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% Bilx Spring 2011 Assignment 1 Answer Key
% Problem 1: Ligand binding
Kd=100; %Dissociation constant in units of nM
L=[1:1000]; %Ligand concentration
p=L./Kd./(1+L./Kd); %probability of receptor occupancy
%plot probability of receptor occupancy as a function of ligand
%concentration
figure, plot(L,p)
xlabel('Ligand concentraion [nM]')
ylabel('Probability')
title('Binding Curve')

% Problem 2: Matrix manipulation
M=[1 2 3;4 5 6;7 8 9] %Create a matrix
M(1,1) %Get elements M_11
M(2,3) %Get elements M_23
M(:,1) %Get first column
M(1,:) %Get first row
M.*pi %Multiply matrix by pi

% Problem 3: Logistic growth
r=1; % rate constant in the logistic equation
K=1; % saturation population size
% choose a step that is much smaller than the smallest time scale in the
% problem
step=0.1;
% Total Integration time
TotalTime=10;
% The initial conditions is
N0=0.01;
% Now, do it for the actual integration
% We'll have our time information in the vector N
N(1)=N0;
% m is a counter that we will use in the for loop
m=2;
for i=step:step:TotalTime
    N(m)=N(m-1)+r*step*N(m-1)*(1-N(m-1)); % logistic equation
    m=m+1; % increment the counter
end
Times=0:step:TotalTime; % create a vector of times for x-axis
figure,plot(Times,N,'-b')
xlabel('Time')
ylabel('Number of cells')
title('Logistic Growth')

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M =
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     1     2     3
     4     5     6
     7     8     9

```

```
ans =
```

```
1
```

```
ans =
```

```
6
```

ans =

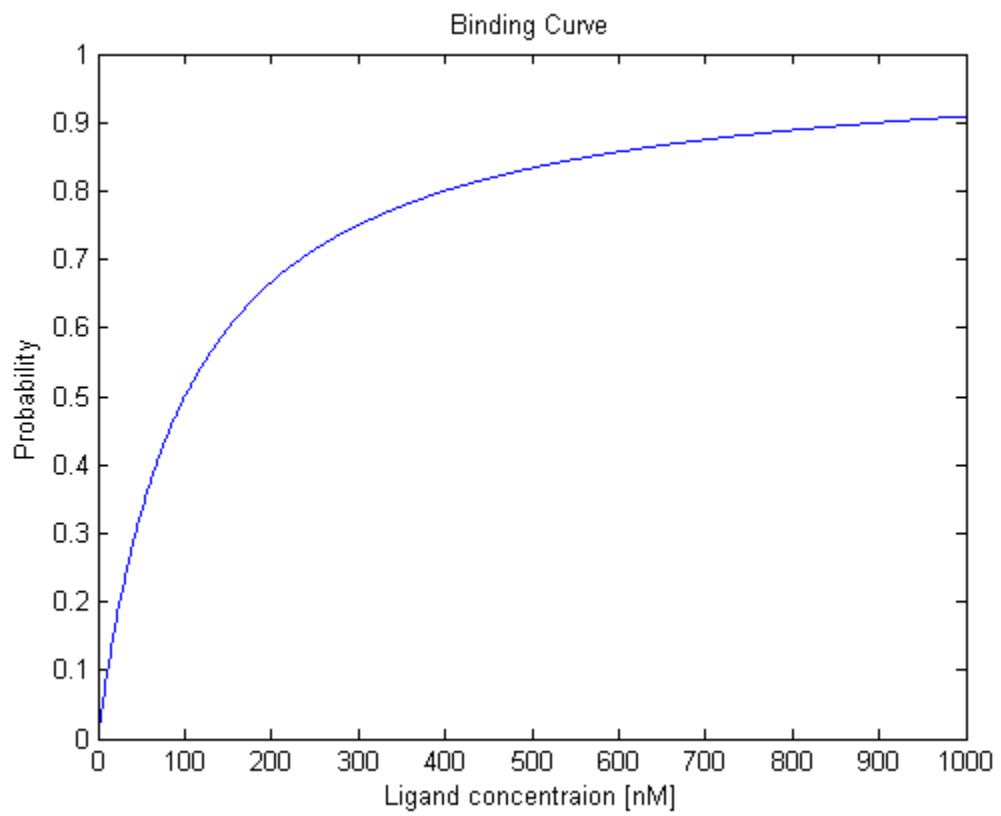
1
4
7

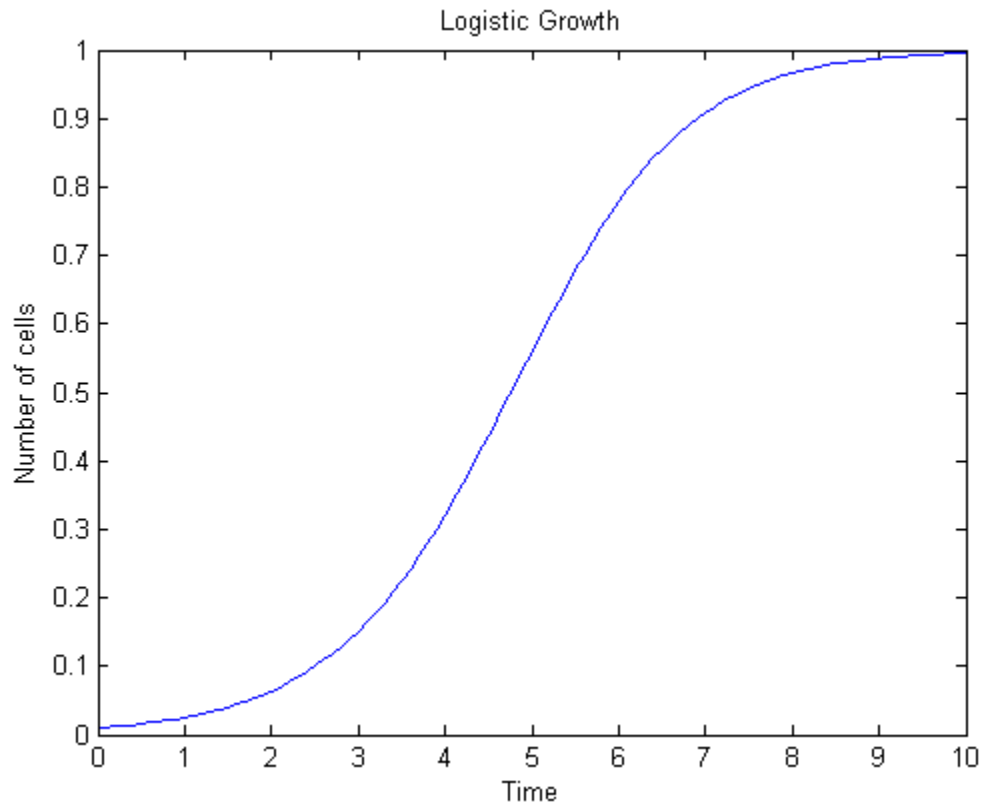
ans =

1 2 3

ans =

3.1416	6.2832	9.4248
12.5664	15.7080	18.8496
21.9911	25.1327	28.2743





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