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```
% ----------------------------------------
% HW1
% LiXin
% 2022/2/18
% ----------------------------------------
clear all; close all; clc
```

Problem 1

```
% 1
r=0.15; % interest rate
L=50000; % loan amount
N=[0.5:1/12:20]; % number of years
PN=(r*L*(1+r/12).^(12*N))./(12*((1+r/12).^(12*N)-1)) % monthly payment

% 2
plot(N, PN) % plot the monthly payment and the number of years

% 3
text(10,1000,"LiXin")
```

```
PN =

   1.0e+03 *

  Columns 1 through 7

    8.7017    7.5044    6.6067    5.9085    5.3502    4.8934    4.5129

  Columns 8 through 14

    4.1910    3.9153    3.6763    3.4673    3.2830    3.1192    2.9728

  Columns 15 through 21

    2.8410    2.7219    2.6136    2.5148    2.4243    2.3411    2.2644

  Columns 22 through 28
```

```
  2.1933    2.1274    2.0661    2.0089    1.9555    1.9054    1.8584

Columns 29 through 35

  1.8142    1.7726    1.7333    1.6961    1.6610    1.6277    1.5961

Columns 36 through 42

  1.5660    1.5375    1.5102    1.4843    1.4595    1.4358    1.4132

Columns 43 through 49

  1.3915    1.3708    1.3509    1.3318    1.3134    1.2958    1.2789

Columns 50 through 56

  1.2626    1.2469    1.2317    1.2172    1.2031    1.1895    1.1764

Columns 57 through 63

  1.1637    1.1515    1.1396    1.1281    1.1170    1.1063    1.0959

Columns 64 through 70

  1.0858    1.0760    1.0665    1.0573    1.0483    1.0396    1.0312

Columns 71 through 77

  1.0230    1.0150    1.0072    0.9997    0.9923    0.9852    0.9782

Columns 78 through 84

