**Singal and system**

**Lab 6**

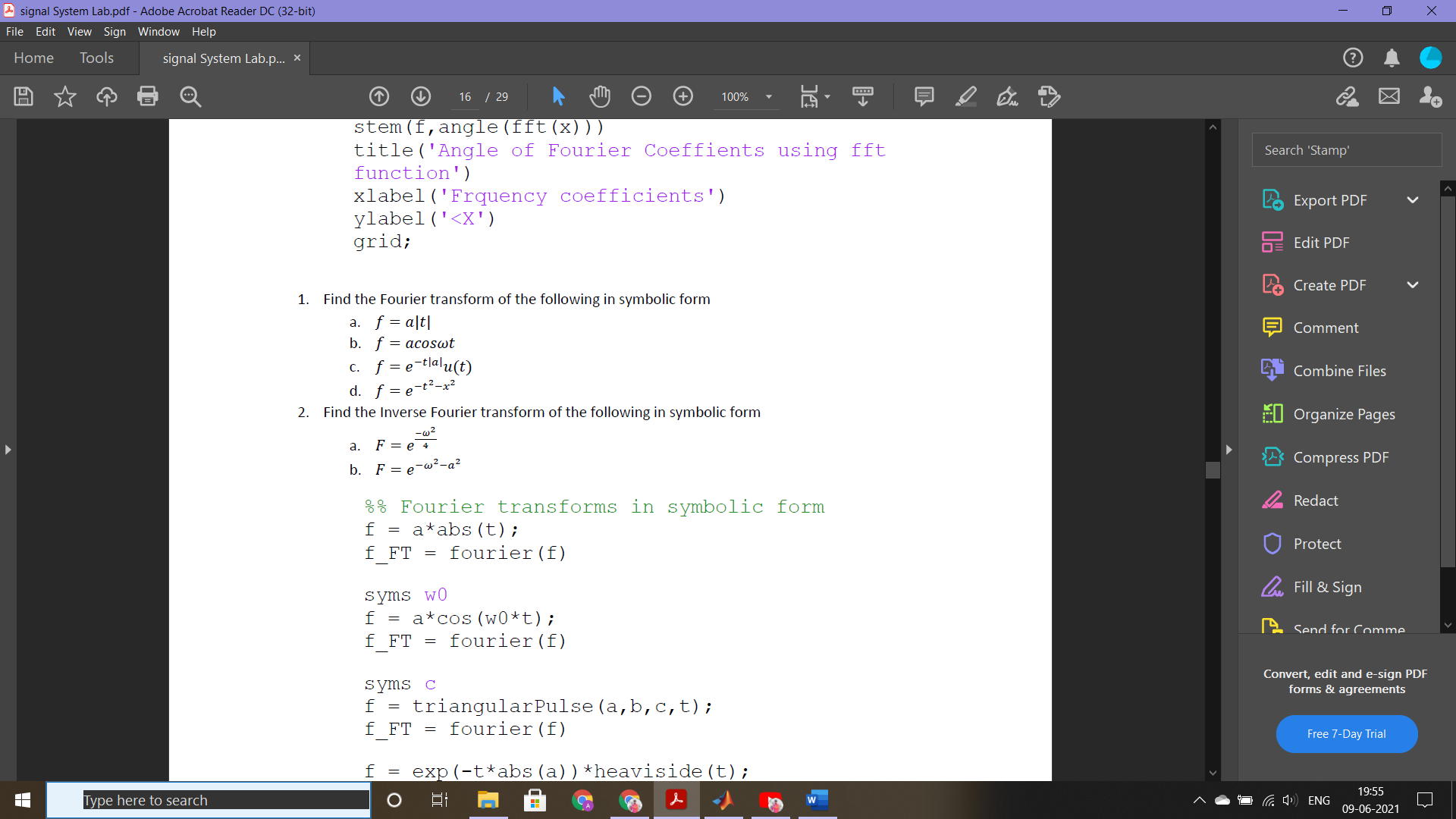
NAME:- Aniket Roy

ROLL NO:- 19CS8020

REG NO:- 19U10064

**1. Find the Fourier transform of the following in symbolic form**

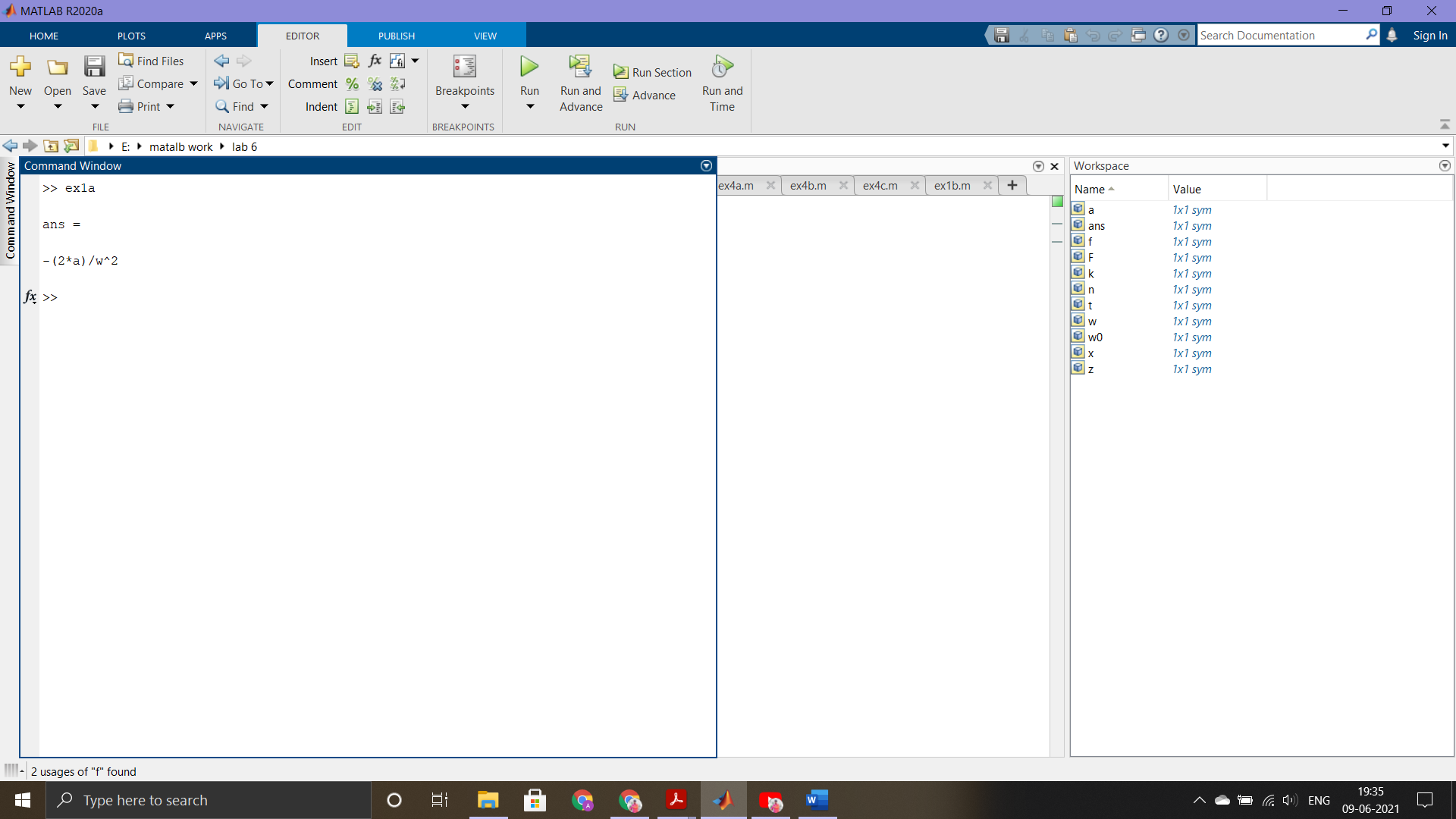
**a>**

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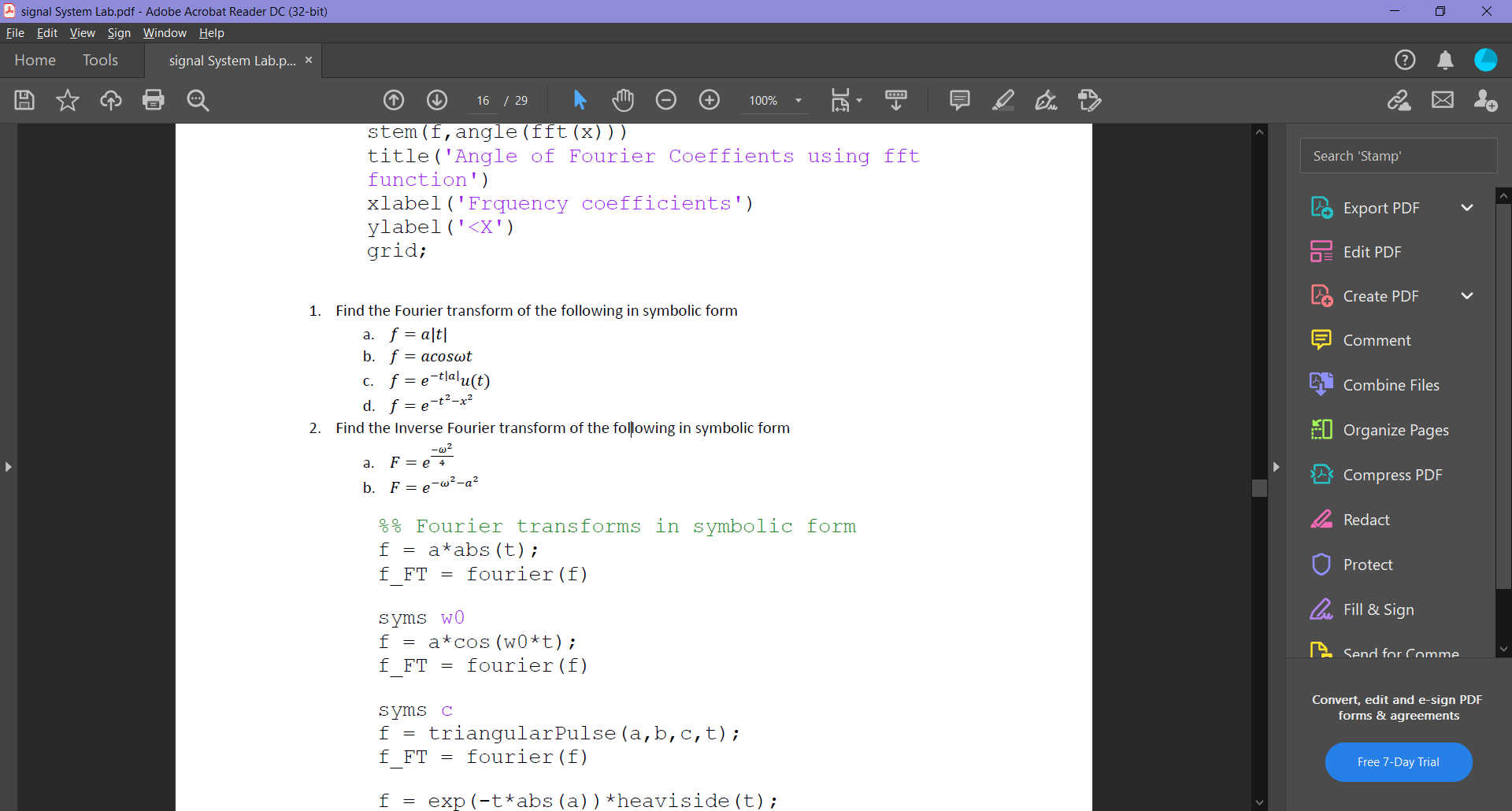
syms t a

f = a\*abs(t);

fourier(f)

