Fall 2016 Final - E7

AKINDI

First Name
Last Name
Course Name **E7: Fall 2016 Final**
Date
Version 58099549

Student Number

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1.	1	1	1	1	1	1	1	1	1	1
2.	2	2	2	2	2	2	2	2	2	2
3.	3	3	3	3	3	3	3	3	3	3
4.	4	4	4	4	4	4	4	4	4	4
5.	5	5	5	5	5	5	5	5	5	5
6.	6	6	6	6	6	6	6	6	6	6
7.	7	7	7	7	7	7	7	7	7	7
8.	8	8	8	8	8	8	8	8	8	8
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Marking Instructions
Completely fill in the appropriate bubble.

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	A	B	C	D	E
1.	A	B	C	D	E
2.	A	B	C	D	E
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19.	A	B	C	D	E
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21.	A	B	C	D	E
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25.	A	B	C	D	E

	A	B	C	D	E
26.	A	B	C	D	E
27.	A	B	C	D	E
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30.	A	B	C	D	E
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33.	A	B	C	D	E
34.	A	B	C	D	E
35.	A	B	C	D	E
36.	A	B	C	D	E
37.	A	B	C	D	E
38.	A	B	C	D	E
39.	A	B	C	D	E
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42.	A	B	C	D	E
43.	A	B	C	D	E
44.	A	B	C	D	E
45.	A	B	C	D	E
46.	A	B	C	D	E
47.	A	B	C	D	E
48.	A	B	C	D	E
49.	A	B	C	D	E
50.	A	B	C	D	E

Final Exam
12/15/2016

Name:_____

Student ID:_____

Version 58099549

UC Berkeley Honor Code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others."
On my honor, I have neither given nor received any assistance in the taking of this exam.

Instructions:

1. Write your full name and Student ID on the question sheet
2. Write your full name on the front of the bubble sheet
3. If your student ID number has 8 digits, start with the left box and bubble then in (leaving the right two boxes blank). If your student ID number has 10 digits, just use all boxes
4. Record your answers on the bubble sheet (use pencil). There is one correct answer for each question. Multiple bubbles, incomplete bubbles, or stray marks will be marked incorrect.
5. You may use one 8.5" by 11" cheat sheet(both sides) for this exam provided you do not disturb those sitting nearby.
6. No electronic devices are permitted in your work area.
7. There will be no questions regarding the exam during the examination time except in cases where there is a missing page or printing problem with your exam.
8. For convenience, you may separate the bubble sheet from the question sheet, return both after the exam.

1. The exponential function e^x can be computed using the series:

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + ...$$

The function `exppo` below was developed to compute the first N terms of this series, but is incomplete. When inserted into the incomplete line, which of these options will correctly compute this series?

```
function sum = exppo(x,N)
sum=0;
for i=1:N
    sum =          % incomplete line
end
end
```

(a) `sum + x^(i)/factorial(i)`

(b) `x^(i)/factorial(i)`

(c) `sum + x^(i-1)/factorial(i-1)`

(d) `x^(i-1)/factorial(i-1)`

(e) `sum + x^(i+1)/factorial(i+1)`

2. A straight line is given to pass through the points $(1, 5)$ and $(2, 8)$. The equation of the straight line is of the form $y = a_0 + a_1 x$. We wish to set up a system of equations to solve for the unknown coefficients a_0 and a_1 (in that order). Which line of code below will accomplish this?

(a) `[1 1; 1 2]\[5;8]`

(b) `[1 2; 1 1]\[5;8]`

(c) `[1 5; 1 8]\[1;2]`

(d) `[1 8; 1 5]\[1;2]`

(e) `[1;2]\[1 5; 1 8]`

3. You are using the bisection method to find the root of a function $f(x)$. The current interval $[a, b]$. You know $f(a) = -2$, $f(b) = 5$, and $f((a + b)/2) = 2$. What is the interval of the next iteration?

