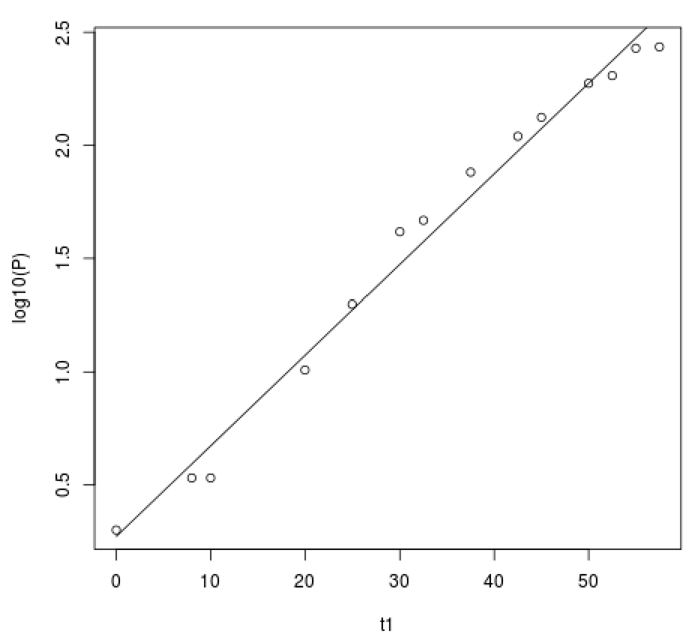
Data of yeast growth in a container and changed the medium every three hours. In this way, he washed away the yeasts' metabolism by-products and replenished their food. Over the course of the experiment, the yeast had, effectively, unlimited resources.

time (hours)	density of yeast
	unlimited resources
0	2
8	3.4
10	3.4
20	10.2
25	19.9
30	41.5
32.5	46.6
37.5	76.1
42.5	109.7
45	133.0
50	188.1
52.5	203.4
55	268.8
57.5	272.7

- Make a plot log-linear plot and fit a line.

```
t1=c(0,8,10,20,25,30,32.5,37.5,42.5,45,50,52.5,55,57.5)
P=c(2,3.4,3.4,10.2,19.9,41.5,46.6,76.1,109.7,133.0,188.1,203.4,268.8,272.7)
```

```
F=lm(log10(P)~t1)
plot(t1,log10(P))
lines(t1,fitted(F))
```



- From the fit, the slope of the line is $m = 0.04004$ and intercept is $b = 0.27225$. Let P be the population size, and t the time in hours. Using the slope and intercept of the best-fit line, we can find a model for P as a function of t.

$$\log_{10}(P) = mt + b$$

$$P = 10^{mt+b}$$

$$P = 10^b 10^{mt}$$

  We change the base to the natural base

$$P = 10^b e^{m \ln(10) t}$$

  Using the values of m and b above, we get a model of the form

$$P = 1.87\, e^{0.092t}$$

- Plot the data and the model together

```
Pmodel = 1.87*exp(0.092*t1)
plot(t1,P)
lines(t1,Pmodel)
```