YourName: $\qquad$
$\begin{array}{llll}\text { Section: } & \text { Lund (9 am) } & \text { Vipperman (1 pm) } & \text { Vasko (honors) } \\ & \text { Patzer (11 am) } & \text { Budny (4 pm) } & \text { Vasko (6 pm) }\end{array}$

Please write neatly and show all of your work. Adequate space for your response has been provided following each question. If you need additional room, turn to the backside of the page or ask the instructor for paper. Good luck!!

| Question | Possible Score | Actual Score |
| :---: | :---: | :---: |
| 1 | 20 |  |
| 2 | 18 |  |
| 3 | 20 |  |
| 4 | 6 |  |
| 5 | 6 |  |
| 6 | 22 |  |
| 7 | 100 |  |
| Total | 8 |  |
| 6 |  |  |
| 6 |  |  |

## Engineering 12 - Spring 2002

Test 1

## YourName:

$\qquad$

1) ( 20 points) Write the screen display for the following script and associated function in the space provided.
```
% script
    m = 4
    n = 5
    [a,b] = confuse1(m,n)
```

function [a,b] = confusel (m,n)
$a=2 * m ;$
b $=3 * n-m$;

| Display \# | Display |
| :---: | :--- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |

Write the screen display for the following script and associated function in the space provided.

```
% script
    m = 4
    n = 5
    [m,n] = confuse2(n,m)
function [n,m] = confuse2(m,n)
    m = 3*m
    n = 2*n-m
```

| Display \# | Display |
| :---: | :--- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |

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YourName: $\qquad$
2) (18 Points) Identify the correct screen display, for the following MATLAB code.
$a=5$;

| Display |
| :--- |
| $\bar{\square}$ |
| $\square$ |
|  |

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Test 1

## YourName:

3) ( 20 points) Identify the correct screen display for the following MATLAB code:
```
v=[[0 1 2 2 3 4 4];
for k = 1:5
    switch (k-1)
        case {1,3}
            v(k)=v(k)+v(k+1);
        case {2,4}
            v(k)=new+1;
            otherwise
                v(k)=k+1;
    end
    new=v (k)
end
```

1) 
2) 
3) 
4) 
5) 
6) 
7) $\qquad$
8) $\qquad$
9) $\qquad$
10) 

) $\qquad$

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Test 1

## YourName:

$\qquad$
4) (8 Points) The polyfit command attempts to fit a polynomial $\left(a_{n} x^{n}+a_{n-1} x^{n-1}+\ldots+a=y\right)$ to a dataset.

The following is a list of the polyfit commands and results (each for a different dataset), write the equation in the form of $\boldsymbol{y}=\boldsymbol{f}(\boldsymbol{x})$ represented by the output of the polyfit command:

$$
\begin{array}{lllll}
\text { Coeff=polyfit }(x, y, 3) \\
\text { Coeff }= & -4 & 0 & 1 & 5
\end{array}
$$

Equation: $\qquad$
Coeff=polyfit(x, $\log (y), 1)$
Coeff $=020$
Equation: $\qquad$
Coeff=polyfit( $\log (\mathrm{x}), \log (\mathrm{y}), 1)$
Coeff $=020$
Equation: $\qquad$
Coeff=polyfit(x,y,1)
Coeff $=020$
Equation: $\qquad$
5) (6 Points) For the following MATLAB commands, what is the resulting value of $y$ ?

```
    x=[-1, 3]
func_f='x.^2-4*x'
y=eval(func_f)
```

$y=$
6) (6 Points) You wish to write a script that will analyze the following function:

$$
f(x)=\frac{x^{2} \cos (2 x+1)}{(6 x) \ln x}
$$

Write the m - file required to define this as a MATLAB function. . Call the function fun_x and pass the function x and return the value y .

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Test 1

## YourName:

7) (22 points) You are a TA reviewing a Matlab script turned in by a student. The script begins on the next page, and the lines are numbered for convenience. To figure out the problems with this script, you must answer the following questions:
a) i) What is the purpose of the statements included in lines 1 through 4 ?
ii) What error is made in both lines 3 and 4?
b) i) What is the purpose of variable keepgoing in line 6? What should the value be?
ii) What will happen based on the value it is assigned?
c) List 4 errors which occur on lines $9,14,19$ and 22 .
d) In lines 27 through 30, a function is called which performs a linear fit to a log-log plot of the data.
i) Based on the definition of the function specified on line 44, is the function called properly from line 28 ? If not, why?
ii) Based on the definition of the function, how should the function file be saved?
iii) Write the equation which linear fit to a $\log$ - $\log$ plot ultimately provide?
iv) The same mistake is made on lines 47 and 49 of the function file. What is this mistake?
e) What is the purpose of the set of statements included in lines 32 through 35 ?

## YourName:

filename $=\operatorname{input}($ 'Enter the full name of the data text file containing $x$ values in column 1 and $y$ values in column 2 (Ex: dataset1.dat): ', ‘s’)
data $=\operatorname{load}($ filename $)$;
$\mathrm{x}=$ filename $(:, 1)$;
$\mathrm{y}=$ filename $(:, 2)$;
keepgoing $=0$;
while keepgoing $==1$
disp('Select type of regression to perform on data file.')
plot_desired=input('Type "1" for Linear, "2" for Semi-log linear, "3" for Log-log linear, 's');
switch plot_desired
case 1 \% Performs linear fit to data
line $=\operatorname{polyfit}(x, y)$;
$y f i t=\operatorname{polyval}($ line, $x)$;
plot(x, y, 'm*', x, yfit, 'k--')
title('X vs. Y Plot with Linear Fit')
disp('Linear Fit coeffiecients are:')
slope=line(2)
intercept=line(1)
elseif 2 \%Performs linear fit to semi-log plot of data
[a,b] = semi_logf(x,y);
disp('Exponential equation coefficients are:')
a, b
case 3 \%Performs linear fit to log-log plot of data
$[\mathrm{a}, \mathrm{b}]=\log \log f(\mathrm{x})$; $\quad$ \% See function below
disp('Power Function coefficients are:')
a, b
otherwise
disp('ERROR: Incorrect input given')
again=input('To try again type " 1 ", otherwise type " 0 ": ');
keepgoing=again;
end
end
38.
39.
40. \% Function file
41. \% Performs linear fit to log-log plot of data, plots the fit,
42. $\%$ and returns the coefficients, $a$ and $b$
43.
44. function $[\mathrm{a}, \mathrm{b}]=\log _{-} \log f(\mathrm{x}, \mathrm{y})$
45.
46. line $=\operatorname{polyfit}(\log (x), \log (y), 1)$;
47. $\log _{\_} \log _{-}$fit $=$polyval(line, $x$ );
48.
49. plot( $\log (x), \log (y), m^{*}$ ', $\left.x, \log _{\_} \log _{-} f i t, ~ ' k--'\right)$
50. title('Log-log Plot with Linear Fit')
51.
52. $a=\operatorname{line}(1)$;
53. $\mathrm{b}=\exp$ (line(2);