(a) $[a, b]$

(b) $[a, \frac{(a+b)}{2}]$

(c) $[\frac{(a+b)}{2}, b]$

(d) $[a, \frac{(a+b)}{4}]$

(e) $[\frac{(a+b)}{4}, \frac{(a+b)}{2}]$

4. You are attempting to solve for the root of a function $f(x)$ using the Newton-Raphson Method. Assume an initial guess `x0`, and that you are writing a `while` loop to solve for the root. You may assume that `f` is a function handle, and `df` is a handle to the derivative of $f(x)$. Complete the incomplete line of code by choosing from the options below.

```
tol= 1e-6;
res=10000;
x= x0;
while (abs(res)>tol)
x=            ; % incomplete
res= f(x);
end
```

   (a) `f(x)/df(x)`

   (b) `x + f(x)/df(x)`

   (c) `-f(x)/df(x)`

   (d) `(x - f(x))/df(x)`

   (e) `x - f(x)/df(x)`

5. Given the function `myFun(a1, a2, a3, a4)`:

```
function [x] = myFun(a1, a2, a3, a4)
    if nargin == 3
        a4 = 1;
    else
        a4 = 2;
    end
    x = a1 + a2 + a3 + a4;
end
```

   after executing the following code, what is the value of `y`?

```
y = myFun(0,1,1,1) + myFun(0,1,1)
```

   (a) `5`

   (b) `7`

   (c) `8`

   (d) `9`

   (e) `10`

6. We have a set of 7 data points of the form (x, y) where x represents the x coordinate and y represents the y coordinate. We are trying to fit a polynomial of the form

$$f(x) = a_0 + a_1x + a_2x^2 + a_3x^3$$

To do this we set up a system of equations in the form $Az = b$ where z represents the unknown coefficients. What is the size of A?

(a) 7×4

(b) 4×7

(c) 7×3

(d) 2×4

(e) 7×2

7. Given the function `bsearch`, which is defined below:

```
function [Idx,Mid] = bsearch(M, Key)
    Left = 1;
    Right = numel(M);
    while Right>Left
        Mid = floor((Left+Right)/2);
        if M(Mid)<Key
            Left = Mid+1;
        else
            Right = Mid;
        end
    end
    if M(Left)==Key
        Idx = Left;
    else
        Idx = [];
    end
end
```

After executing the following code, what is the value of `Mid`?

```
A = [-2, -1, 0, 1, 2, 3, 4, 5, 6, 7];
[K,Mid] = bsearch(A, 5);
```

(a) 5

(b) 6

(c) 7

(d) 8

(e) 9

8. What does the function `myMystery1` do?

```
function y = myMystery1(n)
    if n == 0
        y = 1
    else
        y = 10 * myMystery1(n-1)
    end
end
```

(a) Compute $y = 10 * n$

(b) Compute $y = 10^n$

(c) Compute $y =$`factorial`(n)

(d) Compute $y = 10 * (n - 1)$

(e) Compute $y =$`factorial`(10)

9. Given the function `fib`, which computes Fibonacci numbers in recursive form:

```
function f = fib(n)
    if n==1
        f = 0;
    elseif n == 2
        f = 1;
    else
        f = fib(n-1) + fib(n-2);
    end
end
```

After executing the following code, what is the value of

```
y = fib(6)/fib(7);
```

(a) `5/8`

(b) `8/5`

(c) `8/13`

(d) `13/8`

(e) `5/13`

10. Given the function `myMystery3`:

```
function f = myMystery3(list)
    possible1 = list(1)
    possible2 = myMystery3(list(2:end));
    if possible1 > possible2
      f = possible1
    else
      f = possible2
    end
end
```

After executing the following code, what is the value of `a`?

```
a = myMystery3([5 4 3 9])
```

(a) `3`

(b) `9`

(c) `5`

(d) Matlab returns an error: Index exceeds matrix dimensions.

