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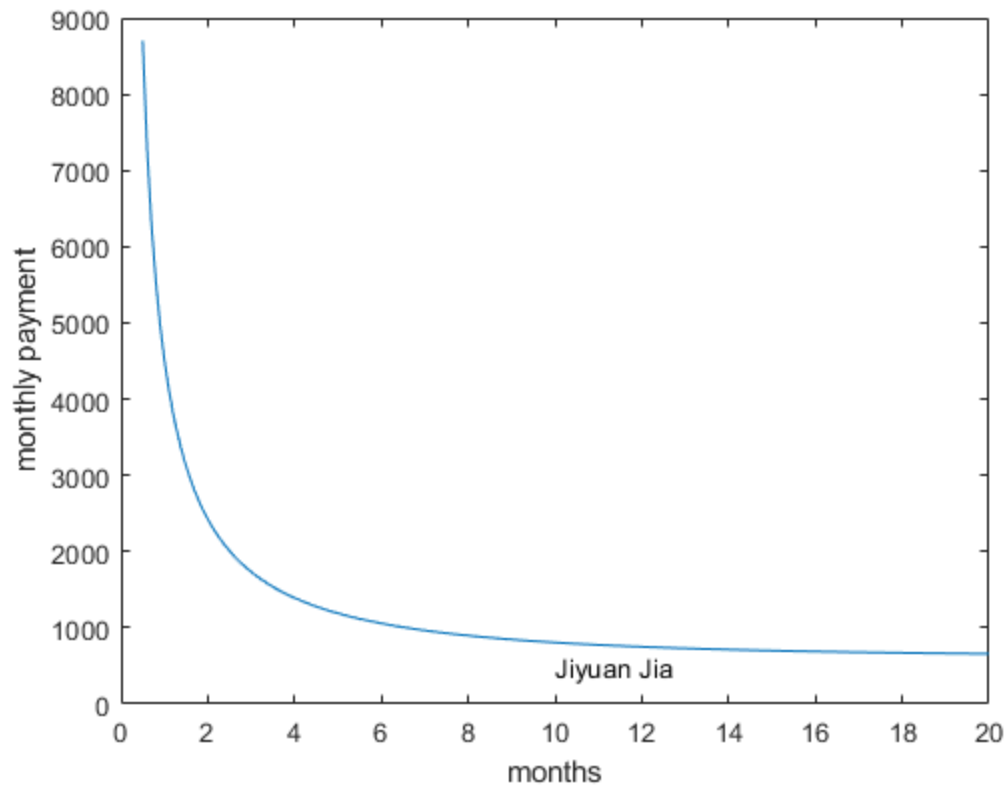
JIA Jiyuan 20210115 HW#1 Class 01

```
clear;clc;
```

Problem 1:

```
%monthly payment calculator
clear;clc
N=0.5:0.1:20;      %number of years
r=0.15;            %interest rate in percentage
L=50000;           %loan amount in Dollar
p=r*L*power((1+r/12),12*N)./(12*(power((1+r/12),12*N)-1)); %formula
    for monthly payment

figure(1)
plot(N,p); %plot fogure
xlabel("months"); %xlabel
ylabel("monthly payment"); %ylabel
text(10,500,"Jiyuan Jia"); %text on
```



Problem 2:

```
clear;clc
A = [20 4 2 6; 6 37 2 3; 8 5 9 9] %matrix A
x1 = A(1,:) %first row of A to a vector called x1
y = A(end-1:end,:) %last 2 rows of A to an array called y
B = A(:,2:2:end) %even-numbered columns of A to an array called B
C = A' %transpose of A to C
reciprocal = 1./A %reciprocal of each element o
A(3,2)=100 %change the number in column 2, row 3 of A to 100
```

A =

20	4	2	6
6	37	2	3
8	5	9	9

x1 =

20	4	2	6
----	---	---	---

y =

6	37	2	3
8	5	9	9

$B =$

4	6
37	3
5	9

$C =$

20	6	8
4	37	5
2	2	9
6	3	9

$reciprocal =$

0.0500	0.2500	0.5000	0.1667
0.1667	0.0270	0.5000	0.3333
0.1250	0.2000	0.1111	0.1111

