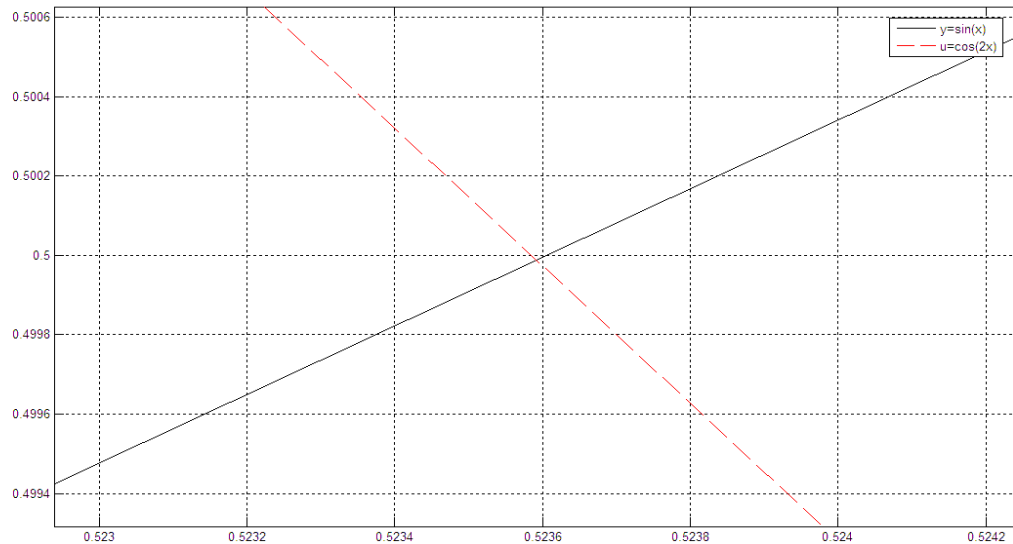


Homework 1.  
Matlab Exercises.

---

Exercise 1.

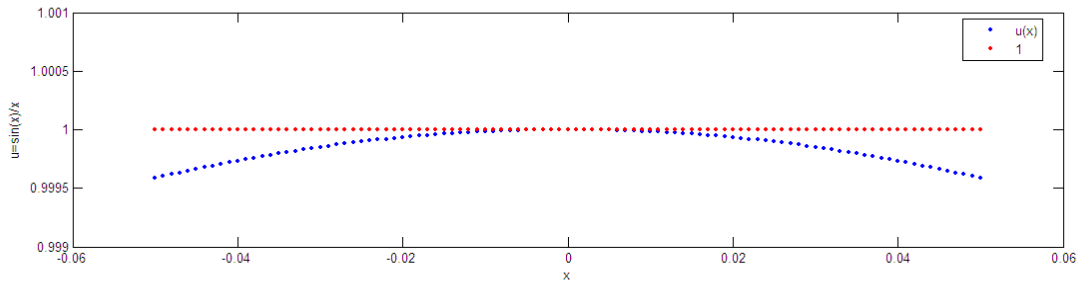
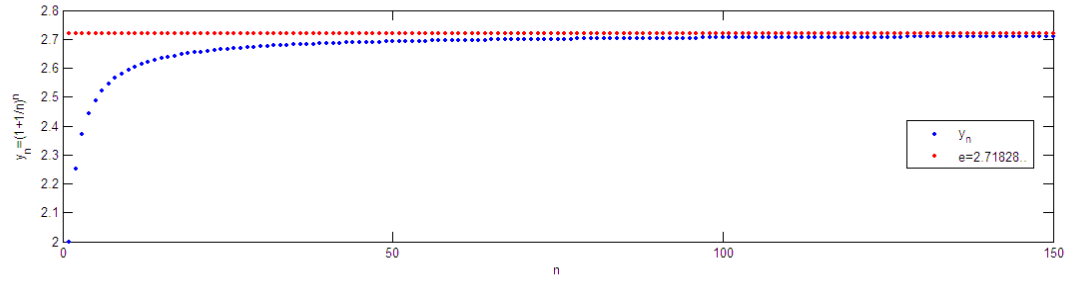
```
>> N=200; h=2/N; x=0:h:2;  
>> y=sin(x);  
>> u=cos(2*x);  
>> plot(x,y,'k-',x,u,'r--')  
>> grid  
>> legend('y=sin(x)', 'u=cos(2x)')  
>> zoom  
Answer: x=0.523
```



---

Exercise 2.