(e) Matlab returns an error: Out of memory. (i.e. infinite recursion)

11. Given a function `myMystery2`, which has a subfunction `add` as shown below.

```
function f=myMystery2(n)
  f=add(n,1,2);
end

function a=add(n,x0,x1)
  if(n==1)
    a=x0;
  else
    if(n==2)
      a=x1;
    else
      a=add(n-1,x1,x0+x1);
    end
  end
end
```

After executing the following code, what is the value of `y`?

y = myMystery2(3)

(a) 1

(b) 2

(c) 3

(d) 4

(e) 5

12. The Taylor expansion of $sin(x)$ is given by:

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \dots \tag{1}$$

An incomplete coding for this series including n terms is given below:

```
function result = sinTaylor(x,n)
   if n < 1
       display('The sin series should have at least one term')
       return
   else
       result = 0;
                          % incomplete line 1
                          % incomplete line 2
       end
   end
end
```

To complete the function, incomplete lines 1 and 2 need to be replaced by

(a)
```
while i < n
    result = result + (-1)^(n-1)*x^(2*n-1)/fact(2*n-1);
```

(b)
```
while i < n
    result = (-1)^i*x^(2*i+1)/fact(2*i+1);
```

(c)
```
while i < n
    result = result + (-1)^(i-1)*x^(2*i-1)/fact(2*i-1);
```

(d)
```
for i = 1:n
    result = result + (-1)^i*x^(2*i+1)/fact(2*i+1);
```

(e)
```
for i = 1:n
    result = result + (-1)^(i-1)*x^(2*i-1)/fact(2*i-1);
```

13. After executing the following code,

```
tspan = linspace(0,10,101)';
odefun = @(t,x) t;
[a,b] = ode45(odefun,tspan,0);
[c,d] = size(a);
```

Which of the following is the best choice?

(a) `c` = 101

(b) `b(1)` is 0

(c) `a` is same as `tspan`

(d) Both (a) and (b) are correct

(e) Above are all correct

14. A student wanted to solve the ODE

$$y' = t$$

at $t = 2$ with initial condition $y(1) = 0$. He chose Forward Euler and came up with the following code. Now he feels something is wrong and needs your help with debugging.

```
dt = 0.01;                  % Line 1
y0 = 0;                     % Line 2
t = 0;                      % Line 3
y = y0;                     % Line 4
yprimeh = @(t,y) t;         % Line 5
for i = 1:100               % Line 6
    yp = yprimeh(t(end));
    yn = y(end) + yp*dt;
    t = [t,tn];
    y = [y,yn];
    tn = t(end)+dt;
end
```

Which of the following change will fix the problem?

(a) Line 1: `dt = 0.02`

(b) Line 2: `y0 = 1`

(c) Line 3: `t = 1`

(d) Line 6: `for i = 1:200`

(e) Line 6: `for i = 1:50`

15. Given the ODE

$$y'' + 3y' + y = 0$$

Assume $\mathbf{x} = [\mathbf{y}'; \mathbf{y}]$

Reduce above second order ODE into two first order ODEs and obtain

$$\mathbf{x}' = \mathbf{A}\mathbf{x}$$

Which of the following Matlab expressions would return a value of `logical(0)` (`false`)?

(a) `A(1,1) == -3`

(b) `A(1,2) == -1`

(c) `A(2,1) == 1`

(d) `A(2,2) == -1`

(e) `sum(sum(A)) == -3`

16. After executing the following code:

```
x = linspace(0,100,101);
dx = diff(x);
y = linspace(0,200,101);
dy = diff(y);
dydx = dy./dx;
n = length(dydx);
plot(x,dxdy)
```

Which of the following is **not true**?

(a) `n` is equal to `100`

(b) `dydx` is a scalar

(c) `dydx` stores the slopes of $y = 2x$

(d) The above code will return an error

(e) `dx(3)` is equal to `1`

17. After executing the following code, which of the following is true?

```
a = [3,1,5,2,1];
da = polyder(a);
a1 = polyint(da);
ia1 = polyint(a1);
a2 = polyder(ia1);
```

(a) `a1` is the same as `a`

(b) `a2` is the same as `a1`

(c) `a1` represents the polynomial $y = 3x^4 + x^3 + 5x^2 + 2x + 1$

(d) `a` represents the polynomial $y = x^4 + 2x^3 + 5x^2 + x + 3$

(e) `a2(end)` is equal to `1`;

