

1-

a)

```
>> syms x y
```

```
>> z=(x^10 - y^10)/(x - y)
```

z =

$(x^{10} - y^{10})/(x - y)$

```
>> simplify(z)
```

ans =

$(x^{10} - y^{10})/(x - y)$

Or >> factor(z)

ans =

$(x + y)^*(x^4 + x^3*y + x^2*y^2 + x*y^3 + y^4)*(x^4 - x^3*y + x^2*y^2 - x*y^3 + y^4)$

b)

```
(i) >> A=[15 -5 23;-1 -11 -65]
```

A =

15 -5 23

-1 -11 -65

```
>> B=[1 4;15 6;7 9]
```

B =

1 4

15 6

7 9

```
>> A*A'
```

```
ans =
```

```
    779    -1455  
   -1455    4347
```

```
>> A*B
```

```
ans =
```

```
    101    237  
   -621   -655
```

```
>> A+B'
```

```
ans =
```

```
    16    10    30  
     3    -5   -56
```

```
(ii) >> sin(5*A)
```

```
ans =
```

```
   -0.3878    0.1324    0.9454  
    0.9589    0.9998    0.9880
```

```
>> log(abs(A))
```

```
ans =
```

```
    2.7081    1.6094    3.1355  
     0     2.3979    4.1744
```

2-

```
function Pn= lagr(x,y,c,n)  
for i=1:n  
    L(i)=1;  
    for j=1:n  
        if i~=j  
            L(i)=L(i)*(c-x(j))/(x(i)-x(j));  
        end  
    end  
end
```

```

    end
end
Pn=0;
for i=1:n
    Pn=Pn+y(i)*L(i);
end

```

```
>> lagr([0.2 4.6],[1 1.2214 1.49182 1.82212 2.22554 ],,3,4)
```

```
ans =
```

```
1.3498
```

```
3-a),b),c)
```

```
function x1= fx(x0,tol,n)
```

```

for i=1:n
    x1=g(x0);
    if abs(x1-x0)<tol
        break
    end
    x0=x1;
end

```

```

function t=g(x)
t=2*exp(-x);

```

```
>> approx=fx(0.5,10^-5,60)
```

```
approx =
```

```
0.8526
```

```
>> exact=vpa(solve(x-2*exp(-x)))
```

```
exact =
```

```
0.85260550201372549134647241469532
```

```
>> error=abs(exact-approx)
```

```
error =
```

```
0.000026093588937636754119727517836337
```