Math Field Day 2016
Name_____
Probability
School_____
Note: Round the final answers to 3 decimal places

1) Nanette must pass through three doors as she walks from her company's foyer to her office. Each of these doors may be locked or unlocked.

List the outcomes of the sample space. 1) _____

A) {LLU, LUL, ULL, UUL, ULL, LUU}
B) {LLL, UUU}
C) {LLL, LLU, LUL, LUU, ULL, ULU, UUL, UUU}
D) None of these.

2) A 12-sided die can be made from a geometric solid called dodecahedron. Assume that a fair dodecahedron is rolled.

The sample space is {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}.

Find $P(4)$.

2)_____

3) For this year's mayoral election, voter dissatisfaction is very high. In a survey of 500 likely voters, 240 said they planned to write in an independent candidate rather than vote for the Democrat or Republican candidate for mayor.

Estimate the percentage of voters who plan to write in an independent candidate? 3) _____

4) If a gambler rolls two dice and gets a sum of 10, he wins $10, and if he gets a sum of three, he wins $20. The cost to play the game is $5. What is the expectation of this game?
4) _____

5) A survey asked 34,407 homeowners how many pets they owned. The results were as followed:

Number of Pets	Number of Homeowners
0	6120
1	11,915
2	9360
3	6363
4 or more	649

Total 34,407

What is the probability that a sampled homeowner has more than 1 pet? 5) _____

6) Let E be the event that a corn crop has an infestation of ear worms, and let B be the event that a corn crop has an infestation of corn borers. Suppose that $P(E) = 0.24$, $P(B) = 0.16$, and $P(E \text{ and } B) = 0.13$. Find the probability that a corn crop has eitheran ear worm infestation, a corn borer infestation, or both.
6) _____

7) On a certain day, a cheese packaging facility packaged 560 units of mozzarella cheese. Some of these packages had major flaws, some had minor flaws, and some had both major and minor flaws. The following table presents the results.

	Minor Flaw	No Minor Flaw
Major Flaw	17	39
No Major Flaw	50	454

Find the probability that randomly chosen cheese package has a flaw (major or minor). 7) _____

8) A lot of 1000 components contains 250 that are defective. Two components are drawn at random and tested. Let A be the event that the first component drawn is defective, and let B be the event that the second component drawn is defective.

Find $P(B|A)$.
8) _____

9) A lot of 1000 components contains 250 that are defective. Two components are drawn at random and tested. Let A be the event that the first component drawn is defective, and let B be the event that the second component drawn is defective.
Find $P(B \text{ and } A)$. 9) _____

10) How many different ways can 5 brands of soda be displayed on a supermarket's shelf, one at a time in a row?
10) _____

11) There are 3 different mathematics courses, 3 different science courses, and 5 different history courses. If a student must take one of each, how many different ways can this be done?
11) _____

12) If 20 tickets are sold and 2 prizes are to be awarded, find the probability that one person will win both prizes if that person buys exactly 2 tickets.
12) _____