

```
clc;
clear;
close;
```

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% Question 3.1:
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```
p = [1 4 5 2]; %defining the polynomial
r = roots(p) %finding the roots of polynomial 'p'
```

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% Qustion 3.3:
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```
t = [0:0.01:15];
AS = 3/2-3/2.*exp(-2.*t)-3.*t.*exp(-t); %analytical solution
sys = tf([3],[1 4 5 2]); %creates the transfer function
fig1 = figure('name', 'HW4'); % sets a figure
step(sys,15); %ploting the system response to a step function input
set(findall(gcf,'type','line'),'linewidth',3); %changing the graph's look
hold on
plot(t,AS,'--','color','green','linewidth',2); %plots on the same graph the
analytica solution
grid on
ylabel('y(t)');
legend("Numerical Solution", "Analytical Solution");
title("Analytical and Numerical Solution For the Step Response");
exportgraphics(fig1, 'HW4_gragh.pdf','ContentType','vector'); %export the fig1 to a PDF
in vector format
```