```python
import numpy as np
```

```python
x = [1.41, 1.84, 1.64, 0.85, 1.32, 1.97, 1.70, 1.02, 1.84, 0.92]
```

```python
r = [0.94, 0.70, 0.16, 0.38, 0.40, 0.57, 0.24, 0.27, 0.60, 0.81]
```

```python
y = [13, 17, 6, 3, 7, 13, 8, 7, 5, 8]
```

```python
def em_step(theta):
    sum_x = np.sum(x)
    tmp = 0.0
    for i in range(len(x)):
        tmp += y[i] * x[i] / (x[i] * theta + r[i])
    return theta * tmp / sum_x
```

```python
def em_all():
    theta = np.random.random_sample() * 5
    for i in range(50):
        theta = em_step(theta)
    print(theta)
```

```python
for i in range(100):
    em_all()
```

```python
def get_l(theta):
    tmp = 0.0
    for i in range(len(x)):
        tmp += x[i] * y[i] / (x[i] * theta + r[i])
    sum_x = np.sum(x)
    return tmp - sum_x
```

```python
get_l(5.606063396561341)
```