B2_python

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차 례

page 4 2
page 5 3
page 6,7 4
page 8 4

page 4

```
import numpy as np

for X in range(11,16):
    MC_N = 10000
    D = np.random.uniform(11,15,MC_N)
    sales_rev= 2* np.minimum(D,X)
    salvage_rev = 0.5*np.maximum(X-D,0)
    material_cost = 1 *X
    profit= sales_rev + salvage_rev - material_cost
    print("X: ",X,", expected profit: ",np.mean(profit))
```

```
## X:  11 , expected profit:  11.0
## X:  12 , expected profit:  11.813635648097334
## X:  13 , expected profit:  12.246390502175258
## X:  14 , expected profit:  12.311631953193793
## X:  15 , expected profit:  11.958627051413577
```

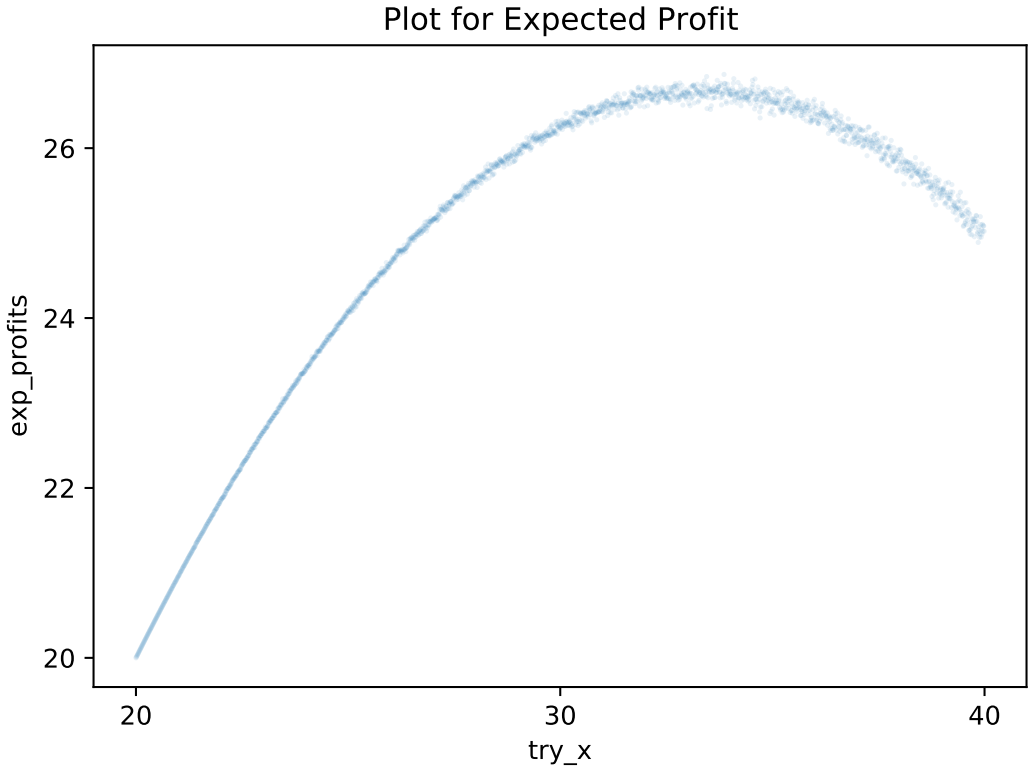
page 5

```
import numpy as np
import pandas as pd

try_X = np.arange(20,40,0.01)
exp_profits=np.array([])

for X in try_X:
    MC_N = 10000
    D = np.random.rand(MC_N,1)*20+20
    sales_rev= 2* np.minimum(D,X)
    salvage_rev = 0.5*np.maximum(X-D,0)
    material_cost = 1 *X
    exp_profit= np.mean(sales_rev + salvage_rev - material_cost)
    exp_profits=np.append(exp_profits,exp_profit)

results = pd.DataFrame({'try_X':try_X,'exp_profits':exp_profits})

results
```

```
##       try_X  exp_profits
## 0     20.00    20.000000
## 1     20.01    20.009997
## 2     20.02    20.019993
## 3     20.03    20.029952
## 4     20.04    20.039959
## ...     ...          ...
## 1995  39.95    25.102897
## 1996  39.96    25.021910
## 1997  39.97    25.087928
## 1998  39.98    25.083505
## 1999  39.99    25.022043
##
## [2000 rows x 2 columns]
```

page 6,7

```
import matplotlib.pyplot as plt

plt.plot(try_X,exp_profits,'o',ms=1,alpha=0.1)
plt.xlabel("try_x")
plt.ylabel("exp_profits")
plt.title("Plot for Expected Profit")
plt.rc('font', size=25)
plt.show()
```



page 8

```
idx=np.where(exp_profits==np.max(exp_profits))

print(*try_X[idx]) #this is optimal quantity
```

```
## 33.86000000000217
```

```
print(*exp_profits[idx]) #this is expected optimal profit
```

```
## 26.867838288054394
```