Exam 1 - MATLAB

Name: _____

1) (20 Points) Show the screen display for the following script and associated function in the space provided.

```
% script
   a = 8
   b = 4
   [g,h] = q1a(b,a)

...
function  [a,b] = q1a(g,h)
   a = 2*h;
   b = 3*h-g;
```

Display #	Display
1	a = 8
2	b = 4
3	g = 16
4	h = 20
5	
6	
7	
8	
9	
10	

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

```
% script
   a = 6
   b = 3
   [a,b] = q1b(a,b)

...
function  [g,h] = q1b(h,g)
   m = 3*h
   n = 2*h-g
```

Display #	Display
1	a = 6
2	b = 3
3	m = 18
4	n = 9
5	a = 3
6	b = 6
7	
8	
9	
10	

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2) (20 Points) Show the screen display for the following MATLAB code in the space provided.

```
h = 4;
for (k = 2:2:20)
   if ( k==6 | k<4 )
      newk = k+2;
      fprintf('\n%.2f', newk)
   elseif ( k<=12 & k>8 )
      h = k*2;
      fprintf('\n%.2f', h)
   elseif ( k==10 | k==12)
      h = k;
      fprintf('\n%.2f', h)
   elseif ( k>18 )
      h = h-1;
      fprintf('\n%.2f', h)
   end %if
end %for
fprintf( '\ndone' )
```

Display #	Display
1	4.00
2	8.00
3	20.00
4	24.00
5	23.00
6	done
7	
8	
9	
10	

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3) (20 Points) Show the screen display for the following MATLAB code in the space provided.

```
w = 0:4
for ( h = 5:-1:1 )
   switch (h-1)
      case {2,4}
         w(h) = w(h)+ w(h-1);
      case {3,1}
         w(h) = aa + 1;
      otherwise
         w(h) = h;
   end %switch
   aa = w(h)
end %for
```

Display #	Display
1	w = 0 1 2 3 4
2	aa = 7
3	aa = 8
4	aa = 3
5	aa = 4
6	aa = 1
7	
8	
9	
10	

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4) (28 Points) For each of the following types of fit to an (x,y) data set (**x** vector of x points, **y** vector of y points) identify the appropriate equation, y = f(x), and MATLAB commands to produce the requested plot or fit to the data set.

(a) exponential	
equation:	$y = Aexp(Bx)$ or $y = Ae^{Bx}$
x-y plot command:	plot(x,y,'*')
semi-log plot command:	plot(x,log(y),'*') or semilogy(x,y,'*')
polyfit command:	coeff = polyfit(x,log(y),1)
(b) linear	
equation:	$y = a_1x + a_0$ or $y = mx + b$
x-y plot command:	plot(x,y,'*')
polyfit command:	coeff = polyfit(x,y,1)
(c) power law	
equation:	$y = Ax^B$
x-y plot command:	plot(x,y,'*')
log-log plot command:	plot(log(x),log(y),'*') or loglog(x,y,'*')
polyfit command:	coeff = polyfit(log(x),log(y),1)
(d) polynomial of degree N	
equation:	$y = a_Nx^N + a_{N-1}x^{N-1} + ... + a_1x^1 + a_0$
x-y plot command:	plot(x,y,'*')
polyfit command:	coeff = polyfit(x,y,N)

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5) (12 Points) As a member of a software development team, you have been given the task of creating a function that will ask the user for a file containing an augmented coefficient matrix that describes a linear system of equations, load the file, and return the extracted coefficient matrix and rhs vector from the file to the workspace.

(a) What information (data) does the function need (require) from the workspace?

Nothing

(b) What information (data) returns to the workspace?

Coefficient matrix : A
rhs vector : rhs

(c) Write a function prototype.

```
function  [A,rhs] = augmat_extract()
```

(d) Write the MATLAB code to perform the required task (you can ignore header info & variable dictionary).

```
fname = input('Please enter filename for augmented matrix ==> ', 's');
augmat = load(fname);
[numrow,numcol] = size(augmat);
A = augmat(:,1:numrow);   %  or  A = augmat(:,1:numcol-1);
rhs = augmat(:,numcol);
```