

In [1]:

```
%matplotlib inline
```

In [2]:

```
import matplotlib.pyplot as plt
import numpy as np
```

In [3]:

```
p = np.linspace(0., 1., 10000)
```

In [12]:

```
def reward_cost(in_p):
    return (8*(1-np.exp(-in_p/4.0)) + 6*(1-np.exp(-in_p/2.0)))*in_p
```

In [13]:

```
def day_cost(in_p):
    tmp = 5 + (8*(1-np.exp(-in_p/4.0)) + 6*(1-np.exp(-in_p/2.0))) - 10
    return 0 if tmp<0 else tmp
```

In [15]:

```
def night_cost(in_p):
    tmp = 4 - (8*(1-np.exp(-in_p/4.0)) + 6*(1-np.exp(-in_p/2.0)))
    return 0 if tmp<0 else tmp
```

In [16]:

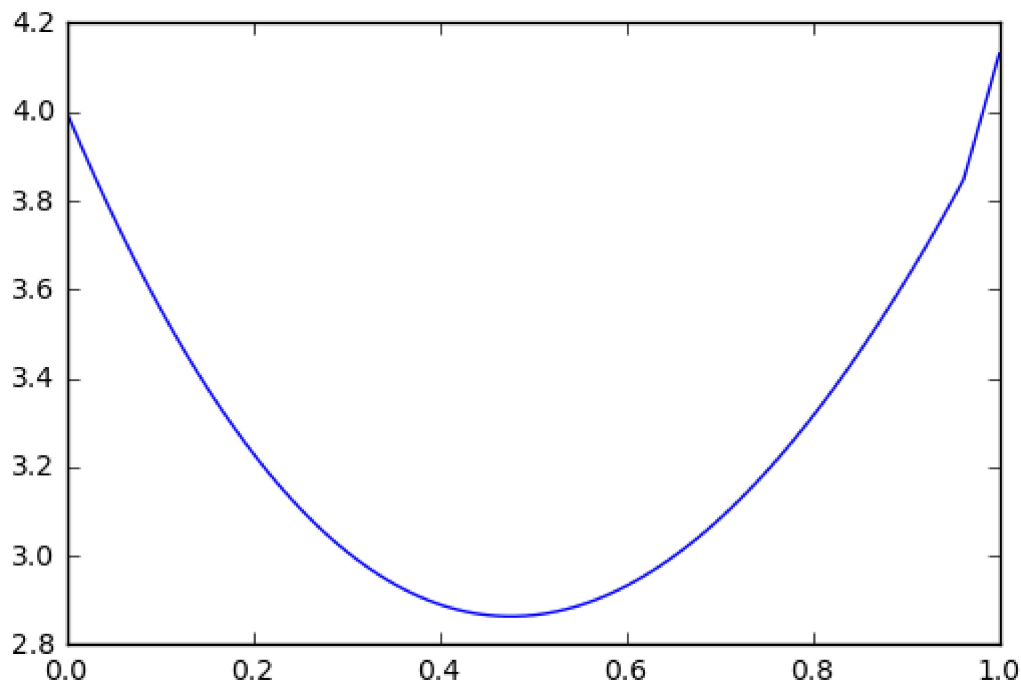
```
cost = [ reward_cost(x)+day_cost(x)+night_cost(x) for x in p]
```

In [17]:

```
plt.plot(p,cost)
```

Out[17]:

[<matplotlib.lines.Line2D at 0x7f49dc4291d0>]



In [18]:

```
np.diff(cost)
```

Out[18]:

```
array([-0.00049999, -0.00049987, -0.00049975, ...,  0.0007507 ,  
       0.00075075,  0.00075081])
```

In [19]:

```
np.where(np.diff(cost)>0)
```

Out[19]:

```
(array([4761, 4762, 4763, ..., 9996, 9997, 9998]),)
```

In [21]:

```
p[4761]
```

Out[21]:

```
0.47614761476147616
```

In []: