Part 3, Find the root

a: Route:

How far will Anna and Elsa get along in 30 min?

- Anna: 51.1 km
- Elsa: 37.0 km

b: Range:

How far would Anna and Elsa get on their respective routes with a battery charge of C = 10, 000 Wh?

- Anna: 52.7 km
- Elsa: 65.0 km

Part 3, Find the root

Code a:

```python
def distance(T, route,n=10**7):

    strecke = load_route(route)[0]

    def _distance(T,min,max):

        ttt = time_to_destination(min+(max -min)/2, route, n)

        if 0<=T-ttt<=10**(-10):

            print("Timediff:",T - ttt)

            return (min+(max -min)/2)

        elif ttt < T:

            return _distance(T,min+(max -min)/2,max)

        else:

            return _distance(T,min,max-(max -min)/2 )

    if time_to_destination(max(strecke), route, 1000)<T:

        print("Stop",time_to_destination(max(strecke), route, n))

        return max(strecke)

    else:

        return _distance(T,0 , max(strecke))
```

Code b:

```python
def reach(C, route, n = 10**7):

    strecke = load_route(route)[0]

    def _reach(x):

        leakage=total_consumption(x, route, n)

        if 0<leakage-C< 10**(-10):

            print("Succes:",leakage)

            return x

        else:

            return _reach(x-(leakage-C)/consumption(velocity(x, route)))

    if total_consumption(max(strecke),route,n)<C:

        print("Stop",total_consumption(max(strecke), route, n))

        return max(strecke)

    else:

        return _reach(0)
```