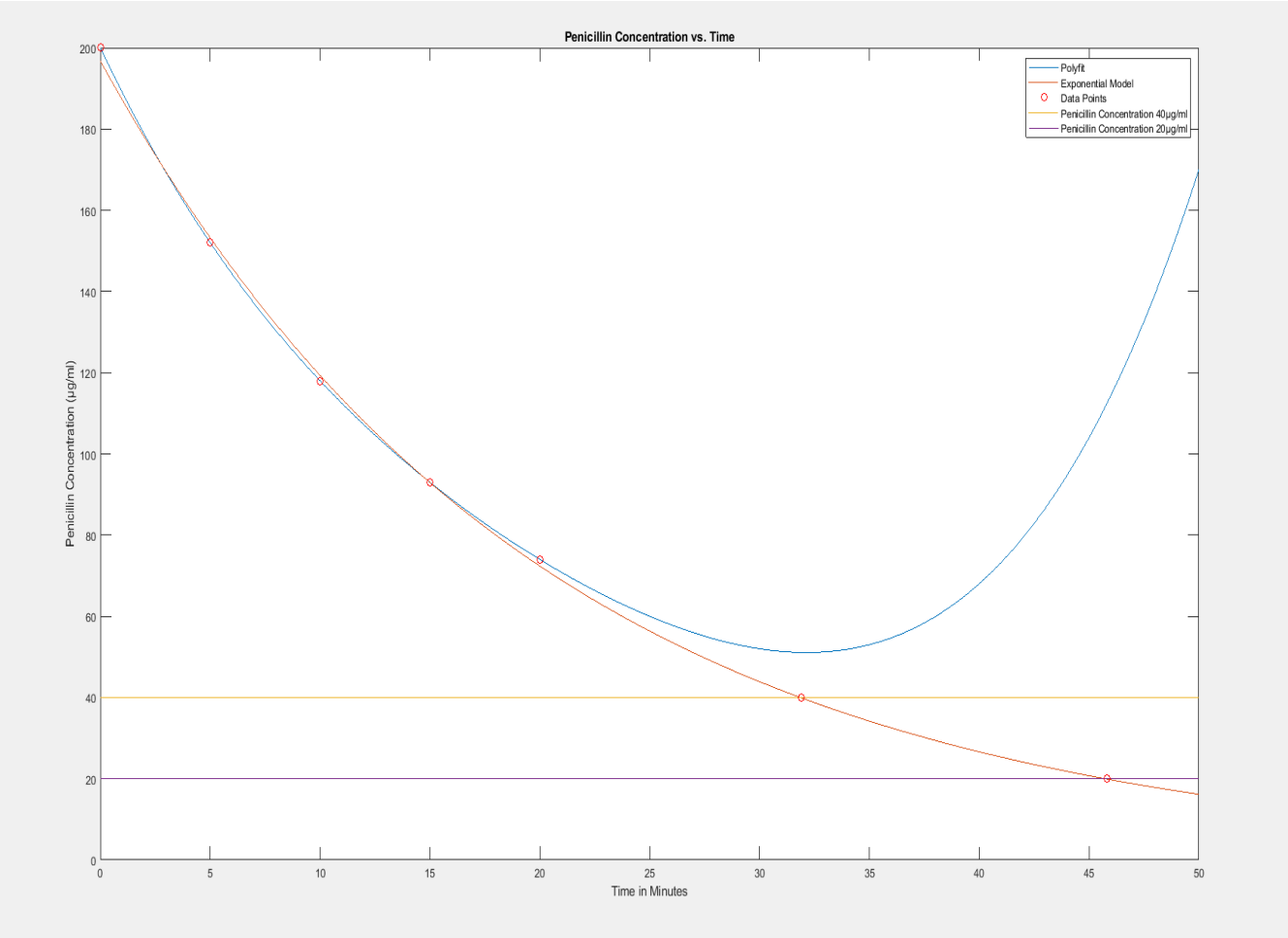
Penicillin Clearance

The following is the graph created for the Penicillin Concentration vs Time from the data found on the given website:



The following is the code utilized to create the graph and plot the data points:

```
x=linspace(0,50,101)
xpts=[0, 5, 10, 15, 20];
ypts=[200,152,118,93,74];
coefs=polyfit(xpts,ypts,4);
y=polyval(coefs,x)
y2=196.74.*(exp(-0.05*x));
plot(x,y,x,y2)
hold all
plot(xpts,ypts,'ro')
y4=40
y5=20
x1=0
x2=50
plot([x1,x2],[y4,y4])
plot([x1,x2],[y5,y5])
plot(31.9,40,'ro')
plot(45.8,20,'ro')
xlabel('Time in Minutes');
ylabel('Penicillin Concentration (µg/ml)');
title('Penicillin Concentration vs. Time');
legend('Polyfit','Exponential Model','Data Points','Penicillin Concentration
40µg/ml','Penicillin Concentration 20µg/ml')
hold all
```

The following is the answers to the questions:

Which type of fit seems to be more realistic as the better model of the real-life situation?

The exponential model is more realistic as the better model of the real-life situation

Predict when the penicillin concentration would drop below 40 µg/ml.

Penicillin concentration would drop below 40 µg/ml after 31.9 minutes approximately.

Suppose it is known that for penicillin to remain effective at killing bacteria, a level of >20 µg/ml must be maintained within a person's bloodstream. Identify the longest time one should wait between penicillin injections.

The longest time one should wait between penicillin injections is 45.8 minutes approximately.

Please include a brief 75-150 word paragraph discussing the use of MatLab as a computational tool to help solve any of the problems above.

MATLAB is a tool like no other! The software's functions are endless and could be applied to several aspects of life. It is a computational tool that can model Penicillin Concentration in the Body, it can predict population growth in different countries, and it can pretty much solve many complex problems that might be too difficult to solve by hand. The use of such a powerful tool can come in handy in various industries and can be very beneficial to any individual.