MATH 3000– PRACTICE TEST # 2
60 minutes

Grade: **Name:**_____
(Please print)
KSU#:_____

Each question is mandatory. Use only MATLAB software to work on the questions. Include the M-files where indicated. Copy every M-file from MATLAB and paste it in one single Word document. Use the back of the test as scratch paper.

Let $f(x)=\begin{cases} x^4-4x^3+6x^2-4x+3, & x\le 1 \\ (2-x)(x+1)e^{x-1}, & x>1 \end{cases}$. Use MATLAB to

1. Write a function M-file to define the function. Include the M-file here:

The MATLAB function can be written as follows:

```
function f=practice_test(x)
if (x<=1)
     f=x.^4-4.*x.^3+6.*x.^2-4.*x+3;
else
     f=(2-x).*(x+1).*exp(x-1);
end
```

2. Write a script to
   a. Graph the function on $[-5,5]$;
   b. Calculate its roots
   c. Calculate $\int_{-4}^{4} f(x)\,dx$.

   Include the M-file here:

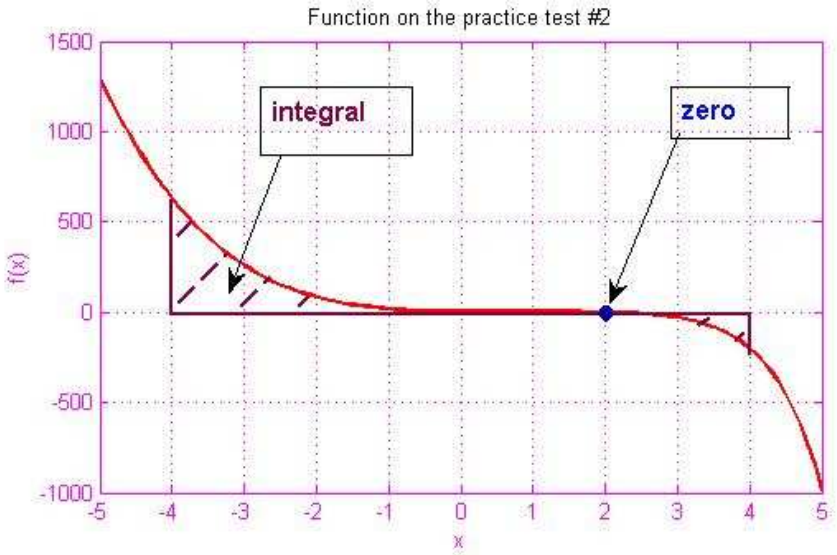
The MATLAB script can be written as follows:

```
% main program main_practice_test2
x=[-5:0.1:5];
for i=1:101
     f(i)=practice_test(x(i));
end
plot(x,f)
root=fzero(@(x) practice_test(x), 3)
integral=quad(@(x) practice_test(x),-4,4)
```

And, if we **run the script**, these are the results:

```
>> main_practice_test2
root =
       2.0000
integral =
     533.5722
```

3. Edit the graph of the function to insert an x-label, y-label, title, mark the zero and the value of the integral. Then generate the M-file which corresponds to the new figure and include it here:



To generate the M-file, in the Figure Window go to "File" and then click on "Generate M-file". Then a new editor window pops-up with the M-file. Copy it and paste it here.

4. Write a script that reads a positive integer N, a sequence of N numbers and calculates their mean. Include the M-file here:

The MATLAB script can be written as follows:

```
N = input('N');
for i=1:N
    i
    x(i)=input('x(i)');
end
S=0;
for i=1:N
    S=S+x(i);
end
S=S/N
```