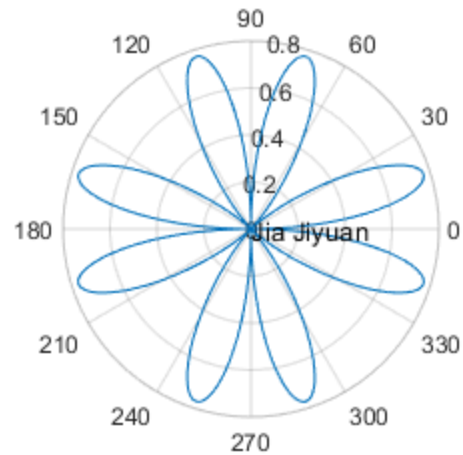
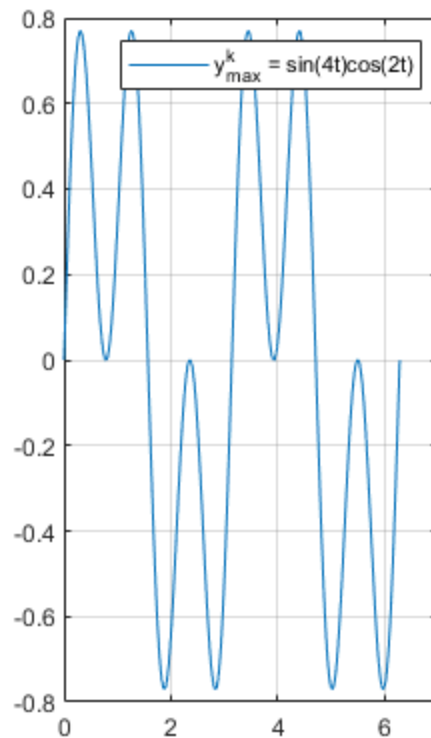
$A =$

20	4	2	6
6	37	2	3
8	100	9	9

Problem 3:

```
clear;clc
t = 0:0.001:2*pi;           %set independent variable
y = sin(4*t).*cos(2*t);      %set dependent variable
figure(2);                   %set figure
subplot(1,2,1);              %set subplot format
plot(t,y);                   %plot normal plot
grid on;                     %set grid on
legend('y_m_a_x^k = sin(4t)cos(2t)') %set legend
axis([0,7,-0.8,0.8]);

subplot(1,2,2);              %set subplot format
polarplot(t,y);              %plot polar plot
text(0,0,"Jia Jiyuan");      %set text
```



Problem 4:

```
clear;clc
% lengthInch = input("Enter a number:"); %input block
lengthInch = 5 %input block for publishing
lengthCentimeters = lengthInch*2.54; %convert inch into centimeter
lengthMilimeters = lengthInch*2.54*10; %convert inch into millimeter
fprintf("%.2f inches is %.2f cm\n",lengthInch,lengthCentimeters); %print out result
disp([num2str(lengthInch,'%.2f') ' inches is also ' num2str(lengthMilimeters,'%.2f') ' mm']); %print out result
```

lengthInch =

5

5.00 inches is 12.70 cm

5.00 inches is also 127.00 mm

Problem 5:

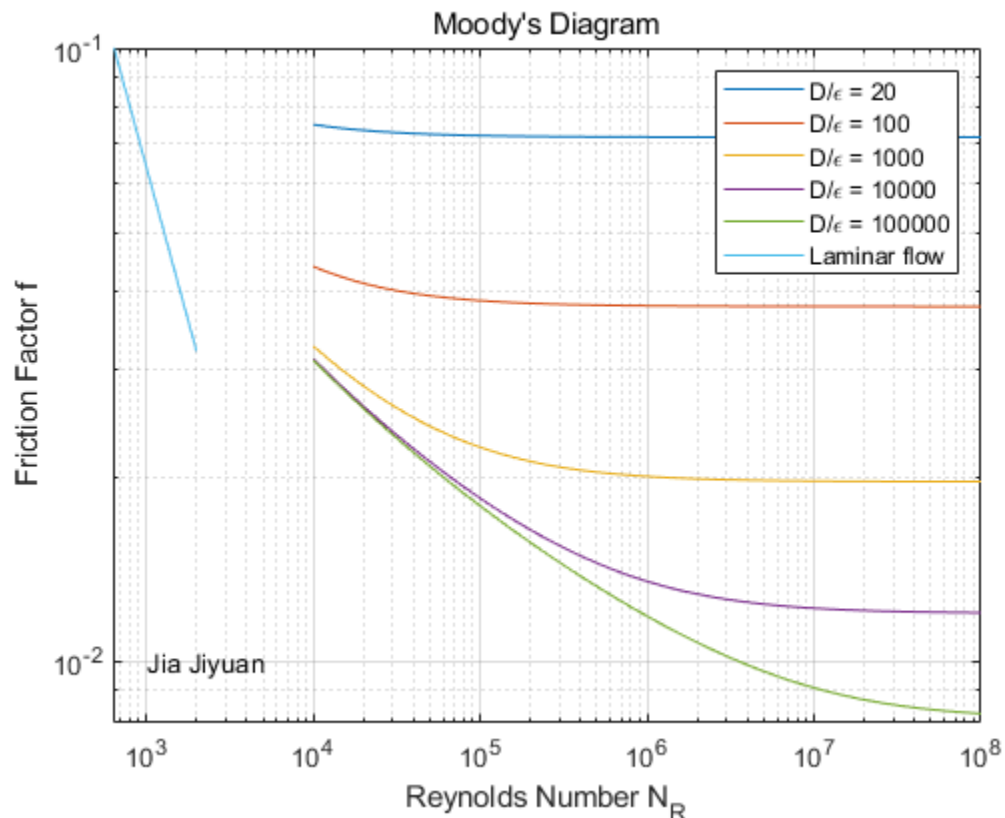
```
clear;clc
N = logspace(4,8); %independent variable for D/\epsilon !
=0
```

```

p = [20 100 1000 10000 100000]; %parameter
figure(3);
for li = 1:1:5                    %draw the figures for different
    parameters
        f = 0.25./((log10(1./(3.7.*p(li))+5.74./(N.^0.9))).^2); %the
        formula to get f
        loglog(N,f,'DisplayName',"D/\epsilon = " + num2str(p(li))) %plot
        and llegend
        hold on
    end

N = logspace(2.8,3.3);            %independent variable forlaminar flow
loglog(N,64./N,'DisplayName',"Laminar flow") %plot and legend
hold off
axis([10^2.8,10^8,10^-2.1,10^-1]) %axis limited
grid on
title("Moody's Diagram")         %title
xlabel("Reynolds Number N_R");   %xlabel
ylabel("Friction Factor f");     %ylabel
legend %legend on
text(10^3,10^-2,"Jia Jiyuan") %text

