

Math 206 - Quiz 4

February 21, 2018

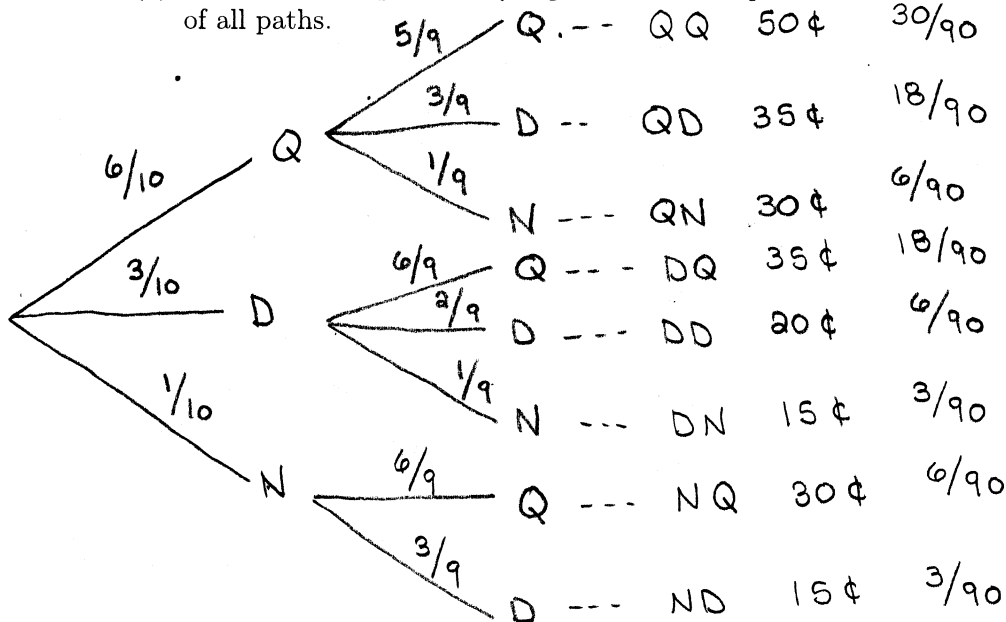
Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3.5 points) A jar contains 6 quarters, 3 dimes, and 1 nickel. Two coins are selected at random (without replacement).

- (a) Sketch the complete tree diagram for this experiment. Include the probabilities of all paths.



- (b) How much money should you expect when two coins are selected. (Compute the expected value.)

$$50 \left(\frac{30}{90} \right) + 35 \left(\frac{36}{90} \right) + 30 \left(\frac{12}{90} \right) + 20 \left(\frac{6}{90} \right) + 15 \left(\frac{6}{90} \right)$$

$$= \boxed{37 \text{¢}}$$

- (c) What are the odds in favor of selecting 30 cents?

$$\text{Prob is } \frac{6}{90} + \frac{6}{90} = \frac{12}{90} \Rightarrow \text{Odds are } 12:78$$

or $\boxed{2:13}$

2. (1.5 points) Design a simulation that could be used to estimate the solution of the following problem.

What is the probability that in a group of five people chosen at random, at least two will have birthdays in the same month?

Perform ten trials of your simulation and explain how you would use your results to answer the question.

LABEL THE MONTHS 1-12. ROLL A 12-SIDED DIE 5 TIMES TO SIMULATE SELECTING 5 PEOPLE AND ASKING THEIR BIRTH MONTHS. THIS WOULD BE ONE TRIAL. IT IS A SUCCESS IF THERE IS A REPEATED NUMBER (I.E. BIRTH MONTH).

REPEAT FOR SEVERAL TRIALS. PROBABILITY IS

$$\frac{\# \text{ OF SUCCESSES}}{\# \text{ OF TRIALS}}$$

SEE ATTACHED SHEET FOR

10 TRIALS.

THERE WERE 8 SUCCESSES.

$$\text{Prob} = \frac{8}{10}$$

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RESULTS

10 Sets of 5 Numbers Per Set

Range: From 1 to 12— Sorted from Least to Greatest

Set #1

3, 3, 3, 5, 5

Set #2

3, 4, 4, 8, 10

Set #3

4, 4, 6, 9, 10

Set #4

1, 5, 6, 6, 6

Set #5

1, 5, 9, 9, 12

Set #6

1, 3, 4, 7, 9

Set #7

3, 3, 7, 9, 10

Set #8

1, 2, 3, 10, 11

Set #9

5, 5, 5, 8, 10

Set #10

3, 12, 12, 12, 12