****

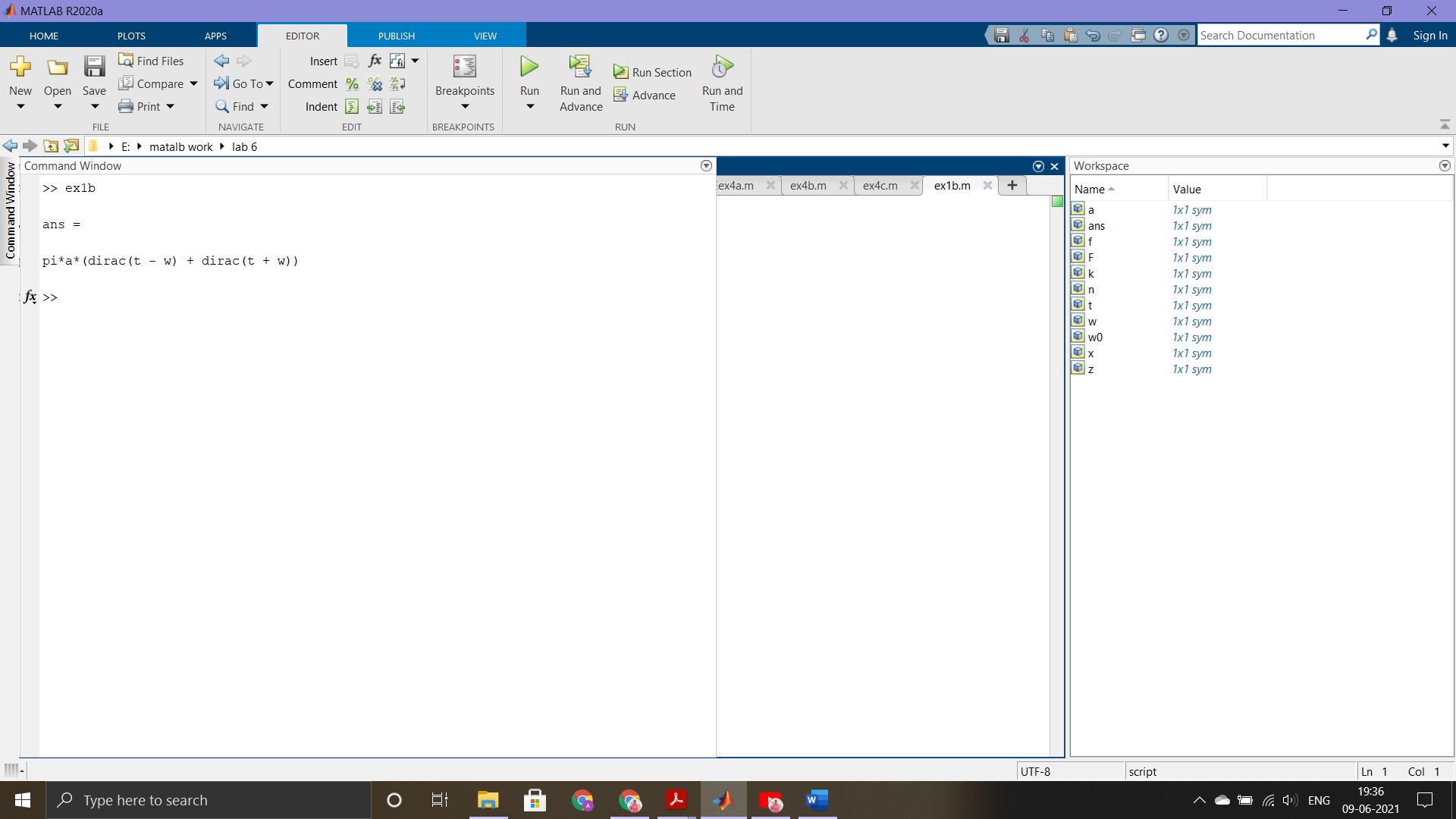
**b>**



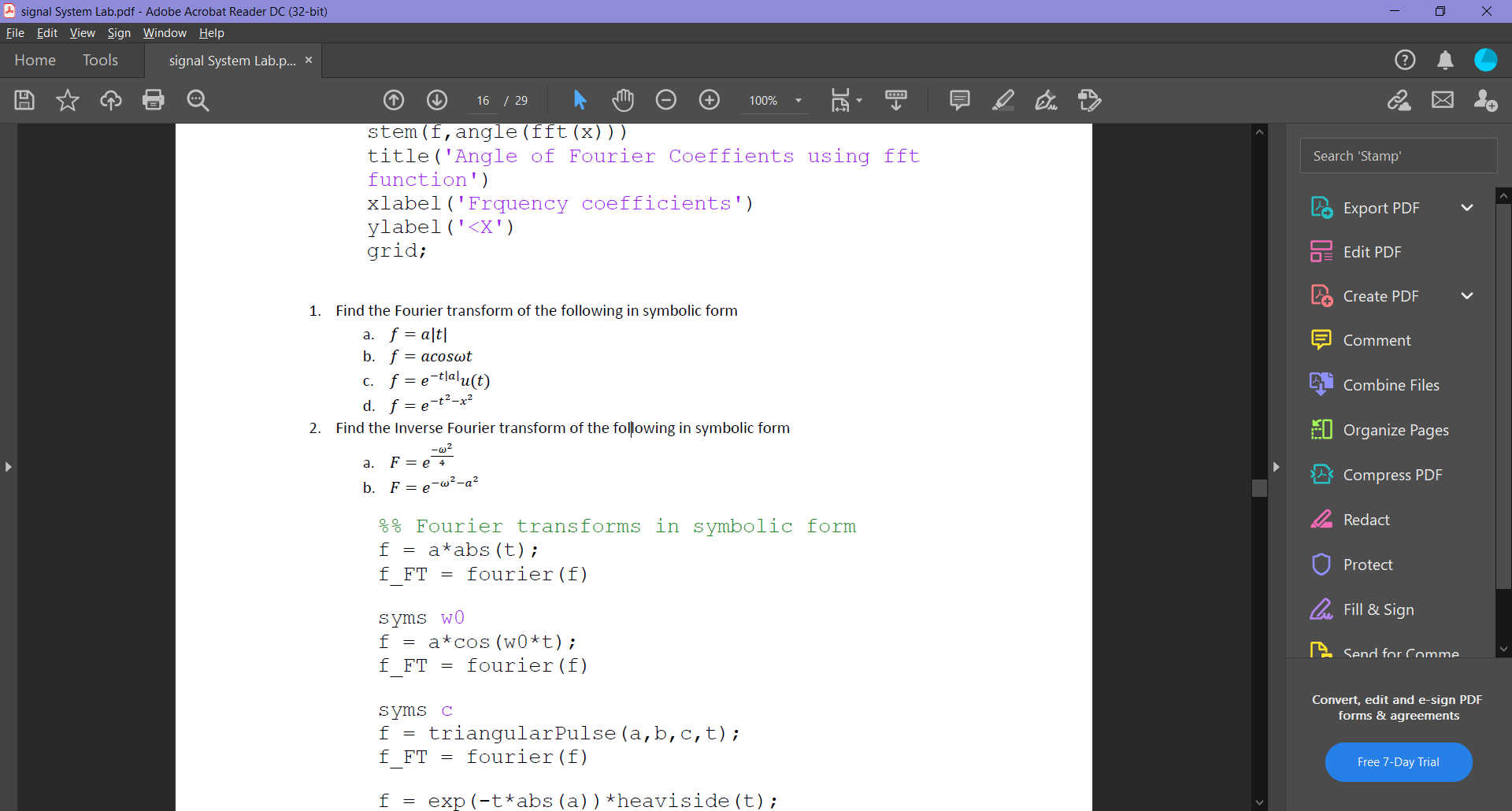
syms t a w0

f = a\*cos(w0\*t);

fourier(f)

****

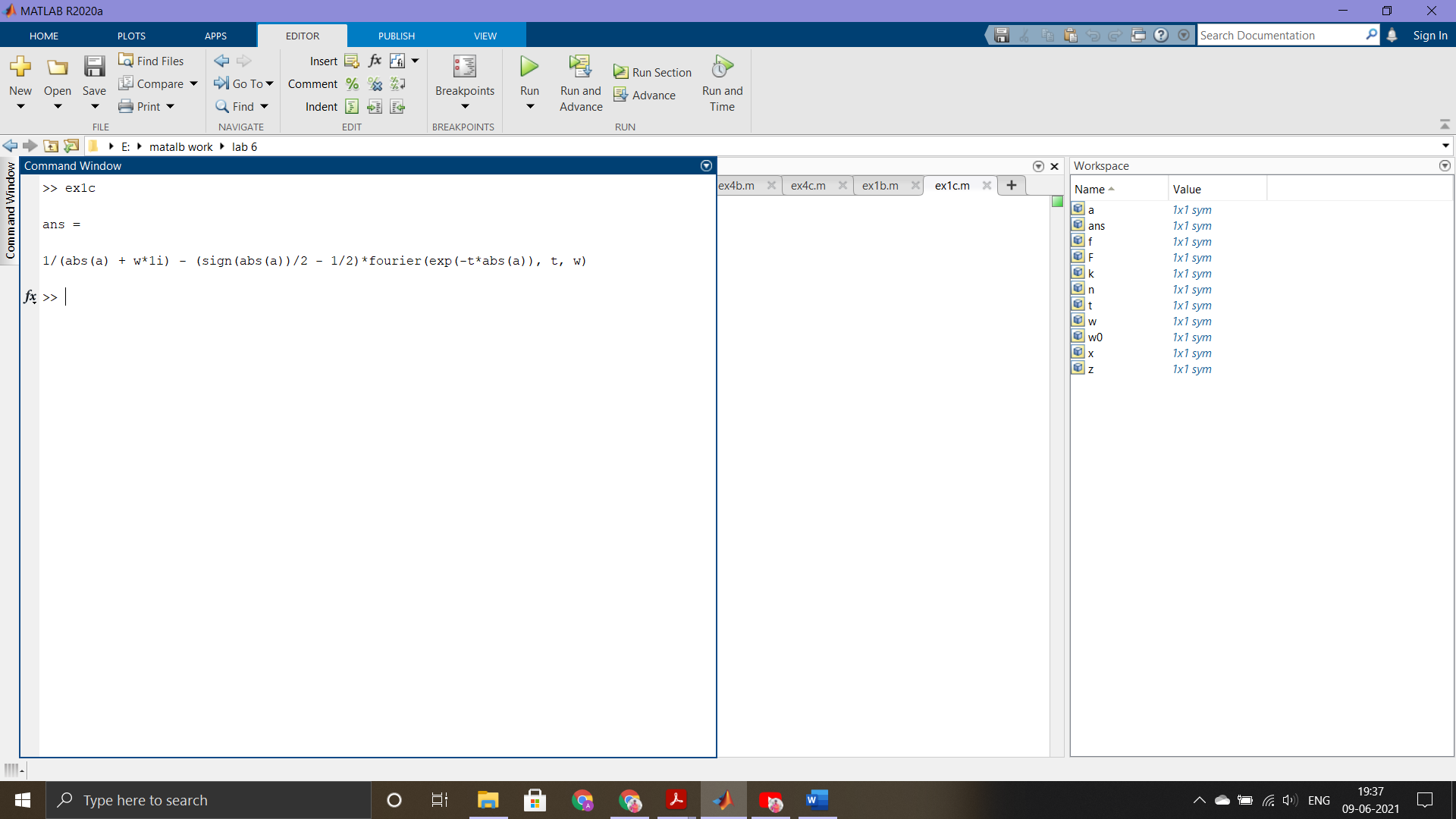
**c>**



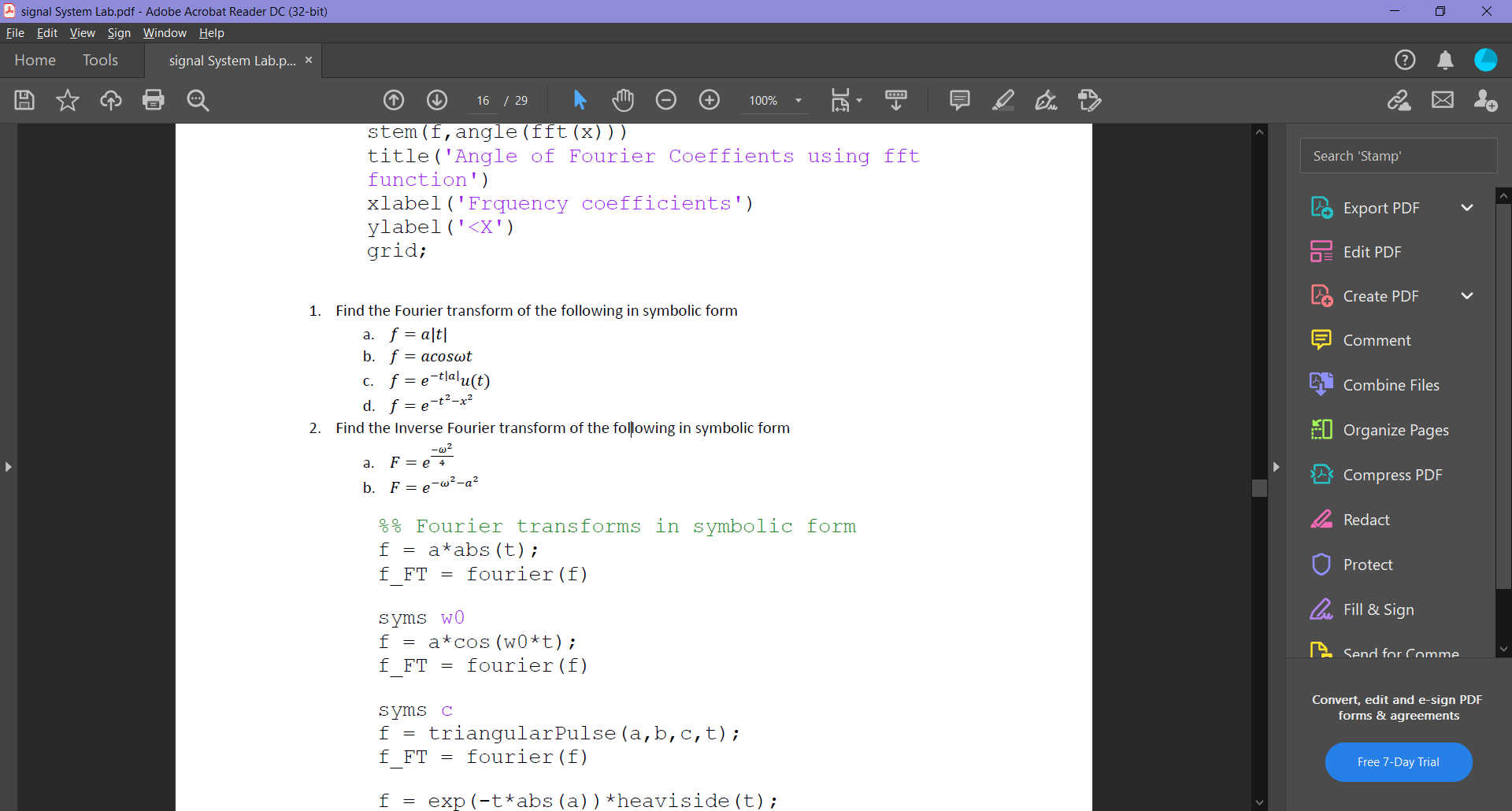
syms t a

f = exp(-t\*abs(a))\*heaviside(t);

fourier(f)