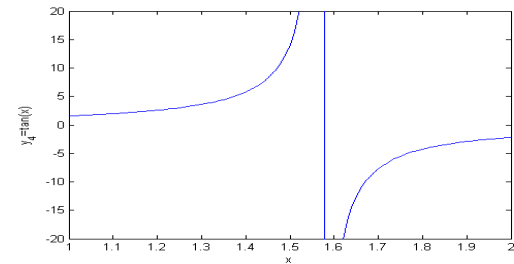
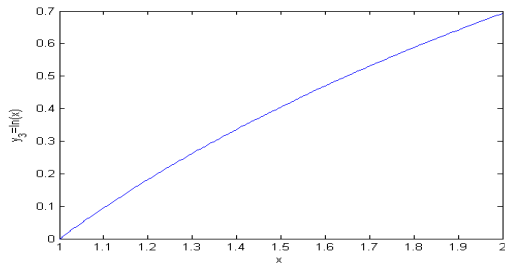
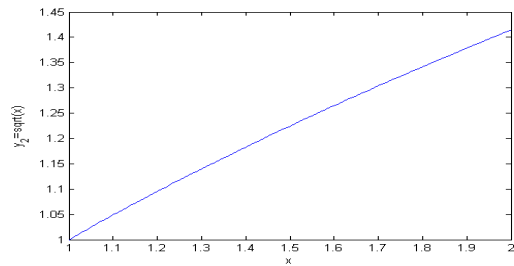
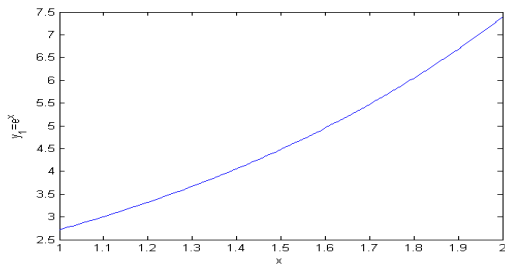
```
>> N=150;  
>> n=1:N; y=(1+1./n).^n;  
>> subplot(211); plot(n,y,'.',n,exp(1),'r.')  
>> xlabel('n'); ylabel('y_n=(1+1/n)^n')  
>> legend('y_n', 'e=2.71828..')  
>> x=-0.05:0.001:0.05;  
>> u=sin(x)./x;  
>> subplot(212); plot(x,u,'.',x,1,'r.')  
>> axis([-0.06 0.06 0.999 1.001]);  
>> xlabel('x'); ylabel('u=sin(x)/x');  
>> legend('u(x)', '1')  
Answer: (a) e=2.71828.. (b) 1.
```




---

Exercise 3.

```
>> x=1:0.01:2;
>> subplot(221), plot(x,exp(x))
>> xlabel('x'), ylabel('y_1=e^x')
>> subplot(222), plot(x,sqrt(x))
>> xlabel('x'), ylabel('y_2=sqrt(x)')
>> subplot(223), plot(x,log(x))
>> xlabel('x'), ylabel('y_3=ln(x)')
>> subplot(224), plot(x,tan(x))
>> xlabel('x'), ylabel('y_4=tan(x)')
>> axis([1 2 -20 20])
```



Exercise 4.

File: dice.m

% Simulates n throws of three dice

% Input: n-the number of throws

```
function[d]=dice(n)
```

```
d=floor(1+6*rand(n,3));
```

```
%end file
```

```
>> n=4;
```

```
>> A=dice(n)
```

---

Exercise 5.

File: fibonacci.m

% Computes n-th number of the Fibonacci sequence

% Input: n>2 integer.

```
function[f]=fibonacci(n)
```

```
F=zeros(1,n);
```

```
F(2)=1;
```

```
if n==1
```

```
    f=0
```

```
elseif n==2
```

```
    f=1
```

```
else
```

```
for i=3:n
```

```
    F(i)=F(i-1)+F(i-2);
```

```
end
```

```
f=F(n);
```

```
end
```

```
% end file
```

```
>> n=10;
```

```
>> F10=fibonacci(n);
```

```
>> N=30; y=zeros(N,1);
```

```
>> for i=2:N
```

```
    y(i)=fibonacci(i-1)/fibonacci(i);
```

```
end
```

```
>> plot(1:N,y,'o')
```

```
>> hold on, xlabel('n')
```

```
>> plot(1:N,y,'-',1:N, (sqrt(5)-1)/2,'r-')
```

```
>> legend('Ratio limit f_{n-1}/f_n')
```

```
Answer: Ratio limit 0.6180
```

