

MATH 179
Probability and Statistics Project

Name: _____

For this project, we will investigate two different types of random variables:

- 1.) A simple random variable (examples: a coin flip, the rolling of dice, etc...)
- 2.) A normally distributed random variable (examples: exam grades, height, weight, etc...)

Let's experimentally examine a simple random variable. We will call it X...

NOTE: The general convention is to denote random variables with upper-case letters.
We denote **specific instances** of the random variable with a lower-case letter.

a.) What is the probability of getting a heads? What about tails?

$P(X=\text{heads}) =$ _____
 $P(X=\text{tails}) =$ _____

b.) Based on this, how many heads and tails do you expect if you were to flip the coin 10 times?

of heads \approx _____
 # of tails \approx _____

c.) Take a coin, flip it 10 times then record the results as Experiment #1, do this 5 times.

NOTE: You should flip the coin a total of 50 times.

Experiment #1	Heads: _____	Tails: _____
Experiment #2	Heads: _____	Tails: _____
Experiment #3	Heads: _____	Tails: _____
Experiment #4	Heads: _____	Tails: _____
Experiment #5	Heads: _____	Tails: _____
Totals	_____	_____

d.) Next, let's define a new random variable... Let Y be the number of heads in each experiment.

HINT: Y is basically the middle column from the table in part c, ***not including the total!***
 Also, you should observe that Y is ***normally distributed!***

Find the Mean, Variance, and Standard Deviation for Y.

Mean = _____
 Variance = _____
 Standard Deviation = _____

e.) Using this, what's the probability of getting between 4 and 6 heads in each experiment?

$$P(4 \leq Y \leq 6) = \underline{\hspace{2cm}}$$

f.) Similar to part d, Let Q be the number of tails in each experiment.

HINT: Q is basically the third column from the table in part c, ***not including the total!***

Also, you should observe that Q is ***normally distributed!***

Find the Mean, Variance, and Standard Deviation for Q.

$$\text{Mean} = \underline{\hspace{2cm}}$$

$$\text{Variance} = \underline{\hspace{2cm}}$$

$$\text{Standard Deviation} = \underline{\hspace{2cm}}$$

g.) Using this, what's the probability of getting between 4 and 6 tails in each experiment?

$$P(4 \leq Q \leq 6) = \underline{\hspace{2cm}}$$