****

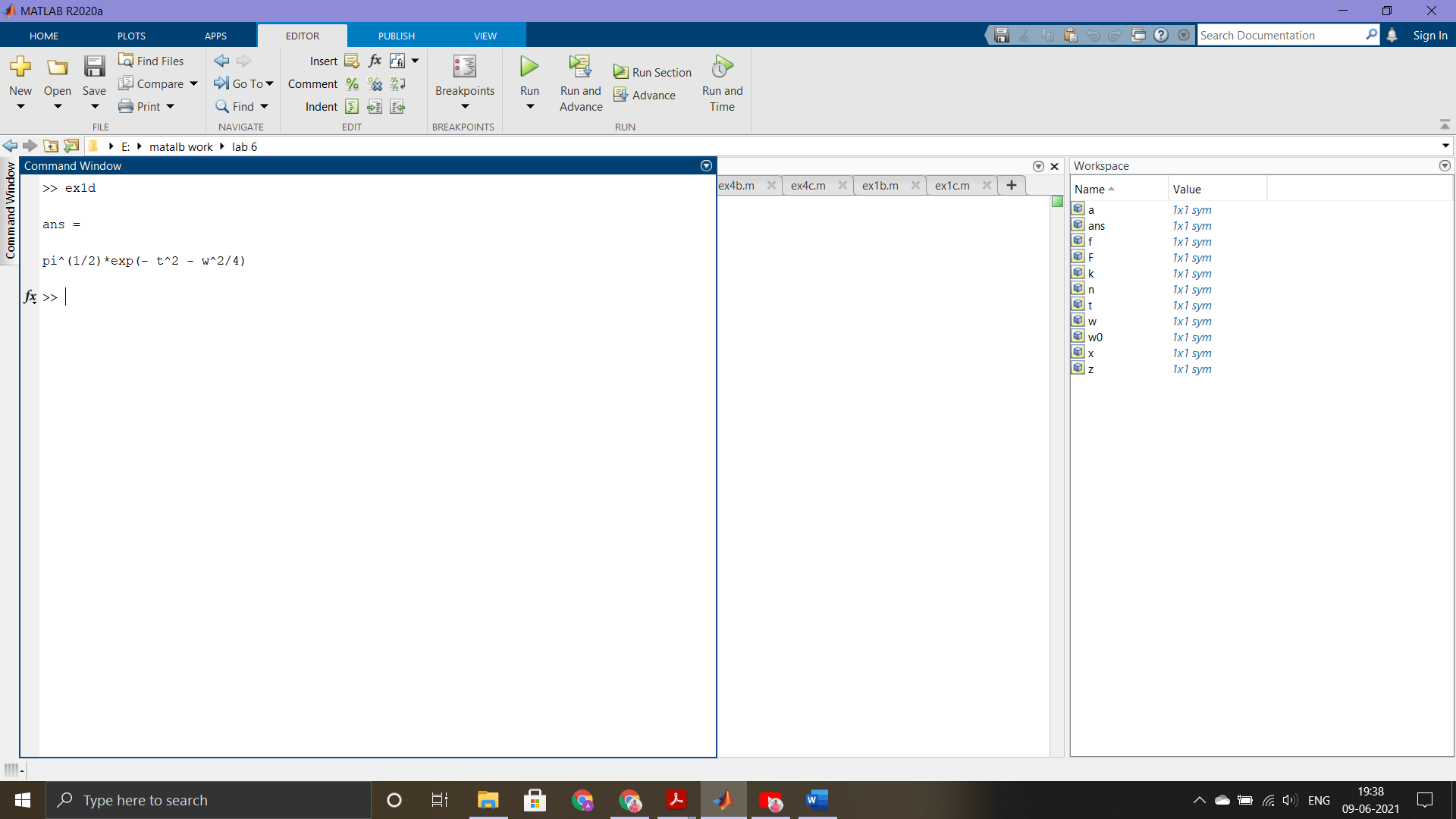
**d>**



syms t x

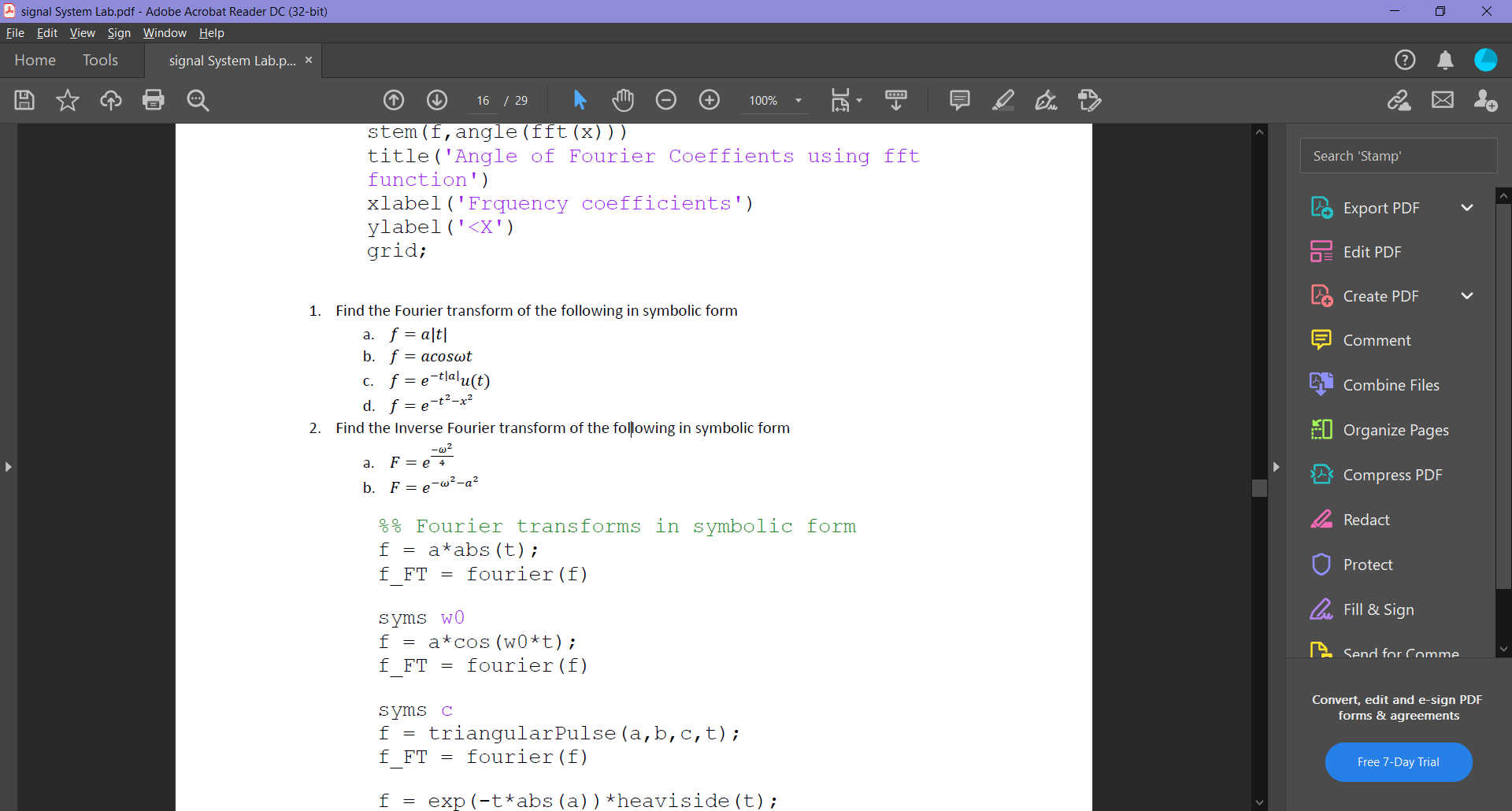
f = exp(-t^2-x^2);

fourier(f)

****

**2. Find the Inverse Fourier transform of the following in symbolic form**

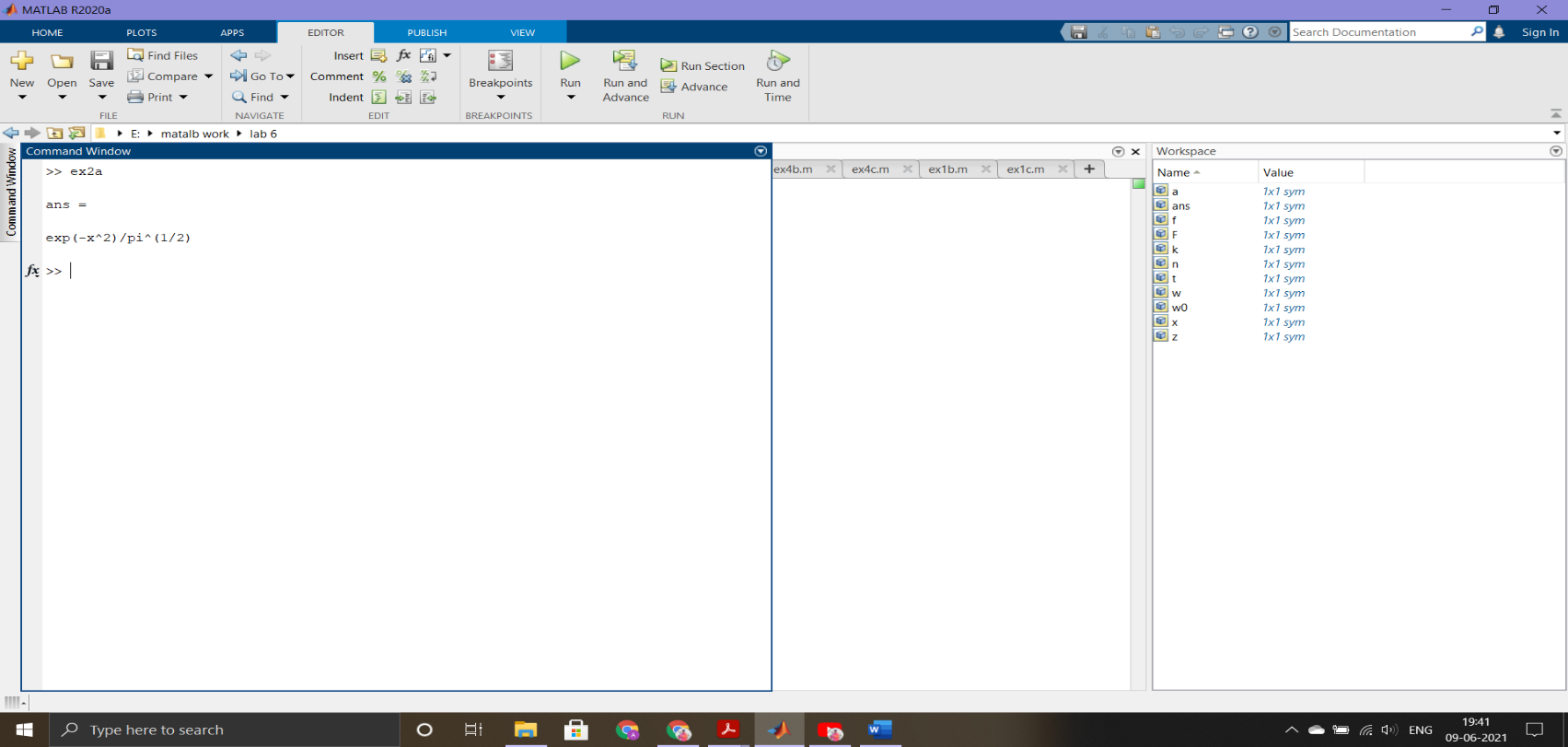
**a>**



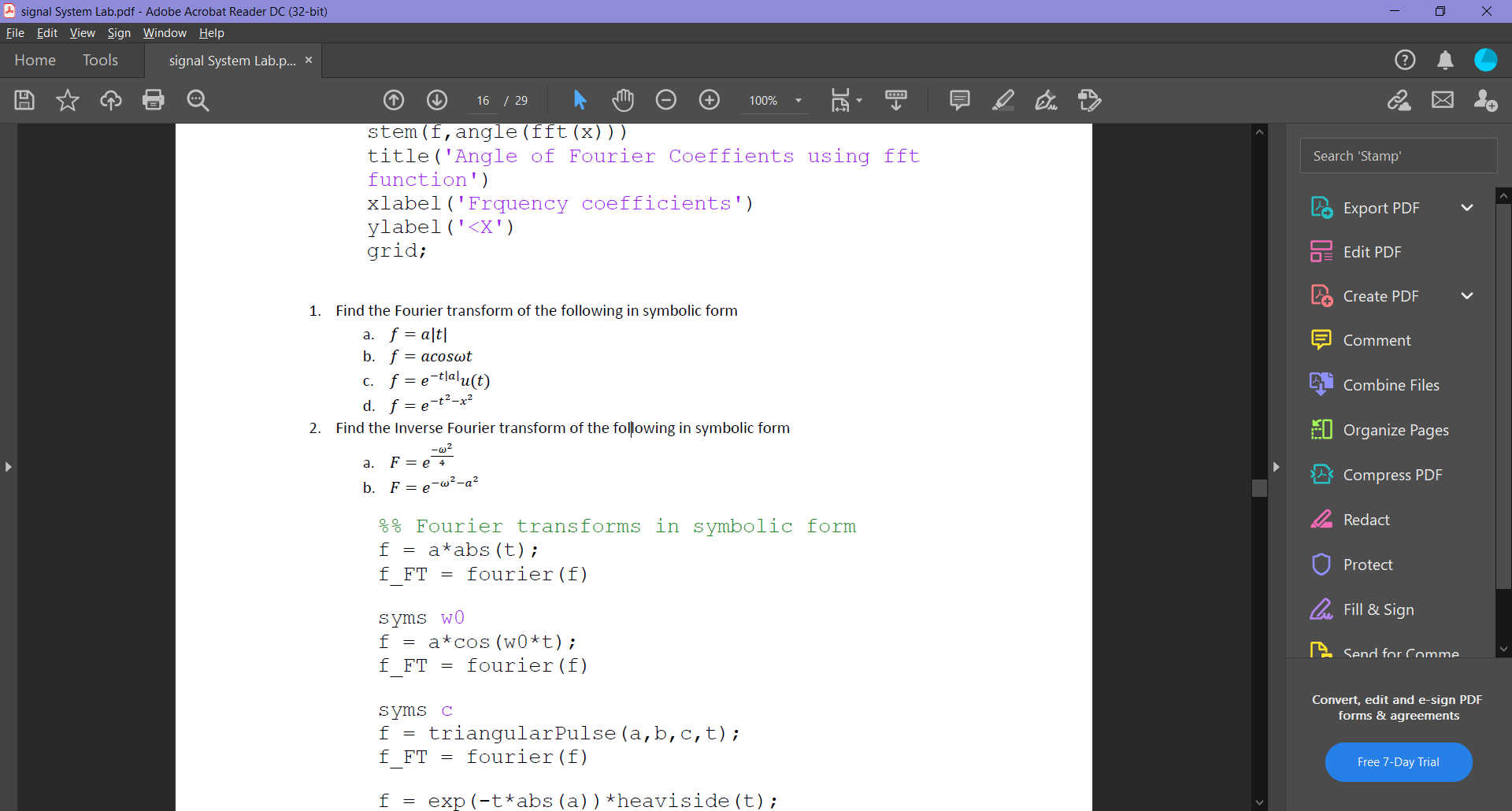
syms w

F = exp(-w^2/4);

ifourier(F)