Note: `polyder` and `polyint` are two Matlab built-in functions.

```
>> help polyder
 polyder Differentiate polynomial.
    polyder(P) returns the derivative of the polynomial whose
    coefficients are the elements of vector P.

    polyder(A,B) returns the derivative of polynomial A*B.

    [Q,D] = polyder(B,A) returns the derivative of the
    polynomial ratio B/A, represented as Q/D.

    Class support for inputs u, v:
       float: double, single

>> polyder([2,1,1])

ans =

     4     1

>> help polyint
 polyint Integrate polynomial analytically.
    polyint(P,K) returns a polynomial representing the integral
    of polynomial P, using a scalar constant of integration K.

    polyint(P) assumes a constant of integration K=0.

    Class support for inputs p, k:
       float: double, single
```

18. After executing the following code, which of the following is **not true**?

```
I1 = trapz([1,9]);
I2 = trapz([2,3],[1,9]);
I3 = trapz([2,2.5],[1,9]);
I4 = trapz([1,1.5,2.5],[2,4,6]);
I5 = trapz([2,3,4]);
```

(a) `I1` is the same as `I2`

(b) `I2` is 10

(c) `I3` is 2.5

(d) `I4` is 6.5

(e) `I5` is 6

Note: `trapz` is a Matlab built-in function.

```
>> help trapz
 trapz  Trapezoidal numerical integration.
    Z = trapz(Y) computes an approximation of the integral of Y via
    the trapezoidal method (with unit spacing).  To compute the integral
    for spacing different from one, multiply Z by the spacing increment.

    For vectors, trapz(Y) is the integral of Y. For matrices, trapz(Y)
    is a row vector with the integral over each column. For N-D
    arrays, trapz(Y) works across the first non-singleton dimension.

    Z = trapz(X,Y) computes the integral of Y with respect to X using
    the trapezoidal method.  X and Y must be vectors of the same
    length, or X must be a column vector and Y an array whose first
    non-singleton dimension is length(X).  trapz operates along this
    dimension.

    Z = trapz(X,Y,DIM) or trapz(Y,DIM) integrates across dimension DIM
    of Y. The length of X must be the same as size(Y,DIM)).
Example:
>> trapz([1,2])

ans =

   1.500000000000000
>> trapz([1,2,3])

ans =

     4
```

19. After executing the following code, what is the value of `a`?

```
fh = @(x) 0*x+1;
I11 = integral(fh,0,0);
I12 = integral(fh,0,1);
a = [I11 I12];
```

(a) `[0 0]`

(b) `[1 0]`

(c) `[0 1]`

(d) `[1 1]`

(e) `[1 2]`

Note: `integral` is a Matlab built-in function.

```
>> help integral
 integral  Numerically evaluate integral.
    Q = integral(FUN,A,B) approximates the integral of function FUN from A
    to B using global adaptive quadrature and default error tolerances.

    FUN must be a function handle. A and B can be -Inf or Inf. If both are
    finite, they can be complex. If at least one is complex, integral
    approximates the path integral from A to B over a straight line path.
    ......
```

20. Given the figure on page 14,

What is the **forward difference** approximation of $\frac{df}{dx}$ at $x = 2$? Use an interval width of $\Delta x = 1$.