```



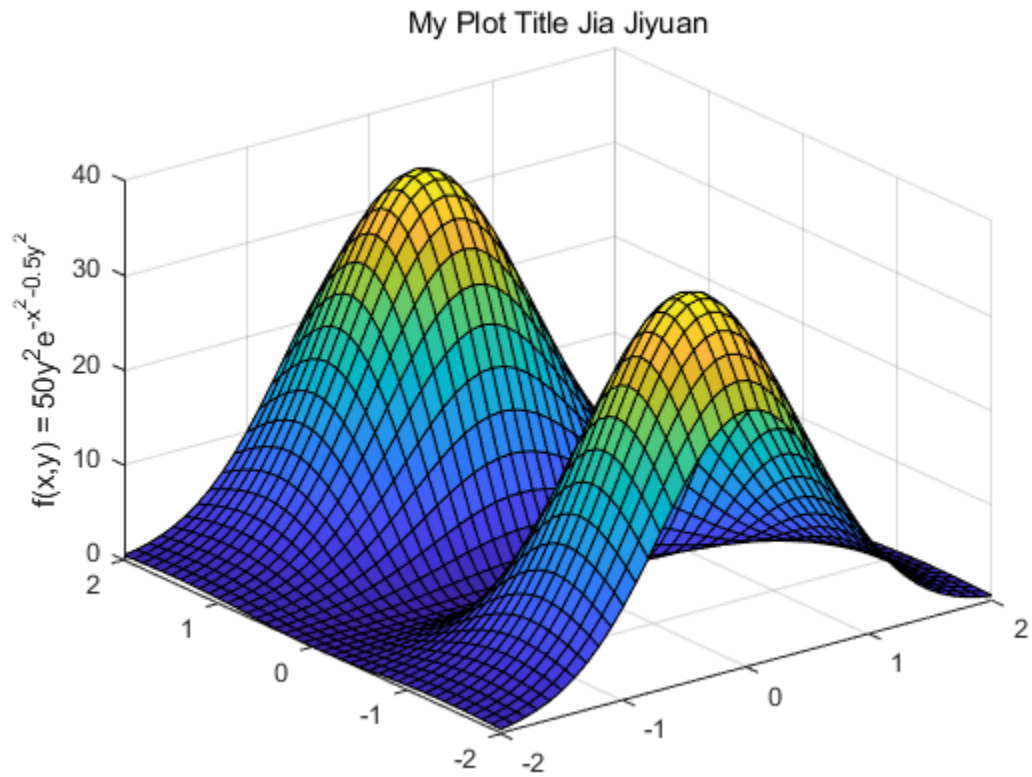
Problem 6:

```

clear;clc
x = -2:0.1:2; %independent variable x

```

```
y = -2:0.1:2; %independent variable y
[xgrid, ygrid] = meshgrid(x,y); %meshgrid for surf
zgrid = 50*(ygrid.^2).*exp(-xgrid.^2-0.5*ygrid.^2); %obtain zgrid
figure(4);
surf(xgrid,ygrid,zgrid); %draw the figure
title("My Plot Title Jia Jiyuan"); %title
xlabel("f(x,y) = 50y^2e^{-x^2-0.5y^2}") %give the label
```



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