****

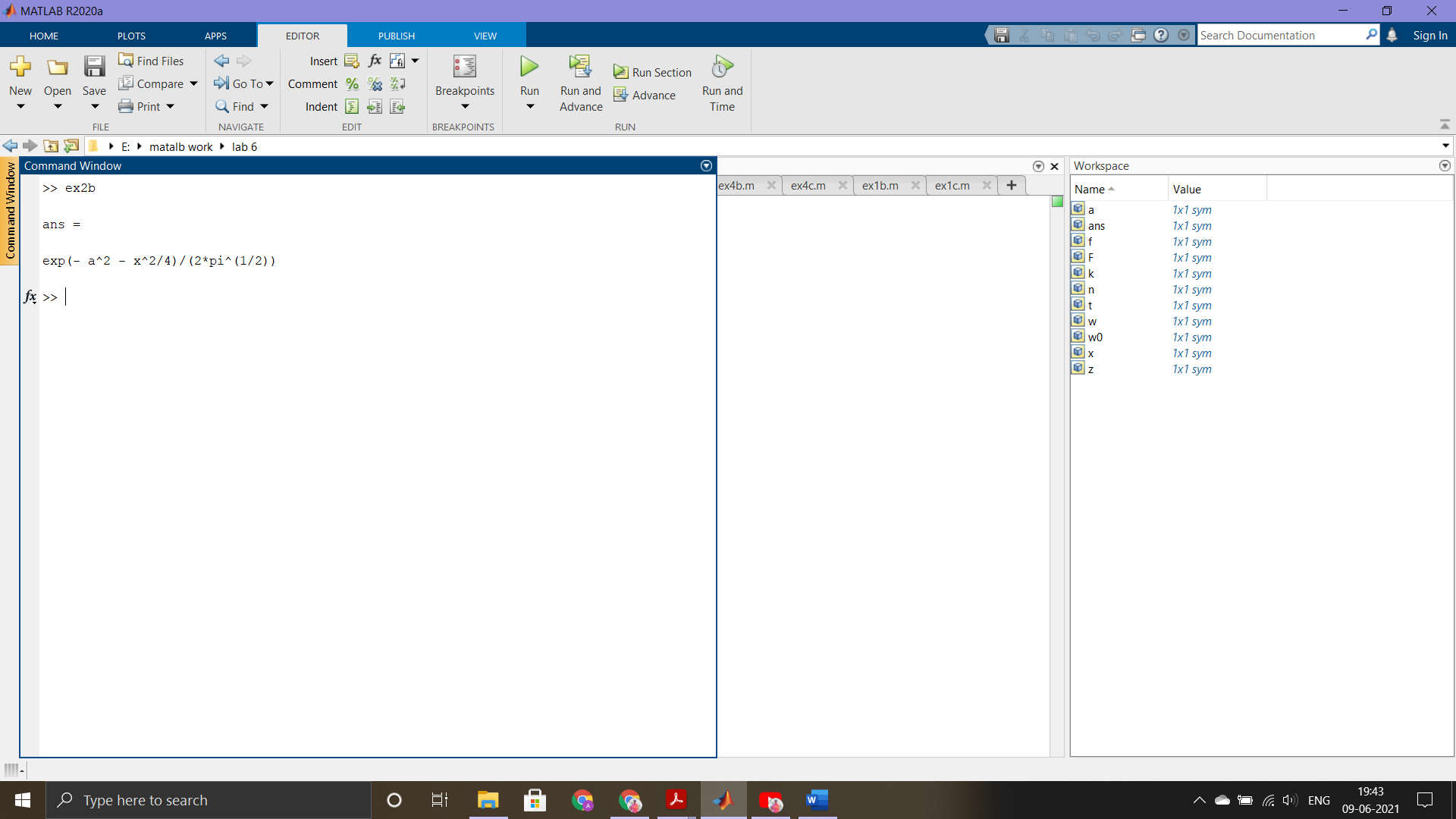
**b>**



syms a w t

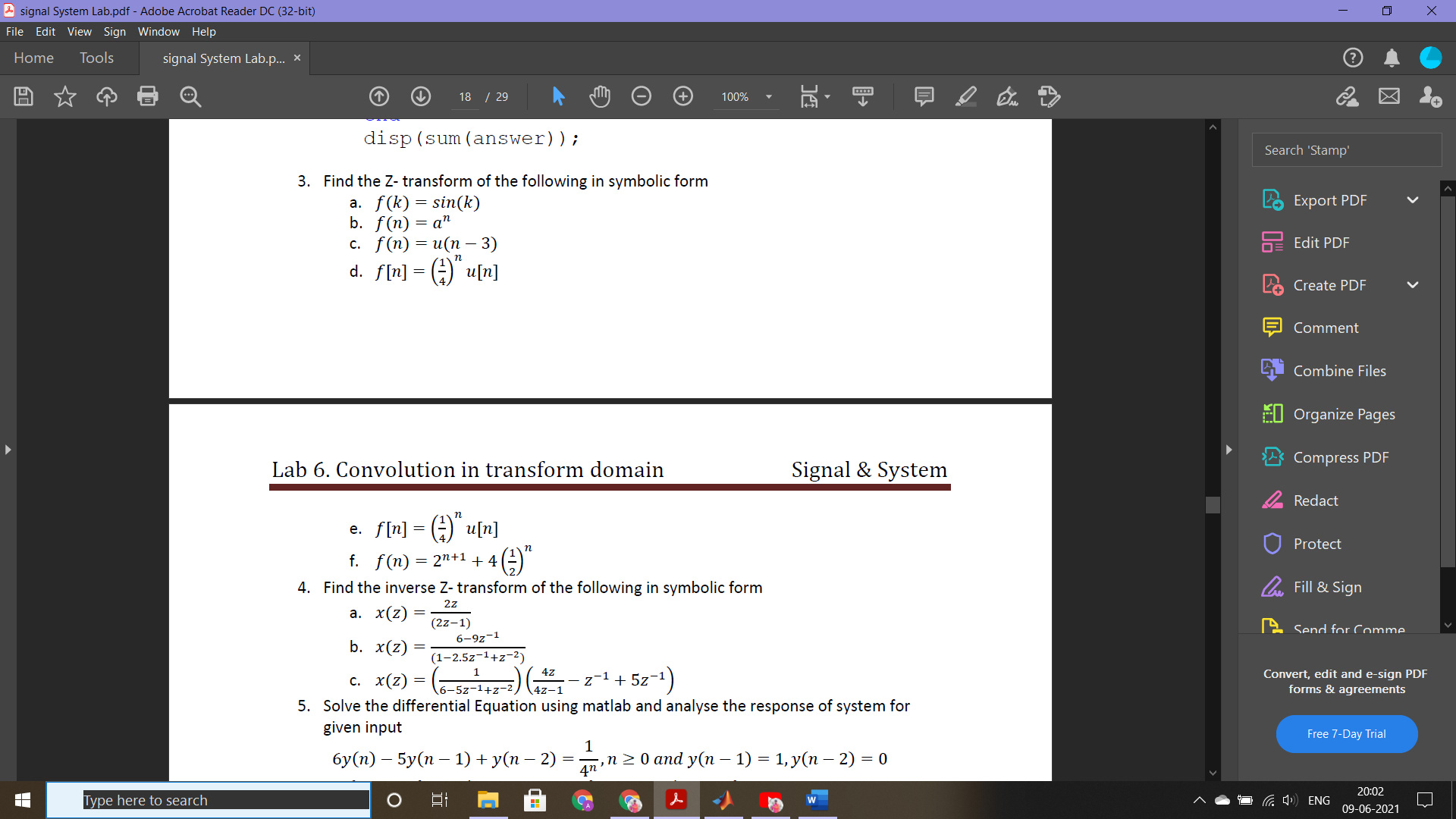
F = exp(-w^2-a^2);

ifourier(F)

****

**3. Find the Z- transform of the following in symbolic form**

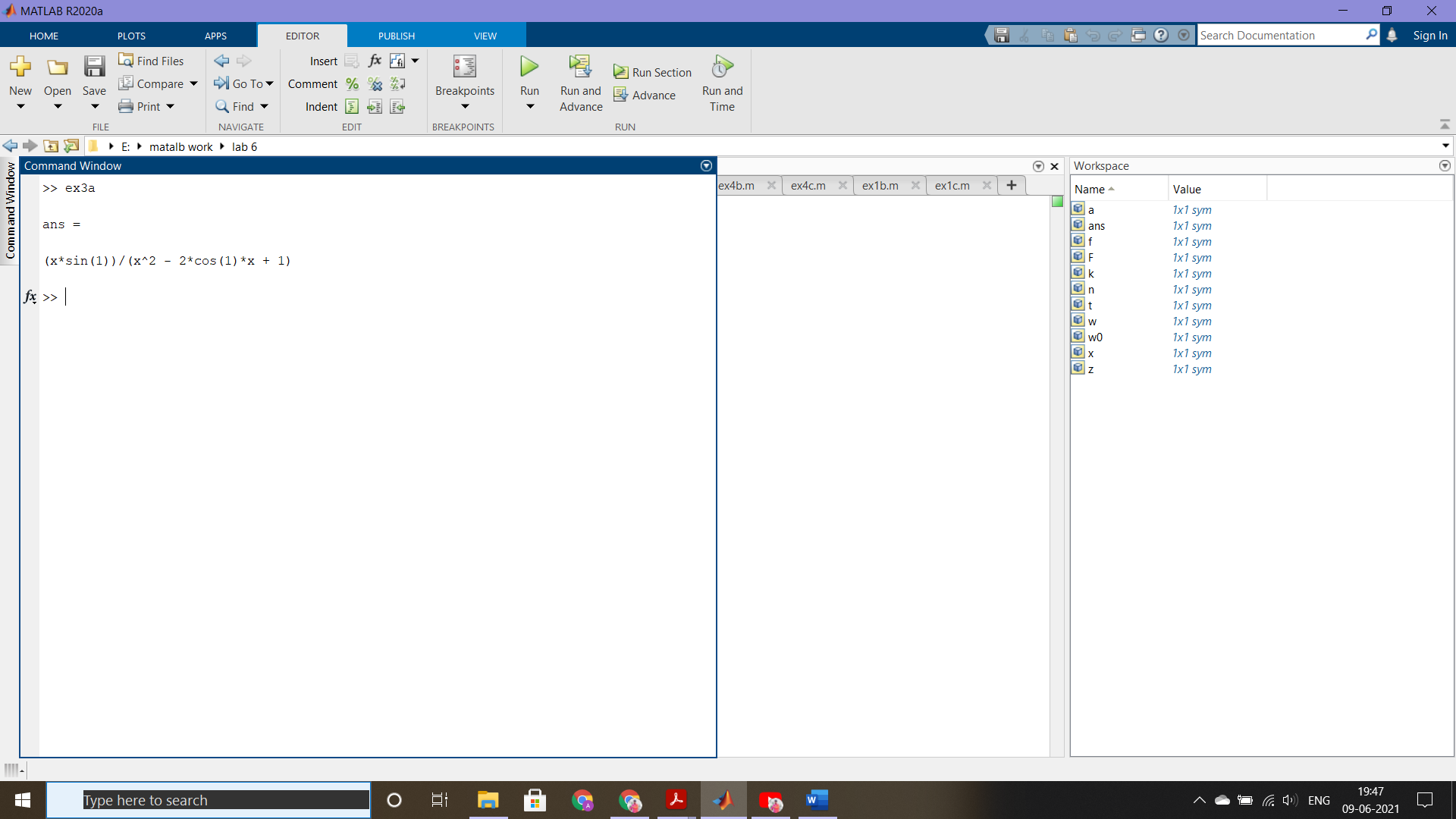
**a>**



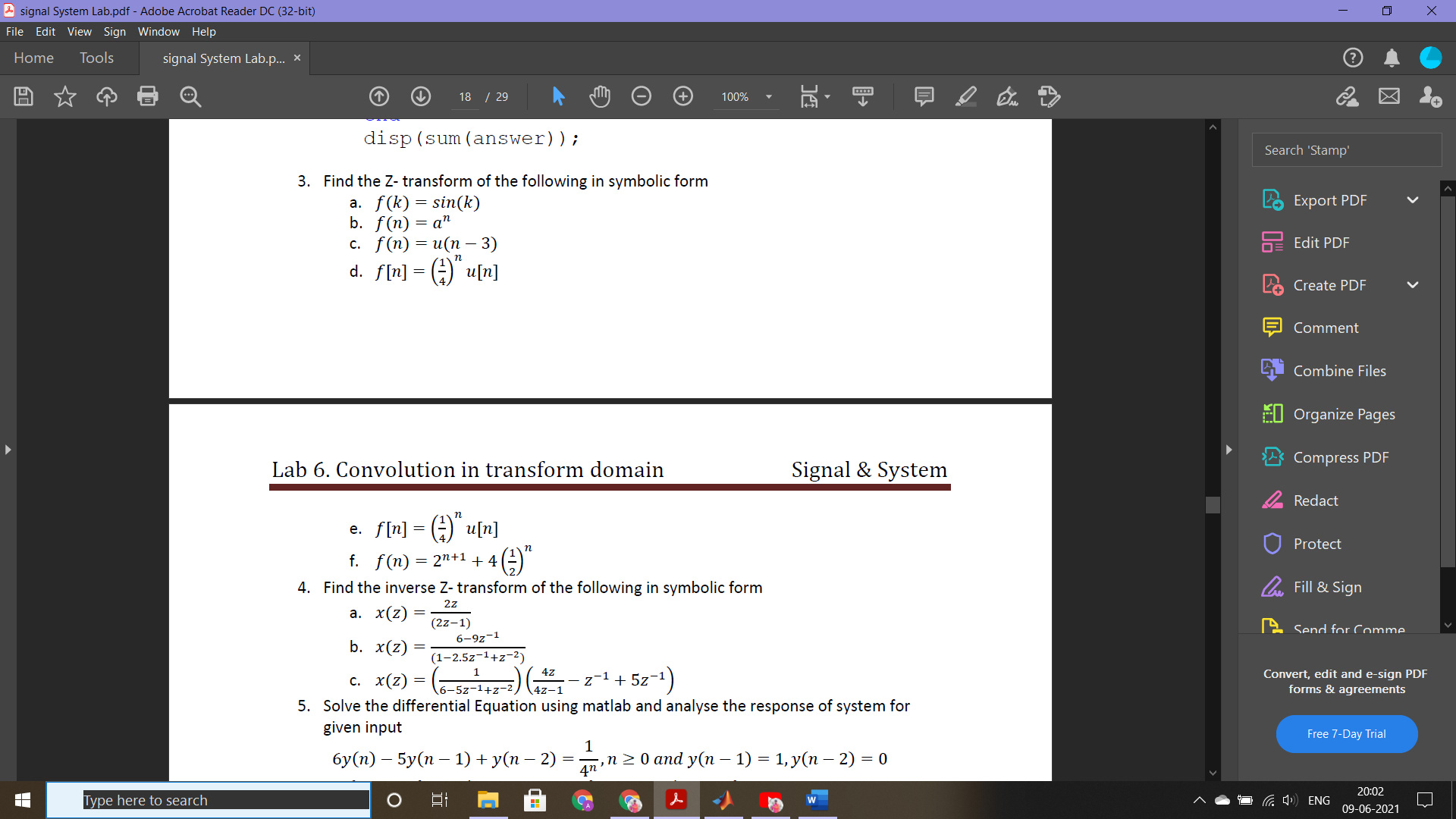
syms k x

f = sin(k);

ztrans(f, k, x)



