

Homework #1 – Tools and Fundamentals

Problem 3

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```
In [ ]: # Imports
        from func import f
        import sys
```

```
In [ ]: # Constants
        CONVERGENCE_CRITERION = 10E-10
```

```
In [ ]: def get_secant_root(a, b):
        xn_1 = b
        xn_2 = a
        N = 0

        if abs(xn_1 - xn_2) < CONVERGENCE_CRITERION:
            xn = (xn_1 + xn_2) / 2
            return N, xn_2, xn_1, xn
        else:
            xn = xn_1 - f(xn_1) * (xn_1 - xn_2) / (f(xn_1) - f(xn_2))
            N = 1
            xn_2 = xn_1
            xn_1 = xn
            while abs(xn_1 - xn_2) >= CONVERGENCE_CRITERION:
                xn = xn_1 - f(xn_1) * (xn_1 - xn_2) / (f(xn_1) - f(xn_2))
                N += 1
                xn_2 = xn_1
                xn_1 = xn
            return N, xn_2, xn_1, xn
```

```
In [ ]: a = sys.argv[1]
        b = sys.argv[2]

        try:
            a = float(a)
            b = float(b)
        except:
            sys.stderr.write("Range error")
            sys.exit(1)

        if a >= b:
            sys.stderr.write("Range error")
            sys.exit(1)

        if (f(a) * f(b)) >= 0:
            sys.stderr.write("Range error")
            sys.exit(1)

        N, xn_2, xn_1, xn = get_secant_root(a, b)

        print(N)
        print(xn_2)
        print(xn_1)
        print(xn)
```