Homework 1 - Question #3

You are given a biased classifier that produce random results for any given query. Probability of getting positive label estimated to be 0.75

Part 1

What will be the accuracy of such model on a dataset with a class imbalance 70% positive instances?

		Actual Label	
		P	N
Predicted Label	P	52.50%	22.50%
	N	17.50%	7.50%

```
prob_positive_label = 0.75
positive_instances = 70

prob_negative_label = 0.25
negative_instances = 30

TruePositives = (prob_positive_label * positive_instances)
TrueNegatives = (prob_negative_label * negative_instances)

FalsePositives = 75 - TruePositives
FalseNegatives = 25 - TrueNegatives

Accuracy = TruePositives + TrueNegatives

print("True Positive:", TruePositives)
print("False Positive:", FalsePositives)
print("False Negatives:", FalseNegatives)
print("True Negatives:", TrueNegatives)

print('\n')

print("Accuracy (TP + TN):", Accuracy)
```

```
True Positive: 52.5
False Positive: 22.5
False Negatives: 17.5
True Negatives: 7.5


Accuracy (TP + TN): 60.0
```

Part 2

What is the entropy of the random model predictions?

```
# calculate the entropy for a dataset
from math import log2

# proportion of examples in each class
prob_y_positive = 0.75
prob_y_negative = 0.25

# calculate entropy
entropy = -(prob_y_positive * log2(prob_y_positive) + prob_y_negative
* log2(prob_y_negative))

# print the result
print("Entropy: ", entropy, " =  %.4f" % entropy)
```

```
Entropy:  0.8112781244591328  =  0.8113
```