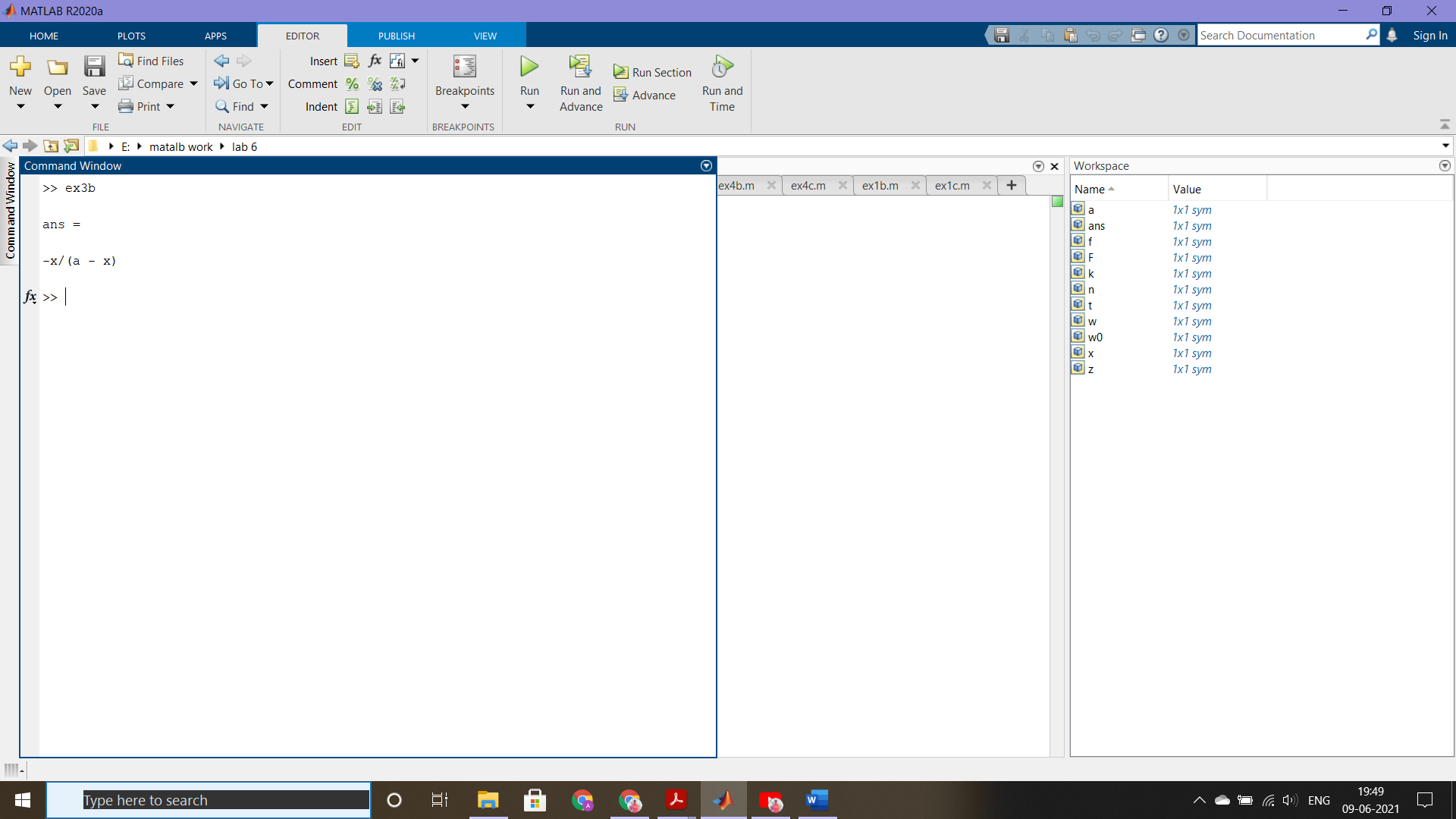
**b>**



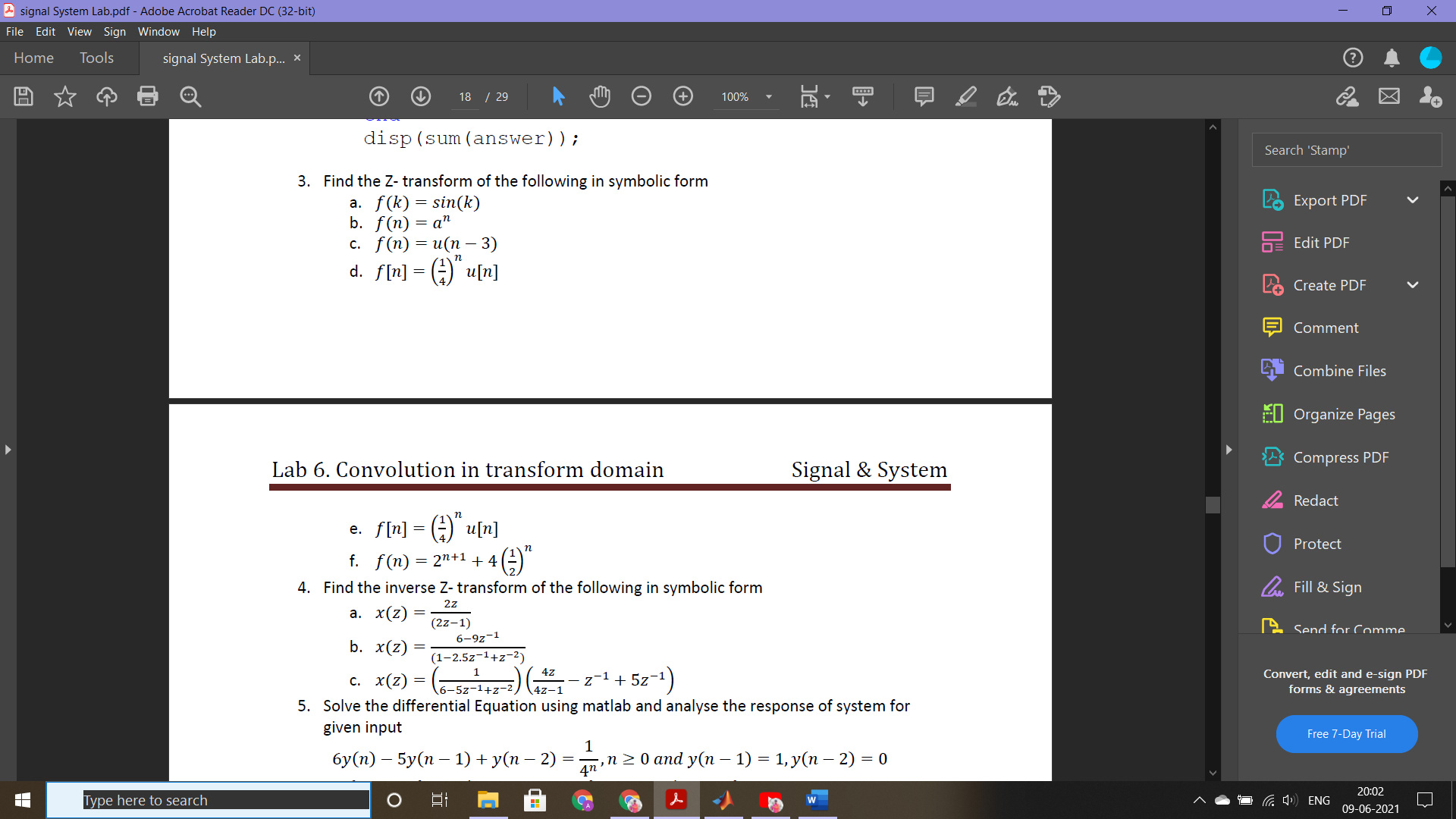
syms a n x

f = a^n;

ztrans(f, x)

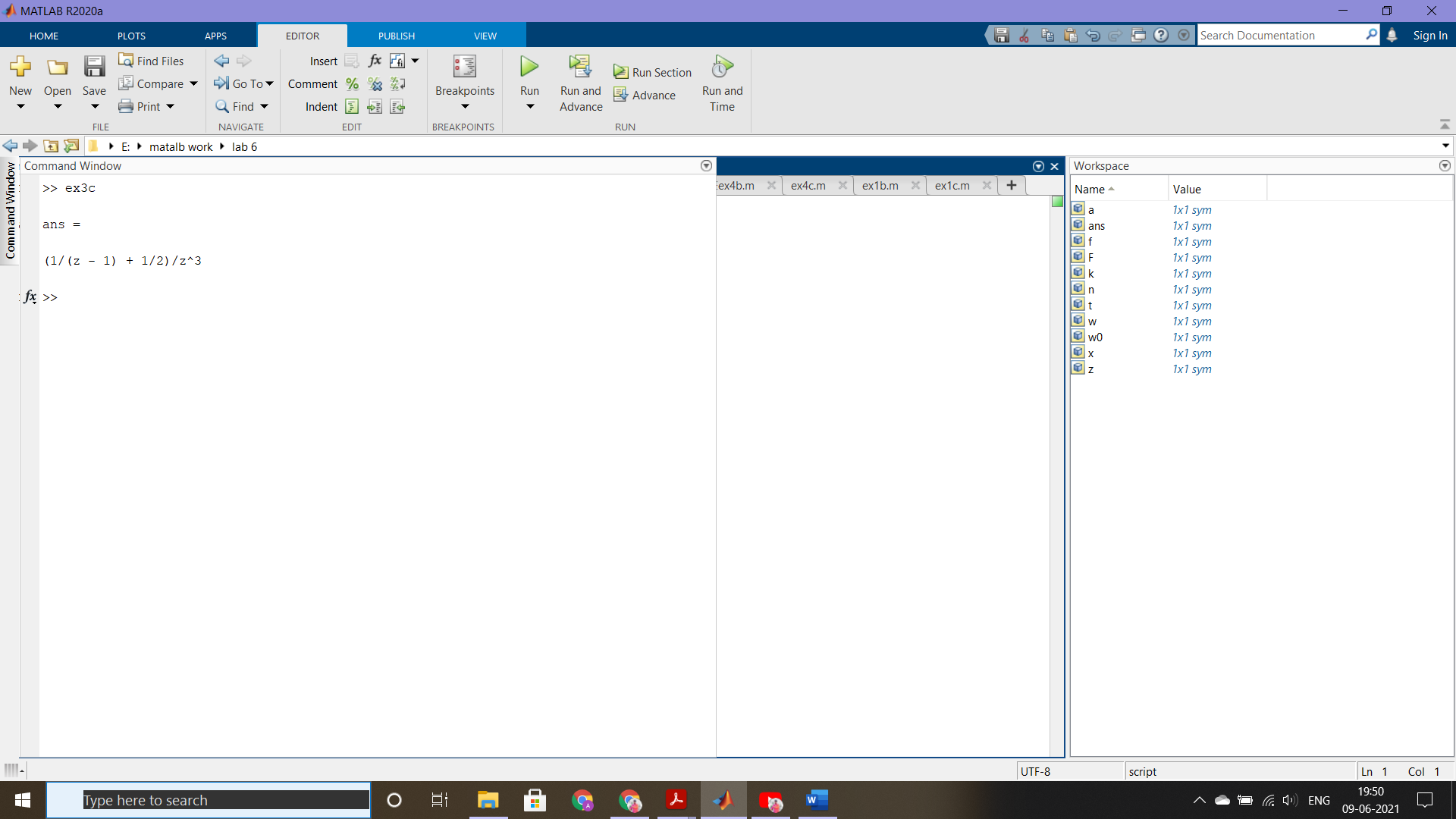
****

**c>**

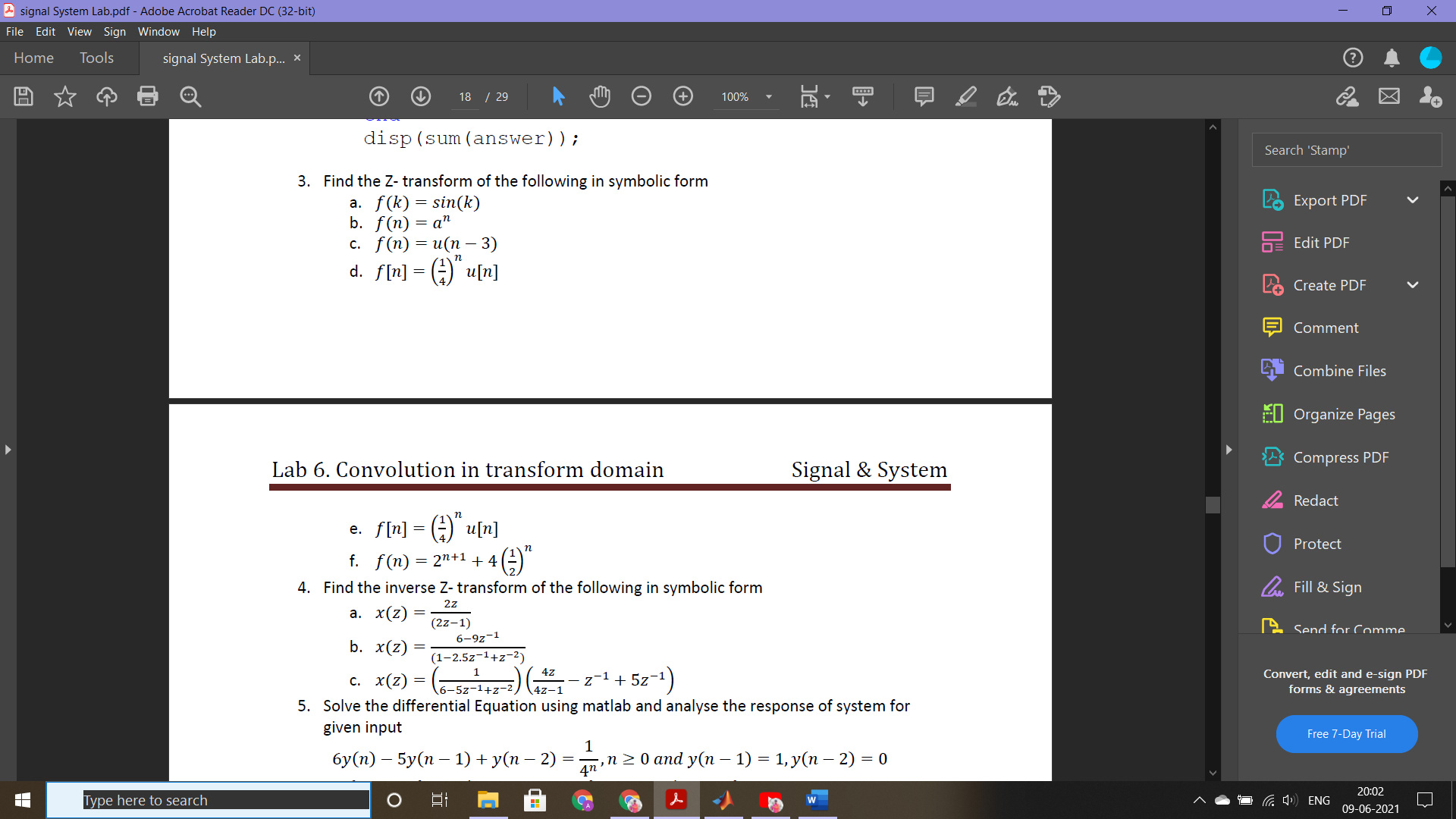


syms n z

ztrans(heaviside(n - 3), n, z)

