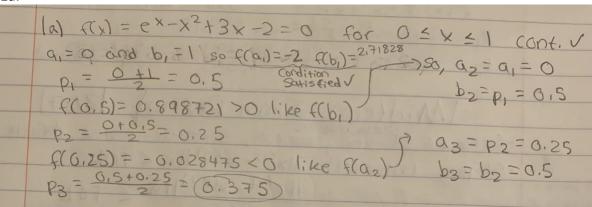
1a.



1b. Please look at the file named bisection.m to see the code and use HW7\_script.m to run it.

## I put in the following input:

```
f=@(x) -x.^2+exp(x)+3*x-2;
a=0;
b=1;
tol=0.00001;
p=bisection(f,a,b,tol)
```

## And got the following output:

```
>> HW7_script
p =
    0.257530212402344

iter =
    17
```

Continued on next page ...

2.

2.
$2 \text{ (i)}  x^{3}-2x+1=0  \text{ (ii)}  x^{3}-2x+1=0  \text{ (iii)}  x^{3}-2x+1=0$ $2x=x^{3}+1  x^{3}=2x-1  x^{3}=2x-1$
$x = \frac{1}{2}(x^3 + 1)$ $x = \frac{2x - 1}{x^2}$ $x^2 = \frac{2x - 1}{x} = 2 - \frac{1}{x}$
$g(\frac{1}{2}) = \frac{1}{2}((\frac{1}{2})^3+1) \qquad x=g(x) \to g(x) = \frac{1}{2} - \frac{1}{2} \qquad x=g(x) \to g(x) = \sqrt{2-\frac{1}{2}}$
$g(0.5625) = \frac{1}{2}((0.5625)^{3}+1)$ = $[0 = 0]$
g(0.588989)=== ((0.588989)]) Not an Sunder. Mot an accompanient
9 (0.602163=P3) appropriate method because
-10.609172=Pyllis undefined Undefined
X3=2x-1 (30.5)=-3/1-2(0.5) (3-2(0.5)) (3-2(0.5)) (3-2(0.5))
$x = \pm 31 + 2x$ $x = 9(x) - 3(x) - 31 - 2x$ $y = -31 - 2(x)$
$\begin{array}{c} x = \pm 31 + 2x \\ x = g(x) \Rightarrow g(x) = -31 + 2x \\ \end{array}$ $= \begin{array}{c} -9 = \rho_1 \\ y = -31 + 2x \\ \end{array}$ $= \begin{array}{c} -1.44225 = \rho_3 \\ y = -31 + 2 \\ \end{array}$ $= \begin{array}{c} -1.57197 = \rho_4 \\ \end{array}$ $= \begin{array}{c} -1.57197 = \rho_4 \\ \end{array}$ $= \begin{array}{c} -1.57197 = \rho_4 \\ \end{array}$

3a) 
$$f(x) = x^3 + 3x^2 - 1 = 0$$
 for  $-3 \le x \le -2$   
 $f'(x) = 3x^2 + 6x = 8 + 6x = 8$ 

3b. Please look at the file named newtons.m to see the code and use HW7\_script.m to run it.

## I put in the following input:

```
f=@(x) x.^3+3*x.^2-1;
deriv=@(x) 3*x.^2+6*x;
x0=-2.5;
```

```
tol=0.00001;
iter=25;
[p,maxiter]=newtons(f,deriv,x0,tol,iter)
```

## And got the following output:

When inputting a different initial guess such as -3, the following was outputted:

```
p =
    -2.888888888888889    -2.879451566951567    -2.879385244836671
-2.879385241571816 <- answer

maxiter =
    3</pre>
```

So changing the initial guess did change the answer because for Newton's method, the whole answer depends on the initial p0 value that was chosen. The closer the value to the actual solution, the faster and more accurate the results.