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Homework 10 CS375

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```
clear all; clc; close all;
format long g;
```

Problem 1

a,b,c,d see attachments

Problem 2

```
    % a: see attachments.
```

Problem 2.b

```
    f=@(x) x*sin(x);
    gauss_int(f,0,pi)
```

```
ans =

           3.14377435398307
```

Problem 2.c

```
    comp_gauss_int(f,0,pi,10)
```

```
ans =

              3.141592655093
```

Problem 2.d

```
    exact_integral=pi;
    n=[4,8,16,32];
```

```
    p=zeros(1,length(n));
    error = zeros(1,length(n));
    h = zeros(1,length(n));
    integral_results = zeros(1,length(n));

    for i=1:length(n)
        integral_results(i) =  comp_gauss_int(f,0,pi,n(i));
        error(i) = abs(exact_integral-comp_gauss_int(f,0,pi,n(i)));
        h(i)=pi/n(i);
        if(i>=2)
            p(i)=log(error(i)/error(i-1))/log(h(i)/h(i-1));
        end
    end

fprintf(" n approx integral\t error\t\t\t convergence p\n");
fprintf("%2d %2.10f\t\t %2.16f\t %2.10f\n",[n;integral_results ;error; p])
```

```
 n approx integral       error                  convergence p
 4 3.1415930272          0.0000003735699172     0.0000000000
 8 3.1415926593          0.0000000057451479     6.0228904358
16 3.1415926537          0.0000000000894151     6.0056810619
32 3.1415926536          0.0000000000013953     6.0018426554
```

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