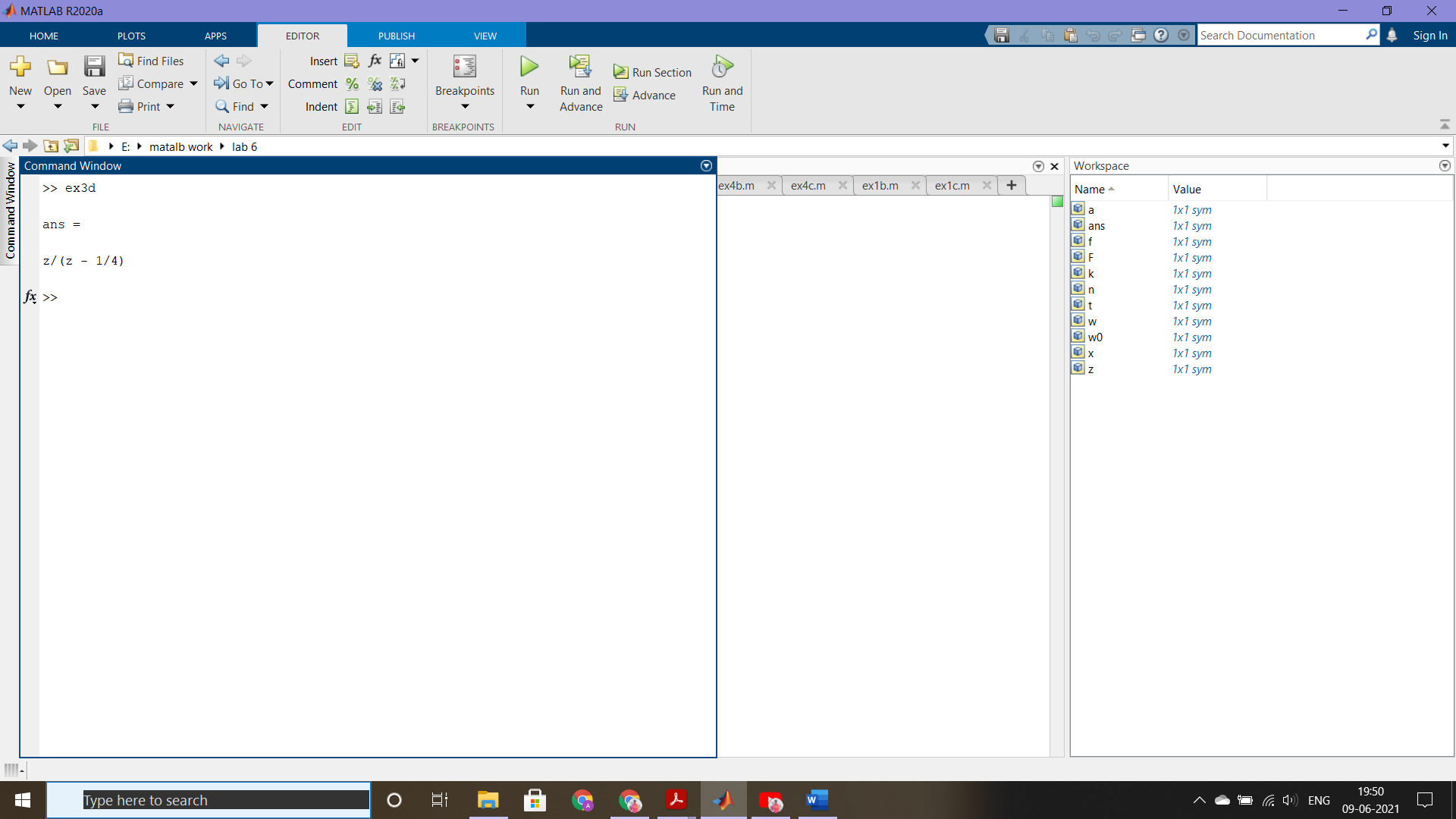
****

**d>**

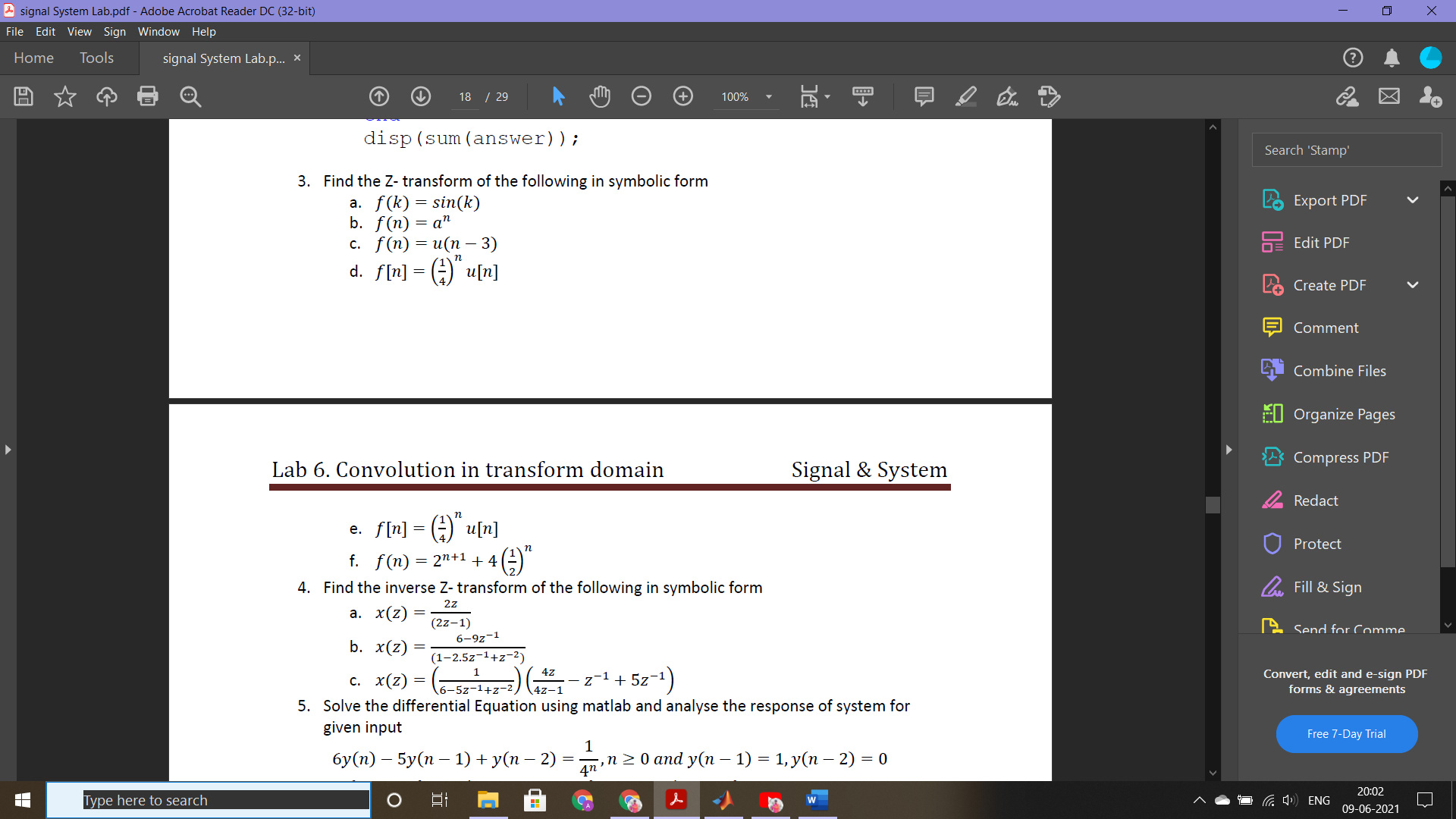


syms z n;

ztrans(1/4^n)

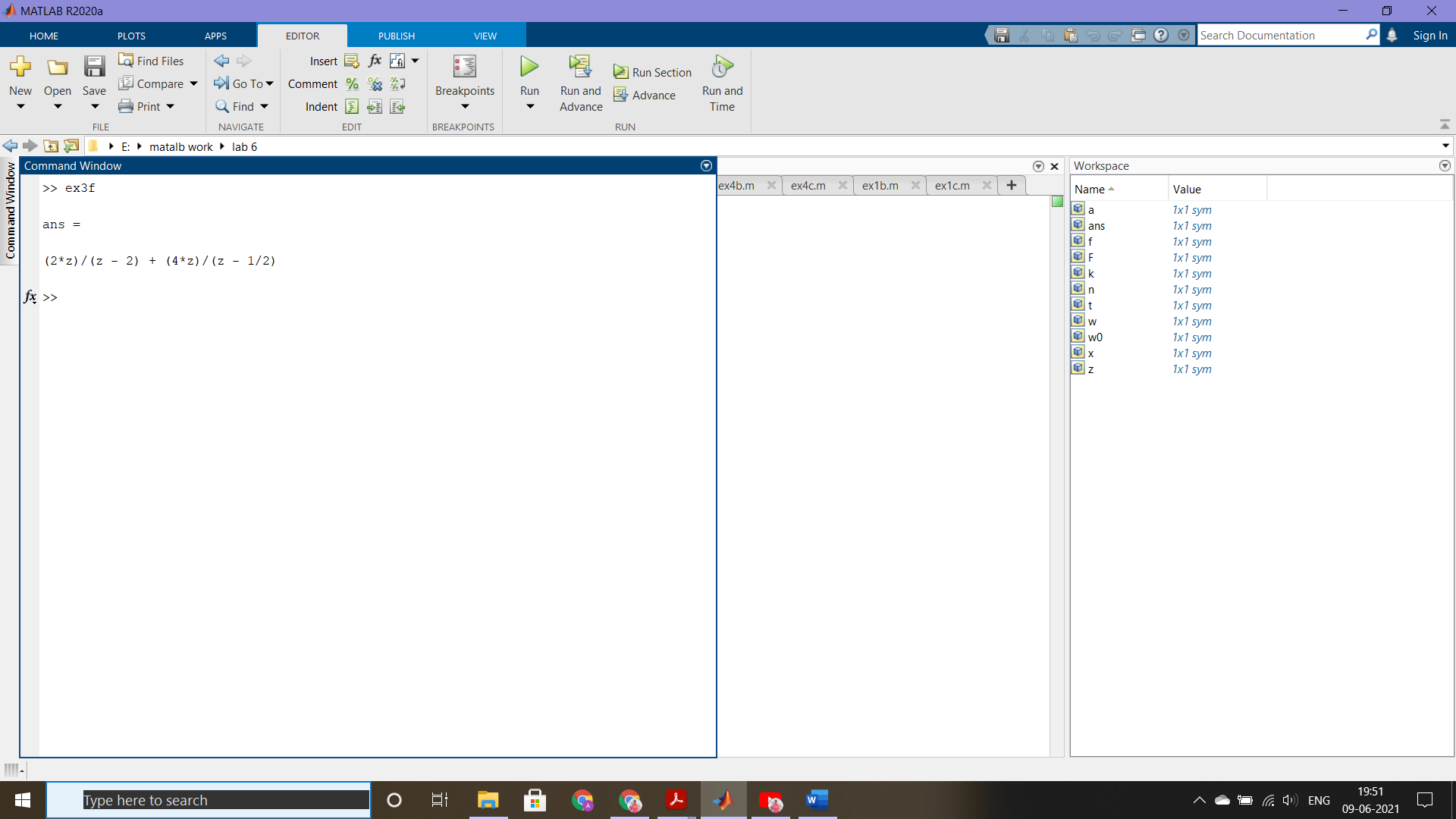
****

**f>**



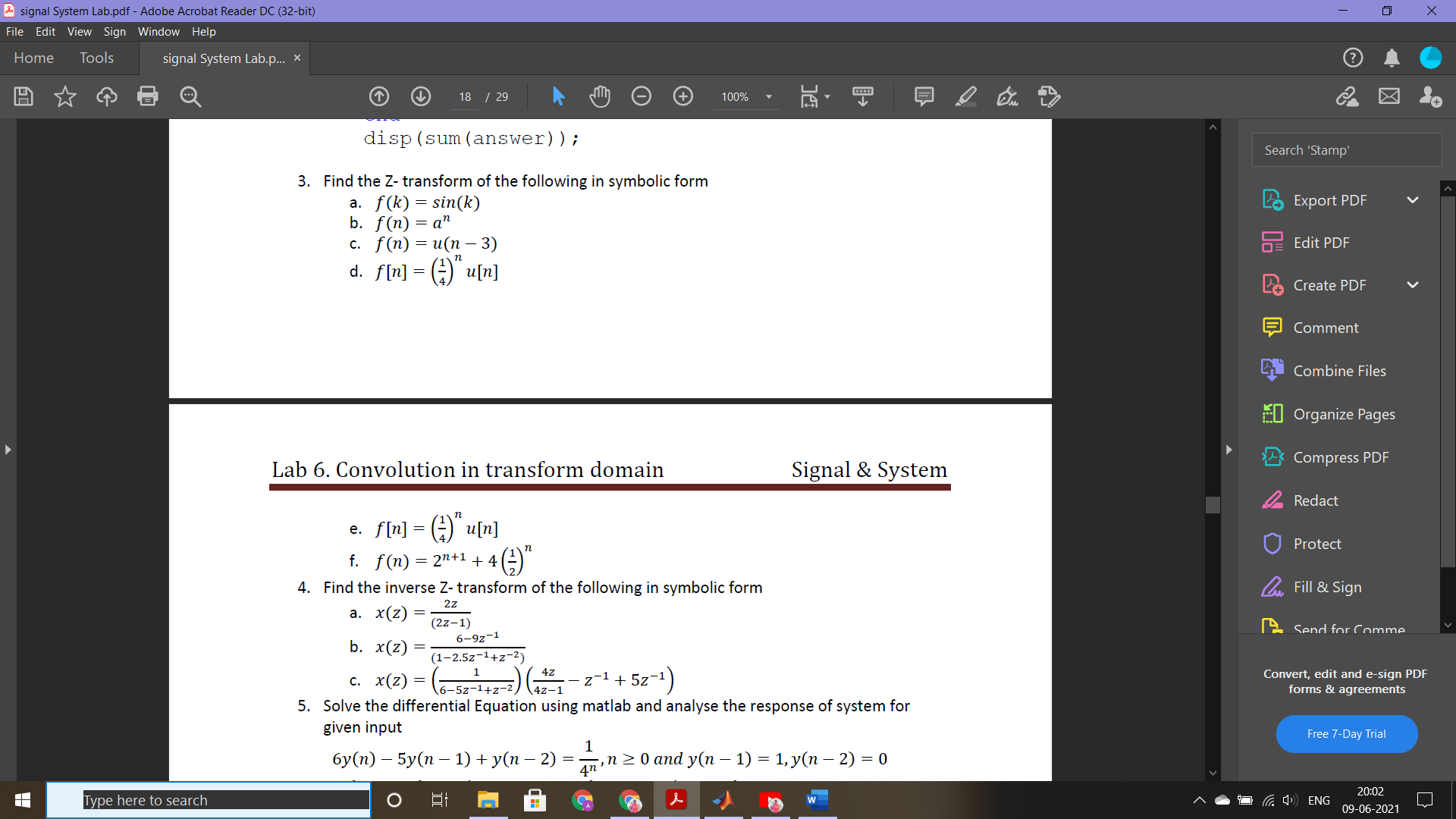
syms z n

ztrans(2\*2^n+4\*(1/2)^n)