  0.9714    0.9648    0.9584    0.9521    0.9460    0.9401    0.9342

Columns 85 through 91

  0.9286    0.9230    0.9176    0.9124    0.9072    0.9022    0.8973

Columns 92 through 98

  0.8925    0.8878    0.8832    0.8787    0.8743    0.8700    0.8659

Columns 99 through 105

  0.8618    0.8577    0.8538    0.8500    0.8462    0.8425    0.8389

Columns 106 through 112

  0.8354    0.8319    0.8286    0.8252    0.8220    0.8188    0.8157

Columns 113 through 119

  0.8126    0.8096    0.8067    0.8038    0.8010    0.7982    0.7955
```

Columns 120 through 126

0.7928 0.7902 0.7876 0.7851 0.7826 0.7802 0.7778

Columns 127 through 133

0.7755 0.7732 0.7709 0.7687 0.7665 0.7644 0.7623

Columns 134 through 140

0.7602 0.7582 0.7562 0.7542 0.7523 0.7504 0.7486

Columns 141 through 147

0.7468 0.7450 0.7432 0.7415 0.7398 0.7381 0.7365

Columns 148 through 154

0.7348 0.7332 0.7317 0.7301 0.7286 0.7271 0.7257

Columns 155 through 161

0.7242 0.7228 0.7214 0.7201 0.7187 0.7174 0.7161

Columns 162 through 168

0.7148 0.7135 0.7123 0.7110 0.7098 0.7087 0.7075

Columns 169 through 175

0.7063 0.7052 0.7041 0.7030 0.7019 0.7008 0.6998

Columns 176 through 182

0.6988 0.6977 0.6967 0.6958 0.6948 0.6938 0.6929

Columns 183 through 189

0.6920 0.6910 0.6901 0.6893 0.6884 0.6875 0.6867

Columns 190 through 196

0.6858 0.6850 0.6842 0.6834 0.6826 0.6818 0.6811

Columns 197 through 203

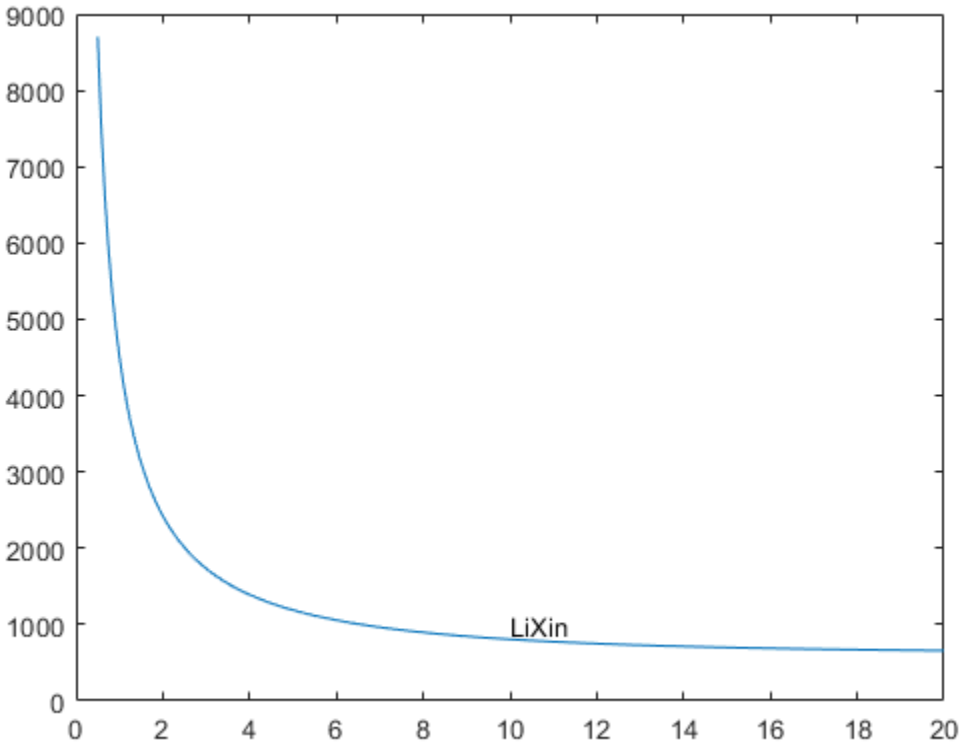
0.6803 0.6796 0.6789 0.6781 0.6774 0.6767 0.6760

Columns 204 through 210

0.6753 0.6747 0.6740 0.6734 0.6727 0.6721 0.6715

Columns 211 through 217

