

---

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% NAME: abraham reines
% JMU-EID: reinesaj
% DATE: Mar 21, 2022
%
% PROGRAM: Problem27b.m
% PURPOSE: Use bisection to find the zeros with ten decimal places accuracy.
%           What are they?
% CREDIT: Adapted from an example written by Dr. Lucas

% JMU PLEDGE
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

f=@(x) 273000*x.^4-277490*x.^3-228731*x.^2+256181*x-31234; % defining
function;

I1=[-1 -0.75];
I2=[0 0.25];
I3=[0.75 1];
I4=[1 1.25];

tolerance=1e-10;

secant(f, I1, tolerance);
secant(f, I2, tolerance);
secant(f, I3, tolerance);
secant(f, I4, tolerance);

function secant(f, Interval, tolerance)

% f=function;
% Interval=initial interval;
% tolerance=error tolerance;
x1=Interval(1); % lower value of the interval;
xu=Interval(2); % upper value of the interval;
xr=(x1*f(xu)-xu*f(x1))/(f(xu)-f(x1)); % new root

iter=0;
while abs(f(xr))>tolerance
    iter=iter+1; % updating iteration number;
    if f(x1)*f(xr)<0 % updating interval
        xu=xr;
    elseif f(xr)*f(xu)<0
        x1=xr;
    end
    xr=(x1*f(xu)-xu*f(x1))/(f(xu)-f(x1)); % new root
end

fprintf('\nRoot in the interval [%g , %g] is: %.12f \n',Interval,xr);
fprintf('\nNumber of iterations: %d \n\n',iter);
end

```

---

---

Root in the interval  $[-1, -0.75]$  is: -0.970000000000

Number of iterations: 12

Root in the interval  $[0, 0.25]$  is: 0.142857142857

Number of iterations: 19

Root in the interval  $[0.75, 1]$  is: 0.766666666667

Number of iterations: 8

Root in the interval  $[1, 1.25]$  is: 1.076923076923

Number of iterations: 46

*Published with MATLAB® R2021b*