****

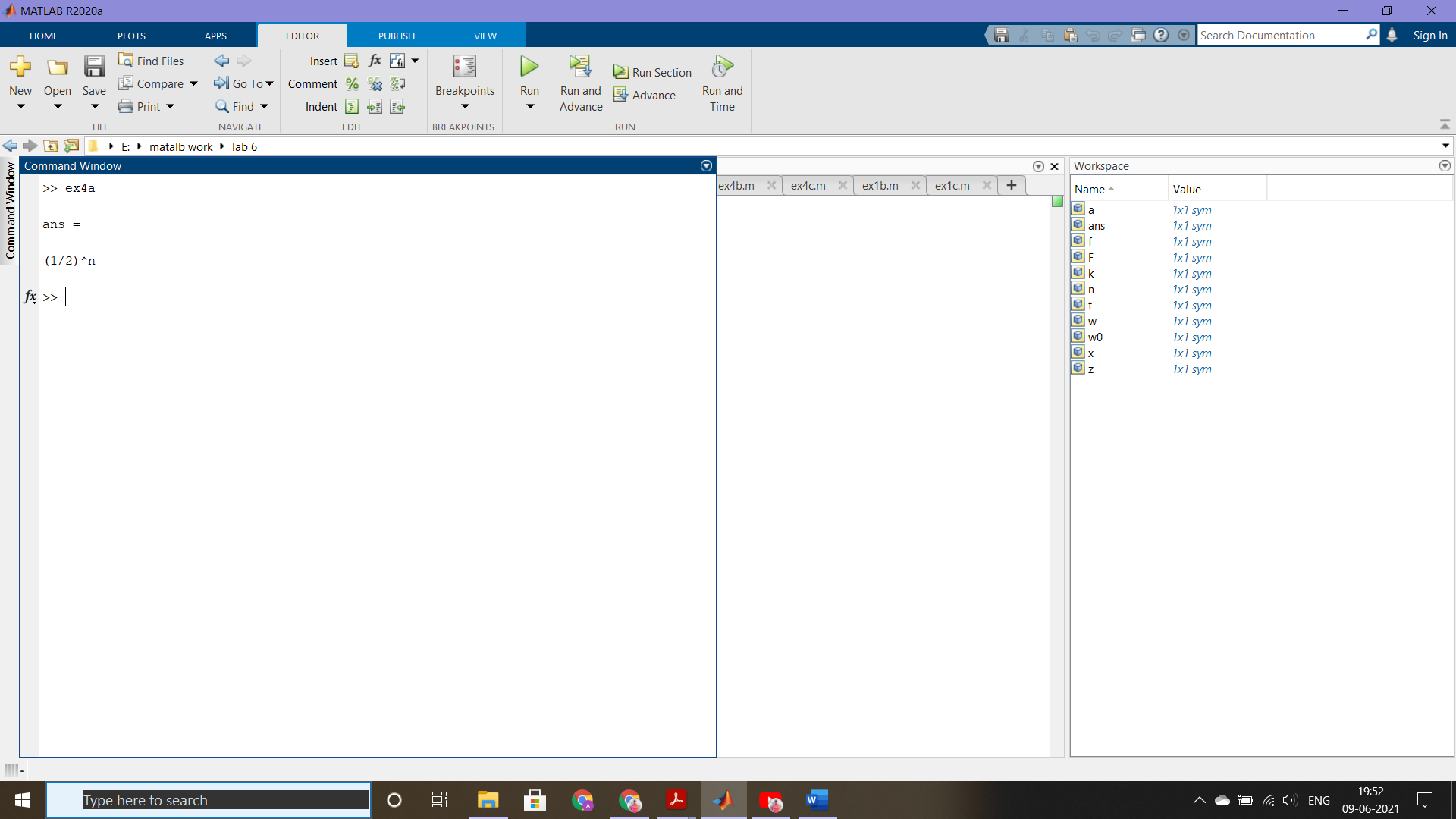
**4. Find the inverse Z- transform of the following in symbolic form**

**a>**

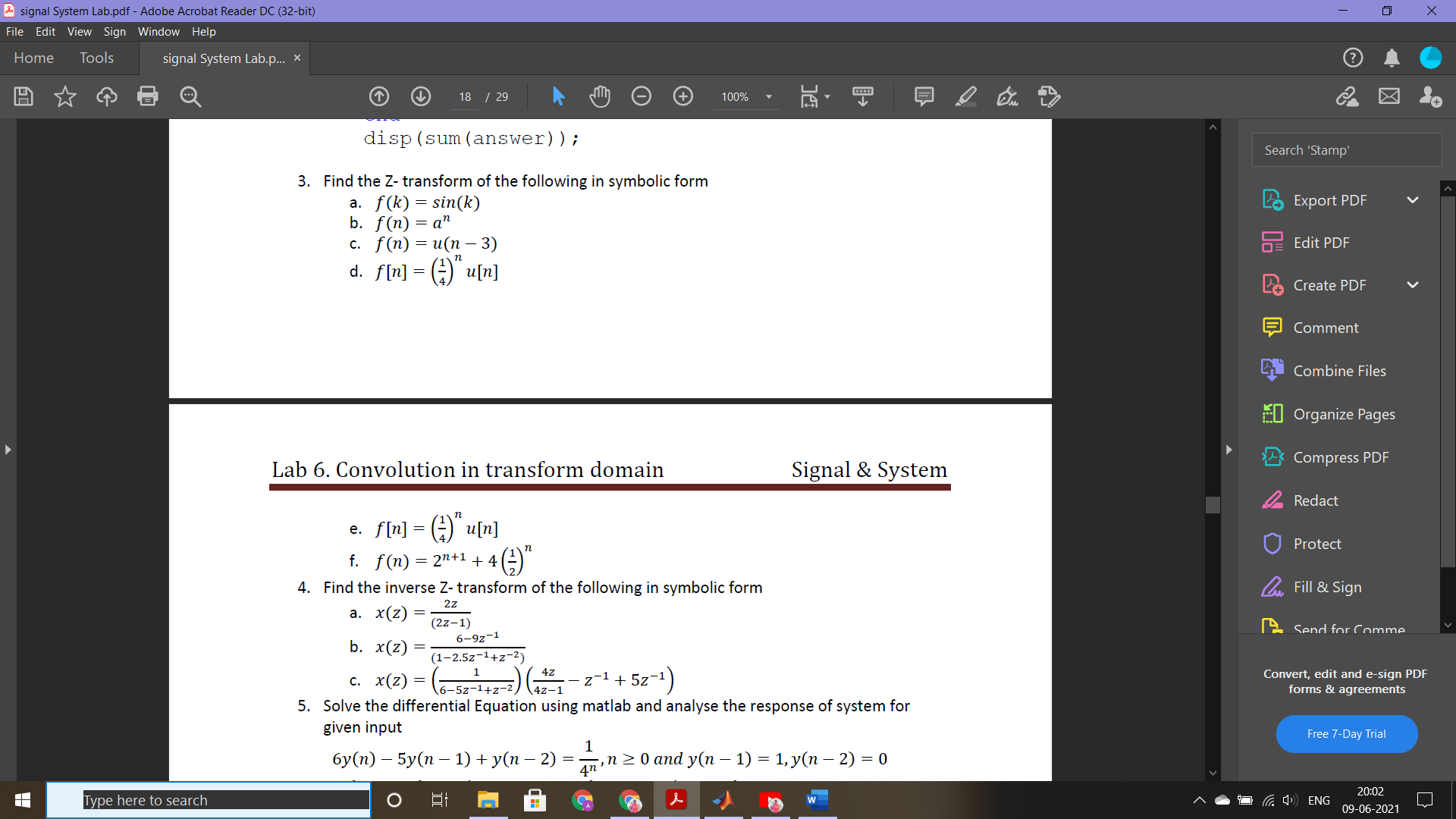


syms z n;

iztrans(2\*z/(2\*z-1))