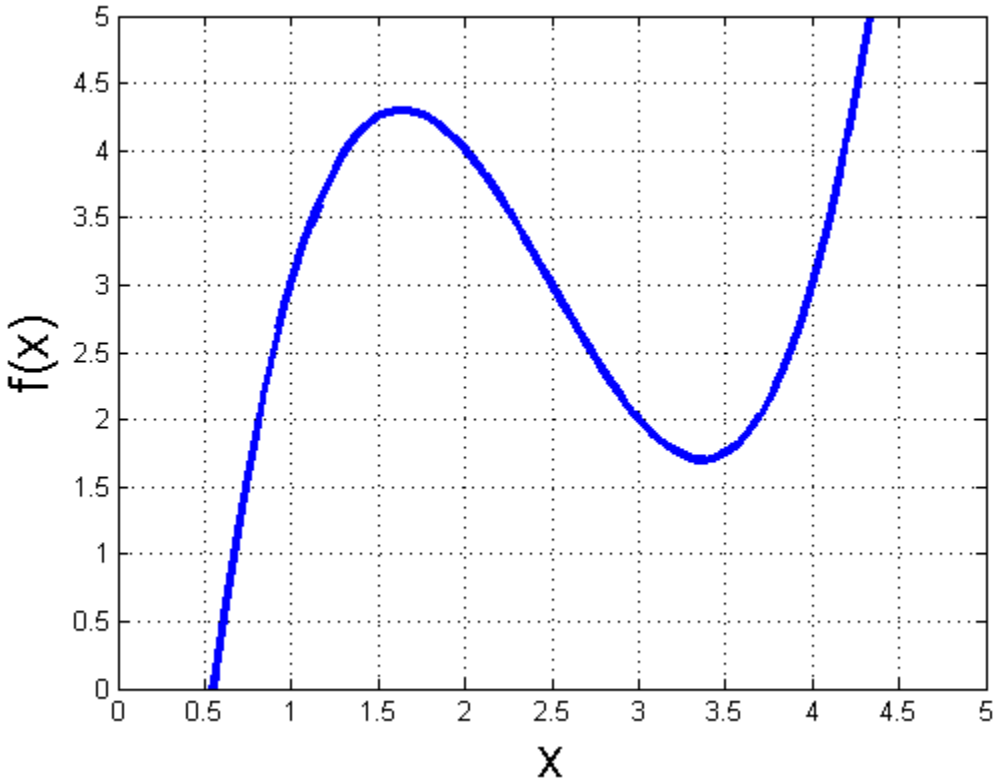
(a) -2

(b) -1.5

(c) -0.5

(d) 1

(e) 2



21. Given the vector,

```
p = [1 2 3 4 5];
```

which of the following commands would assign to `q` the value `[5 4 3]`?

(a) q = p(5:3)
(b) q = q(end:end-2)
(c) q = p(end:-1:3)
(d) q = p(end:end-2)
(e) q = q(5:3)

22. Given the vectors,

```
x = [4 8 9];
y = [2 2 3];
```

which of the following commands would compute and assign to `z` the value `[2 4 3]`?

(a) z = x\y
(b) z = x/y
(c) z = x.y
(d) z = x.\y
(e) z = x./y

23. Which of the following commands, when filling in the incomplete line, would assign to `a` the value of `[-2 -3 -1 -2]`?

```
a = [1 -2 -3 0 -1 -2];

a =                % incomplete line
```

(a) a = a(a<0)
(b) a = a(2 3 5 6)
(c) a = a<0
(d) a = a([0 1 0 0 1 1])
(e) a = a(negative)

24. After executing the following code, what is the value of `y`?

```
p = [1, 1, 3];
x = [1; 2; 0];
y = polyval(p, x)
```

(a) `[5; 9; 3]`
(b) `[5; 3; 3]`
(c) `[3; 5; 1]`
(d) `[15; 9; 5]`
(e) Matlab returns an error

25. After executing the following code, what is the value of `G`?

```
x = [0 4 3 -1; 2 1 1 -1];
v = x.^2 - 10;
F = sum(v);
G = F(1)
```

(a) -20
(b) -16
(c) -10
(d) 16
(e) 20

26. After executing the following code, what is the value of `n`?

```
p = 3;
q = 10;
for i = 1:0.5:p
    for j = q:-2:1
        n=i+j;
    end
end
```

(a) 2.5
(b) 4
(c) 5
(d) 7.5
(e) 10

27. After executing the following code, what is the value of `n`?

```
m=0;
n=0;
while n >= m
    n = n+1;
end
```

(a) 0
(b) 1
(c) 64
(d) 128
(e) The loop will run until the user terminates it, so it is impossible to know

28. After executing the following code, what is the value of `T`?

```
K = 5;
I = -2;
T=-10;
while (I <= K)
    I = I + 2;
    K=K-I;
    T = T+K*I;
end
```

(a) 0

(b) 8

(c) -4

(d) -8

(e) -14

29. After executing the following code, what is the value of `f`?

```
A = [4 2 16 12 4 3];
B = [12 3 1 10 -1 7];

f = find(A<B)
```

(a) `[4 2 3]`

(b) `[1 2 6]`

(c) `[12 3 7]`

(d) `[4 12 2 3 3 7]`

(e) `3`

30. After executing the following code, what is the value of `B`?

```
A = ones(4,4);
for c = 1:4
    for r = 1:4
        if r == c
            A(r,c) = 2;
        else
            A(r,c) = 1;
        end
    end
end
B = A(1,:)
```

