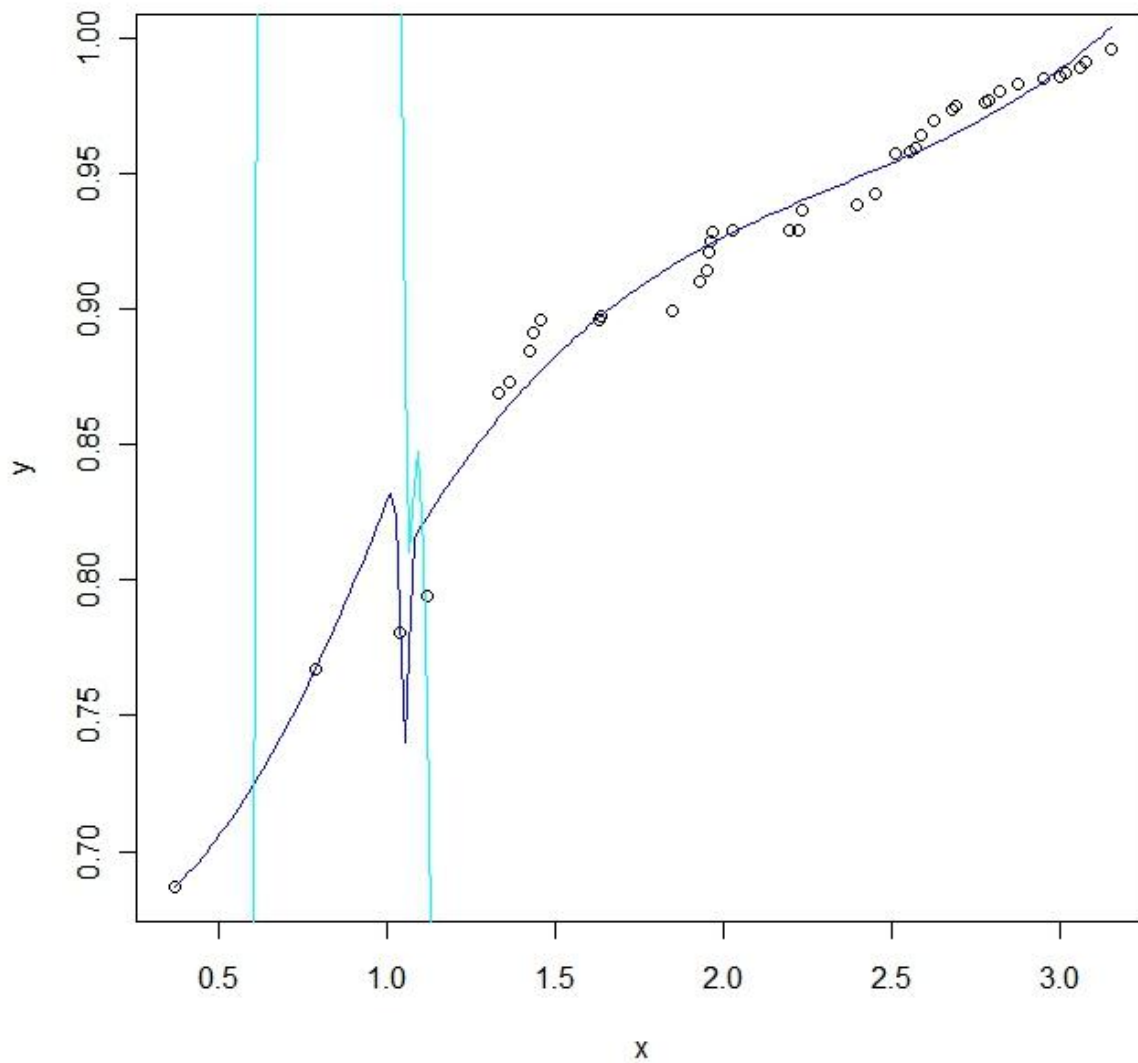
```
> lines(xx,predict(b1,data.frame(x=xx)),col=4)
```



```

> X <- model.matrix(b1) # extract model matrix
> beta <- solve(t(X)%*%X,t(X)%*%y,tol=0)
> b1$coefficients <- beta # trick for simple prediction
> lines(xx,predict(b1,data.frame(x=xx)),col=5)

```



```

## Upping the basis dimension to 11 also makes the normal
## equations estimates perform very badly

```