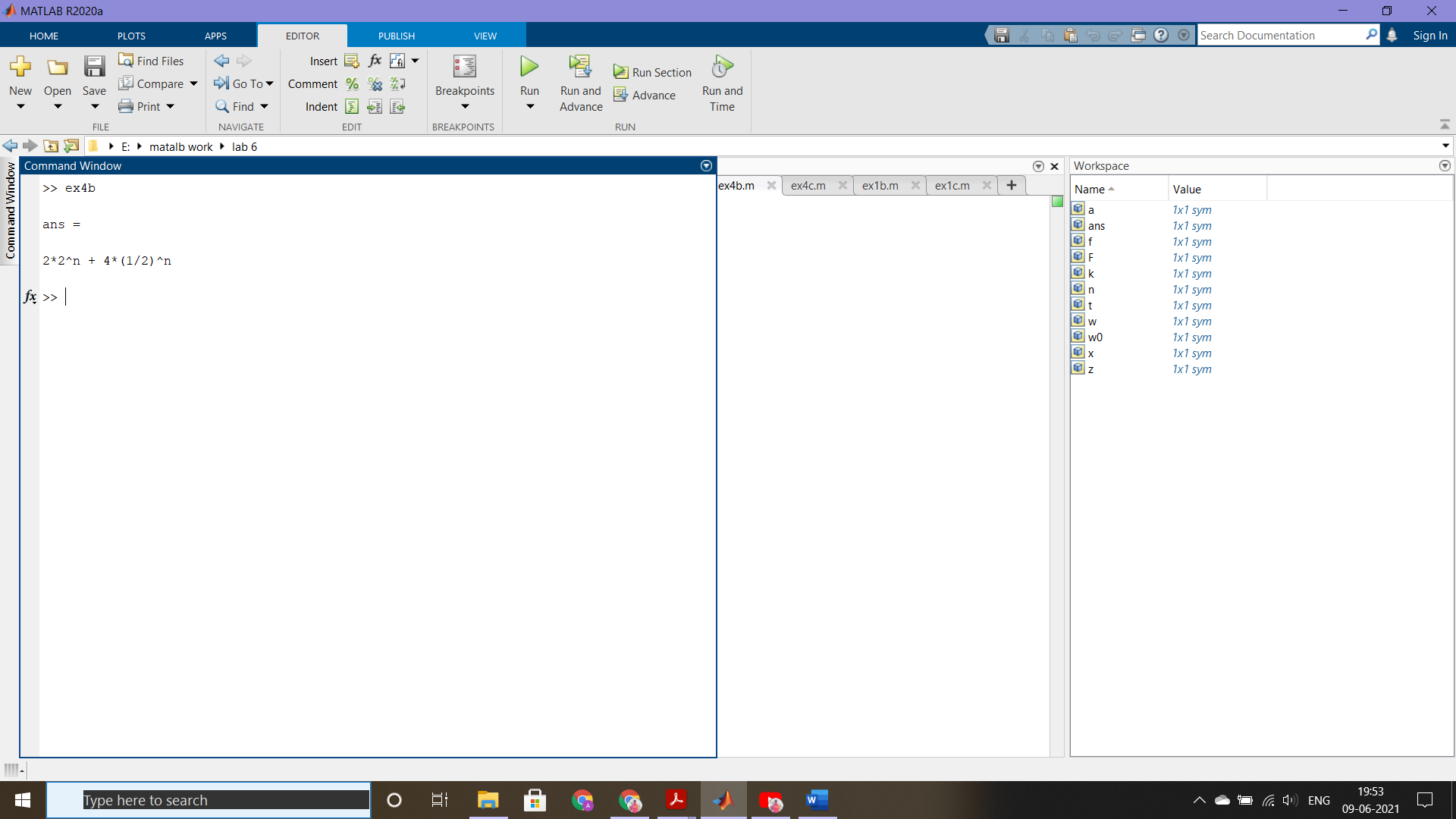
****

**b>**

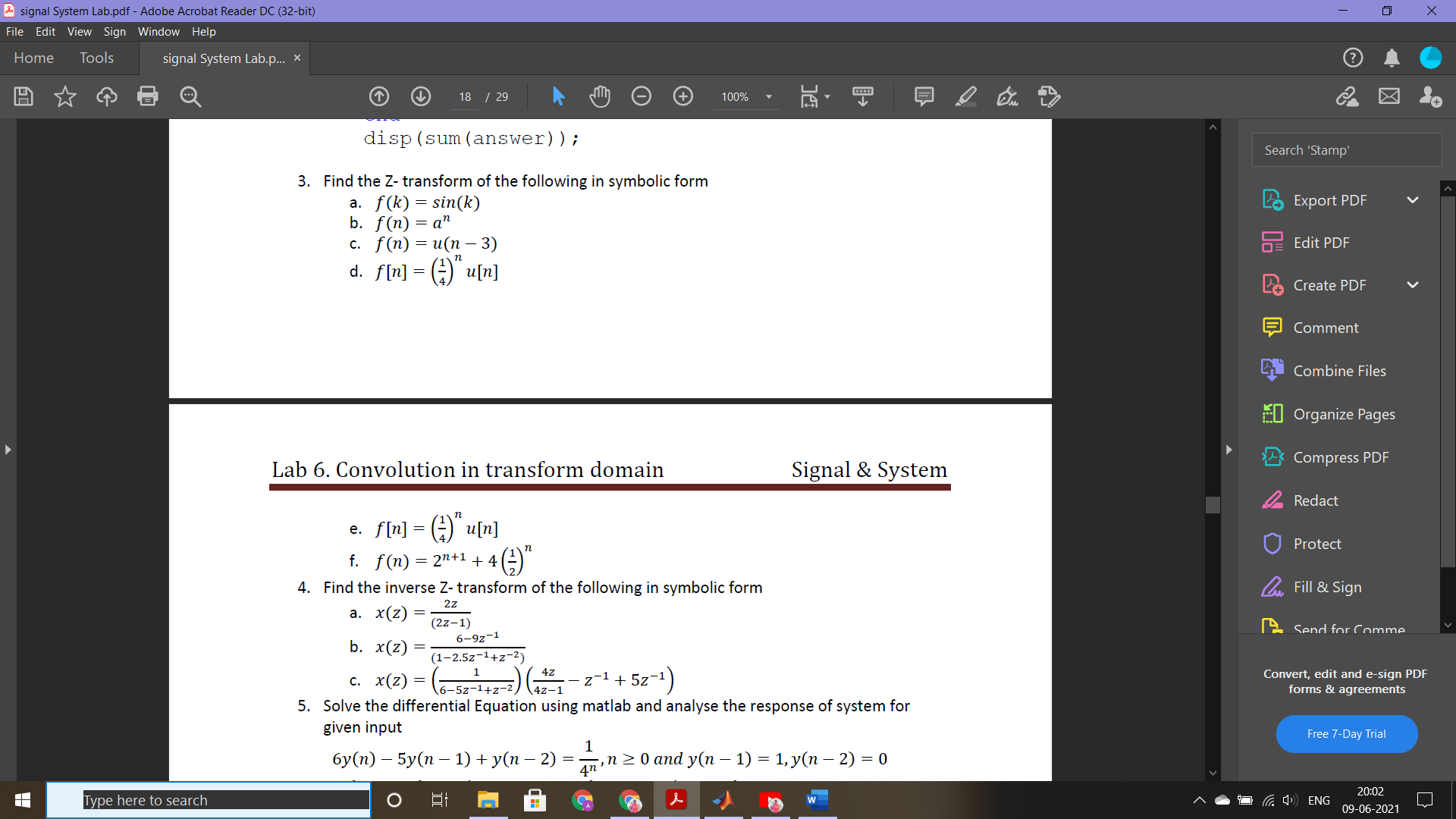
****

syms z n;

iztrans((6-9\*z^-1)/(1-2.5\*z^-1+z^-2))

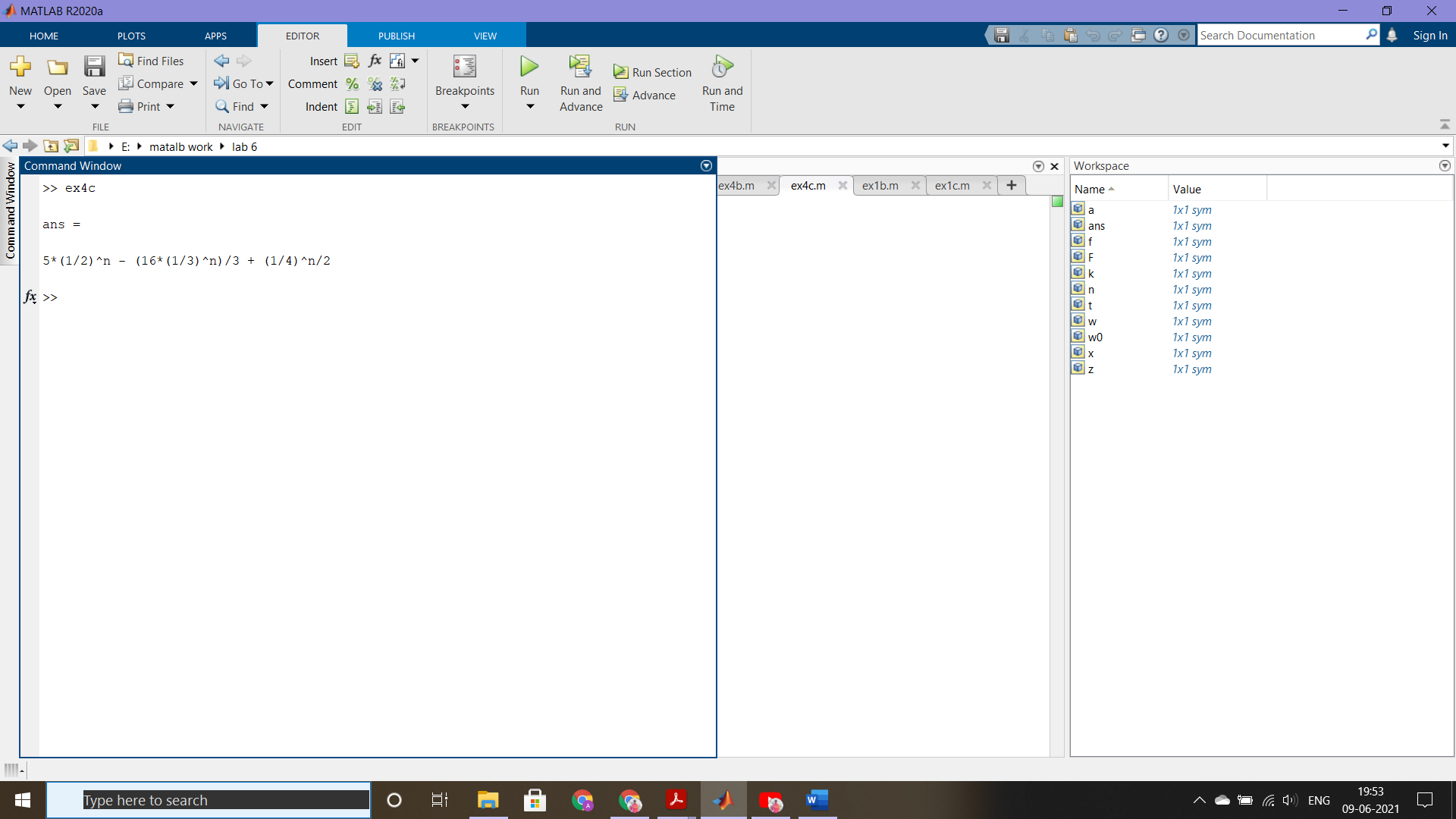


**c>**

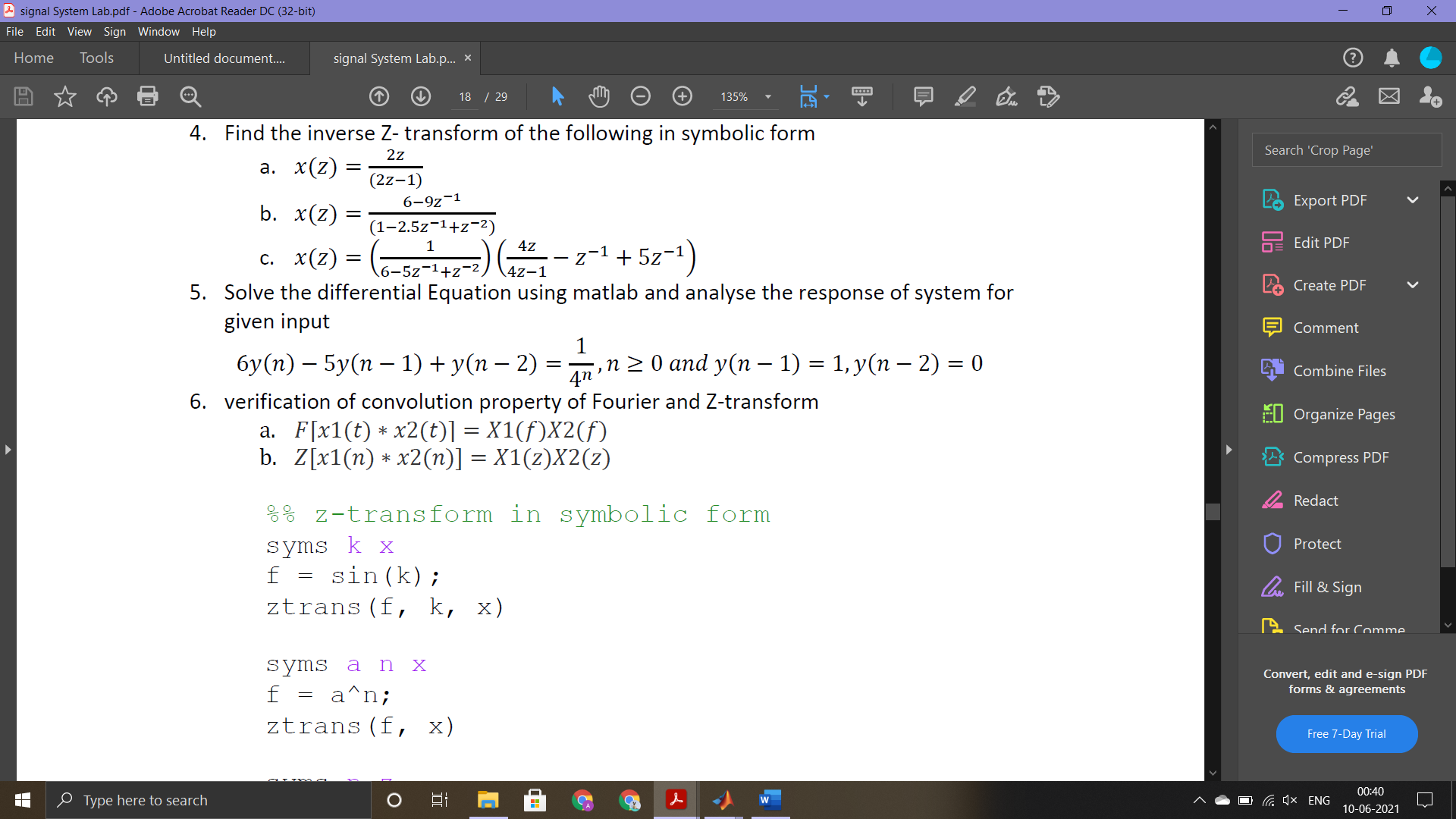
****

syms z n;

iztrans((1/(6-5\*z^-1+z^-2))\*((4\*z/(4\*z-1))-z^-1+5\*z^-1))



**6. verification of convolution property of Fourier and Z-transform**



function [ w ] = convmat(x1,x2)

n=0:100;

x1=[1 2 3 4 5];

x2=[6 7 8 9 10];

lengthofx1=length(x1);

lengthofx2=length(x2);

X1=[x1,zeros(1,lengthofx2)];

X2=[x2,zeros(1,lengthofx1)];

for k=1:(lengthofx1+lengthofx2-1)

w(k)=0;

for j=1:lengthofx1

if(k-j+1)>0

w(k)=w(k)+X1(j)\*X2(k-j+1);

end

end

end

subplot(2,4,2)

r=x1.\*x2;

f=abs(fft(r));

stem(f)

title('fourier transform of two multiplied signals')

subplot(2,4,6)

a1=abs(fft(x1));

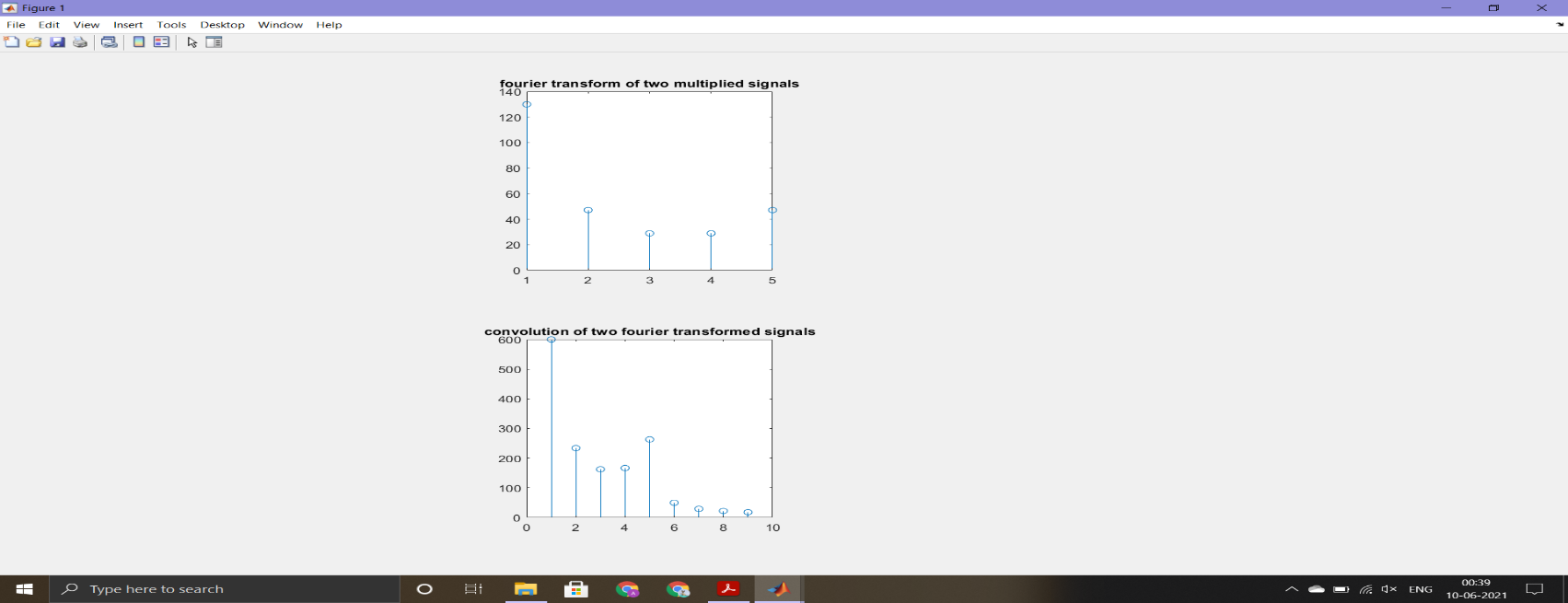
a2=abs(fft(x2));

b=conv(a1,a2);

stem(b)

title('convolution of two fourier transformed signals')

end

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