```
  0.6708    0.6702    0.6696    0.6691    0.6685    0.6679    0.6673

Columns 218 through 224

  0.6668    0.6662    0.6657    0.6651    0.6646    0.6641    0.6636

Columns 225 through 231

  0.6631    0.6626    0.6621    0.6616    0.6611    0.6607    0.6602

Columns 232 through 235

  0.6597    0.6593    0.6588    0.6584
```



Problem 2

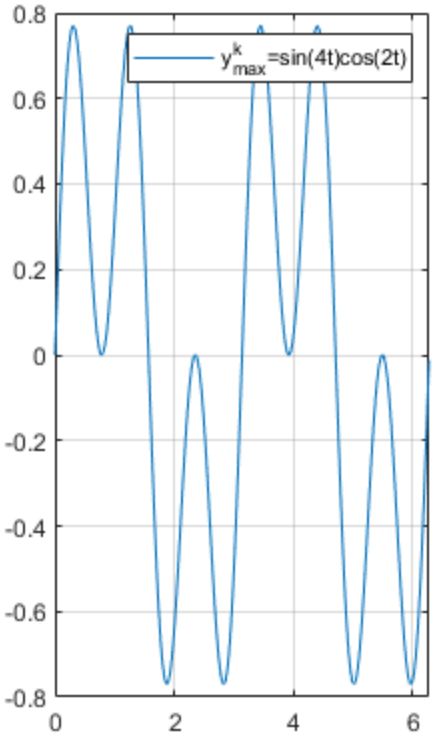
```
clear all; close all; clc % erase all the workspace data, command
 window output, and close all figures
% a
A=[20 4 2 6; 6 37 2 3;8 5 9 9] % create the matrix
% b
x1=A(1,:) % assign the first row of A to a vector called x1
% c
y=A([end-1 end],:) % assign the last 2 rows of A to an array called y
% d
```

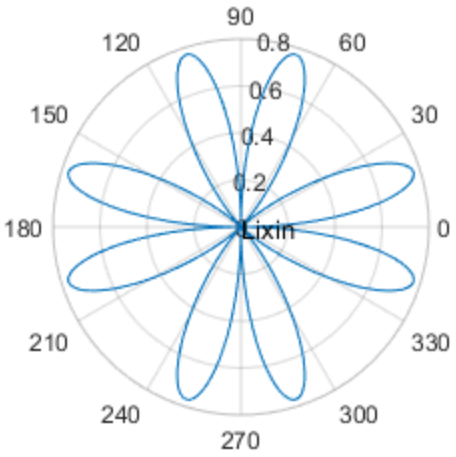
```
B=A(:,2:2:size(A,2)) % assign the even-numbered columns of A to an
 array called B
% e
C=A' % assign the transpose of A to C
% f
reciprocal = 1./A % compute the reciprocal of each element of A
% g
A(3, 2)=100 % change the number in column 2, row 3 of A to 100


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 all; close all; clc % erase all the workspace data, command
 window output, and close all figures
% a
figure % create an empty figure

% b
t=0:0.01:2*pi; % create a vector contains numbers range from 0 to 2*pi
y=sin(4*t).*cos(2*t); % calculate the result of the function according
 to the scope
ax1=subplot(1,2,1);
plot(t,y) % normal plot
ax2=subplot(1,2,2);
polarplot(t,y) % polar plot

% c
legend(ax1,'y^k_{max}=sin(4t)cos(2t)') % put legend on the first
 subgraph

% d
grid(ax1, 'on') % grid on the first subgraph

% e
text(0,0,'Lixin') % text on the second subgraph
```





Problem 4

```
clear all; close all; clc % erase all the workspace data, command
 window output, and close all figures
% a
num=input('Enter a number: ');

% b
num_cm=num * 2.54; % convert to cm
fprintf('%.2f inches is %.2f cm\n', num, num_cm)

% c
num_mm=num_cm * 10; % the number converted to mm
formatSpec='%.2f';
str = [num2str(num, formatSpec), ' is also ', num2str(num_mm,
 formatSpec), 'mm'];
disp(str)

Error using input
Cannot call INPUT from EVALC.

Error in Homework_01 (line 64)
num=input('Enter a number: ');
```

Problem 5

```
clear all; close all; clc % erase all the workspace data, command
 window output, and close all figures
Nr = logspace(4,8,100); % Reynolds number
for De = [20 100 1000 1000 100000] % D/epsilon
    f = 0.25./(log(1/(3.7*De)+5.74./Nr.^0.9)/log(10)).^2;
    loglog(Nr, f)
    hold on
end
grid on
grid minor
Nr=[1e2:0.2e4];
f = 64./Nr;
plot(Nr, f) % plot f = 64 / Nr
title('Moody''s Diagram')
ylabel('Friction Factor')
xlabel('Reynolds Number N_R')
legend('D/\epsilon = 20', 'D/\epsilon = 100', 'D/\epsilon = 1000', 'D/
\epsilon = 10000', 'D/\epsilon = 100000','Laminar flow',...
'Location','southwest')
text(1e7,0.08,'Lixin') % print my name
xlim([0.8e3 1e8])
ylim([0.8e-2 1e-1])% adjust axis limits
```

Problem 6

```
clear all; close all; clc % erase all the workspace data, command
 window output, and close all figures
[x, y]=meshgrid(-2:0.1:2);
f=50*y.^2.*exp(-x.^2-0.5*y.^2);
C=x.*y;
surf(x,y,f,C)
xlabel('x');
ylabel('y');
zlabel('f(x,y) = 50y^2e^{-x^2-0.5y^2}');
title('My Plot Title')
```

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