(a) `[1 2 1 1]`

(b) `[2 1 1 1]`

(c) `[1 2 1 1]`

(d) `[2 2 1 1]`

(e) `[2 2 1 2]`

31. Which of the following commands would plot discrete points of `X` vs. `Y` with **crosses** in blue color?

(a) `plot(X, Y, 'b', '.')`

(b) `plot(X, Y, 'b', 'y')`

(c) `plot(X, Y, 'b')`

(d) `plot(X, Y, 'b+')`

(e) `plot(X, Y, 'r+')`

32. After executing the following code, what is the value of `R`?

```
clear all
x = [1 -2 2 1];
y = [5 -1 4 1];
R = [y(x == max(x)), y(max(x))]
```

(a) `[4, -1]`

(b) `[4, 4]`

(c) `[1, 4]`

(d) `[5, -1]`

(e) Matlab Error: Undefined function or variable 'R'.

33. Given the function `f`,

```
function x = f(y)
x = y + 3;
end
```

After executing the following code, what is the value of `y`?

```
y = f(fzero(@f, 1))
```

(a) `-2`
(b) `-1`
(c) `0`
(d) `3`
(e) `6`

34. After executing the following code, what is `y`?

```
y = class('2')
```

(a) `integer`
(b) `double`
(c) `char`
(d) `cell`
(e) `E7`

35. Given the function `myRecursion`, defined as:

```
function x = myRecursion(y)
    if y == 1
        x = 1;
    elseif y == 2
        x = 2;
    else
        x = myRecursion(y+1) + myRecursion(y);
    end
end
```

what is the output of the following command?

```
myRecursion(0)
```

(a) 4

(b) 3

(c) 2

(d) 1

(e) Matlab returns an error

36. After executing the following code, what is the value of b?

```
a = [1, 3, 7, −1, 3, −1, −1];
b = [mean(a), median(a), mode(a)]
```

(a) `[1.5714, 1.5714, 1]`

(b) `[1.5714, 1.5714, 3]`

(c) `[1.5714, -1, 2]`

(d) `[1.5714, 1, -1]`

(e) `[1.5714, 1, 3]`

37. After executing the following code,

```
A = [1 2 3; 2 4 6; 3 6 9];
B = [A; A];
C = [A; A(1, :)];
D = [A; zeros(1, 3)];
E = [A; ones(1, 3)];
ra = rank(A);
rb = rank(B);
rc = rank(C);
rd = rank(D);
re = rank(E);
```

which of the following variables has the greatest numerical value?

(a) `ra`

(b) `rb`

(c) `rc`

(d) `rd`

(e) `re`

38. After executing the code below, what is the value of `y`?

```
A = [1 2 3;
     2 0 1;
     3 0 0];
b = [10; 7; 9];
x = A\b;
y = x(1,1)
```

(a) `1`

(b) `2`

(c) `3`

(d) `9`

(e) `10`

39. Upon executing the following code, which line will cause an error?

```
a = [1 2 3; 4 5 6];
b = [1 2; 3 4; 5 6];
c = a*b;
d = b*a;

f1 = c^2              %LINE 1
f2 = d*b*a            %LINE 2
f3 = ((d.^2).*d)^2    %LINE 3
f4 = c*a*d*b          %LINE 4
f5 = 3*a^2            %LINE 5
```

(a) Line 1

(b) Line 2

(c) Line 3

(d) Line 4

(e) Line 5

40. After executing the following code, you would expect the value of `B` to be closest to which value?

```
N = 10000;
A = 5*randn(N,1) + 2*rand(N,1);
B = mean(A)
```

(a) 0

(b) 1

(c) 2

(d) 5

(e) 6

41. After executing the following code, you would expect which variable to have the largest numerical value?

```
r1 = 2 + 3*randn(50000,1);
r2 = 1 + 5*randn(10000,1);
a = mean(r1);
b = mean(r2);
c = std(r1);
d = std(r2);
e = a+b;
```

