

```

import numpy as np
import pandas as pd

df = pd.read_csv('exp2.csv.csv')
n_row = df.shape[0]

li = []
for i in range(n_row):
    li.append(1)

df.insert(0,"X0", li, True)
print(df)

```

	X0	X1	X2	Y
0	1	5	45	460
1	1	3	40	232
2	1	3	30	315
3	1	2	36	178

```
main_matrix = df.to_numpy()
```

```
print(main_matrix)
```

```

[[ 1  5 45 460]
 [ 1  3 40 232]
 [ 1  3 30 315]
 [ 1  2 36 178]]

```

```
n_col = df.shape[1]
```

```

result = np.hsplit(main_matrix, [n_col-1,n_col])
X = result[0]
Y = result[1]

```

```

print(X)
print(Y)

```

```

[[ 1  5 45]
 [ 1  3 40]
 [ 1  3 30]
 [ 1  2 36]]
[[460]
 [232]
 [315]
 [178]]

```

```

X_T = X.transpose()
print(X_T)

```

```
[[ 1  1  1  1]
 [ 5  3  3  2]
 [45 40 30 36]]
```

```
X_T_X = np.matmul(X_T,X)
print(X_T_X)
```

```
[[  4   13  151]
 [ 13   47  507]
 [151  507 5821]]
```

```
inv = np.linalg.inv(X_T_X)
print(inv)
```

```
[[13.35864297  0.71405493 -0.40872375]
 [ 0.71405493  0.3901454  -0.05250404]
 [-0.40872375 -0.05250404  0.01534733]]
```

```
inv_T = np.matmul(inv, X_T)
print(inv_T)
```

```
[[ -1.46365105 -0.84814216  3.23909532  0.0726979 ]
 [  0.30210016 -0.21567044  0.30936995 -0.39579968]
 [  0.01938611  0.04765751 -0.10581583  0.03877221]]
```

```
answer = np.matmul(inv_T, Y)
print(answer)
```

```
[[163.20678514]
 [115.92972536]
 [ -6.45638126]]
```

```
temp = ""
for i in range(1,n_col-1):
    if answer[i][0]<0:
        temp += " - "+str(-answer[i][0])+" X"+str(i)
    else:
        temp += " + "+str(answer[i][0])+" X"+str(i)
print("Y = "+ str(answer[0][0])+temp)
```

Y = 163.20678513731286 + 115.92972536348917 X1 - 6.45638126009684 X2

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