(a) `a`

(b) `b`

(c) `c`

(d) `d`

(e) `e`

42. After executing the following code, what is the value of `a`?

```
X= [7; 3; 2; 4];
a= [mean(X), median(X)]
```

(a) `[3.5, 3.5]`

(b) `[4.0, 3.5]`

(c) `[5.33, 3.5]`

(d) `[4.0, 4.0]`

(e) `[NaN, NaN]`

43. The 1×100 row vector `X` has already been loaded into the MATLAB workspace and contains the numerical results of 100 repetitions of an experiment (all values of `X` are greater than 1). After the following code is executed, which of the following statements is NOT true?

```
m1 = mean(X);
m2 = mean(5+X);
m3 = mean(3*X);
s1 = std(X);
s2 = std(5+X);
s3 = std(3*X);
```

(a) `m2` is greater than `m1`

(b) `m3` is greater than `m1`

(c) `s2` is greater than `s1`

(d) `s3` is greater than `s1`

(e) `m1` is greater than `1`

44. We have an cell array `C` and we wish to append the number `1` to it. Which of the following commands will NOT achieve this goal?

(a) `C = [C {1}]`

(b) `C{end+1} = 1`

(c) `C(end+1) = {1}`

(d) `C = { C{:} 1}`

(e) `C(end+1) = 1`

45. How do you use error function `erf` or complementary error function `erfc` in Matlab to calculate the probability of $x > -1$ if the random variable x follow standard normal distribution? It is known that the probability density function follows

$$f(x) = \frac{1}{\sqrt{2\pi}} \exp(-\frac{x^2}{2})$$

An error function is defined as

$$\text{erf}(b) = \frac{2}{\sqrt{\pi}} \int_0^b \exp(-x^2) dx$$

and complementary error function is

$$\text{erfc}(b) = \frac{2}{\sqrt{\pi}} \int_b^\infty \exp(-x^2) dx$$

(a) 1-erf(-1)
(b) erf($1/\sqrt{2}$)/2+1/2
(c) erfc(-1)/2
(d) erfc($-1/\sqrt{2}$)
(e) erfc(-1/2)/2

46. Which of the following is NOT correct to access the value `20` in the cell array `data`?

```
data={'name',['double','char'],[4 8 20;3 5 10]}
```

(a) `data{1,3}(1,3)`
(b) `data{3}(1,3)`
(c) `data{1,3}(3)`
(d) `data{3}(5)`
(e) `data{end}(end-1)`

47. After the following is executed, what is the value of `n` ?

```
color='red';
n=0;
switch color
    case {'red','black','blue'}
        n=n+2;
        color='green';
    case {'yellow','green','white'}
        n=n+10;
    otherwise
        n=2*n;
end
```

(a) `2`

(b) `12`

(c) `4`

(d) `24`

(e) `10`

48. After executing the following code, what is the value of `y`?

```
S=struct('Name',{'Robert','Rachael'},'Math',{93,95},'Chemistry',{78,82});
y = S(2).Name(3)
```

(a) `Rachael`

(b) `b`

(c) `c`

(d) 95

(e) `Chemistry`

49. Structure `S` is defined as:

```
S=struct('Name',{'Robert','Rachael'},'Math',{93,95},'Chemistry',{78,82});
```

We wish to compute the average of the Math scores of the two students and assign it to the variable `y`. Which of the following Matlab expressions will NOT accomplish this?

(a)
```
y = mean(S.Math)
```

(b)
```
y = 0
for i=1:length(S)
    y = y+S(i).Math/length(S)
end
```

(c)
```
y = mean([S.Math])
```

(d)
```
y=0
for i=1:size(S,2)
    y = y+S(i).Math/size(S,2)
end
```

(e)
```
y = (S(1).Math + S(2).Math)/2
```

50. After executing the following code, how many curves show up in figure 2?

```
figure(1)
hold on;
for i=1:10
    x=linspace(0,1,20);
    p=rand(1,5);
    y=polyval(p,x);
    plot(x,y);
    figure(2)
    hold on;
    y=polyval(-p,x);
    plot(x,y);
end
```

(a) 1

(b) 9

(c) 10

(d) 19

(e) 20