

Mr Murphy
AP Statistics
Probability Partner Worksheet

Part I - Multiple Choice

1. Restaurants in a town have their average price entrée calculated. The sample space is {inexpensive ($\leq \$10$), moderate (between $\$10$ and $\$20$), and expensive $\$20$ and up)}. Which of the following represents a legitimate assignment of probabilities for this sample space?

- (a) 0.33, 0.33, 0.33
- (b) 0.5, 0.25, 0
- (c) 0.4, 0.5, 0.2
- (d) 1, 1, 1
- (e) None of these

2. If you choose a card at random from a well-shuffled deck of 52 cards, what is the probability that the card chosen is a diamond or a king?

- (a) 0.308
- (b) 0.288
- (c) 0.019
- (d) 0.327
- (e) None of these

3. You play tennis regularly with a friend and from past experience, you believe that the outcome of each match is independent. For any given match, you have a probability of 0.7 of winning. The probability that you win at least one of the next two matches is

- (a) 0.6
- (b) 0.91
- (c) 0.09
- (d) 0.36
- (e) None of these

4. If $P(A) = 0.44$ and $P(B) = 0.22$ and A and B are independent, what is $P(A \cup B)$?

- (a) 0.66
- (b) 0.0968
- (c) 0.5632
- (d) 0.2420
- (e) not enough info

5. Event A occurs with probability $\frac{1}{4}$ and event B with probability $\frac{1}{3}$. If A and B are disjoint, then:

- (a) $P(A \cap B) = \frac{1}{12}$
- (b) $P(A \cup B) = \frac{7}{12}$
- (c) $P(A \cup B) = \frac{1}{12}$
- (d) $P(A \cap B) = \frac{7}{12}$
- (e) depends on whether the events are independent

The next 3 problems deal with the following situation. At Mama's Pizza, pizzas are available in the following sizes and people buy them with the given probabilities:

Personal	Small	Medium	Large
0.12	0.25	0.3	0.33

6. The probability that someone doesn't order a personal or large pizza is:

- (a) 0.55
- (b) 0.45
- (c) 0.075
- (d) 0.925
- (e) none of these

7. If two customers come in and each orders a pizza, what is the probability that they order two large pizzas?

- (a) 0.66
- (b) 0.5511
- (c) 0.1089
- (d) 0.33
- (e) none of these

8. If two customers come in and order a pizza, what is the probability that the pizzas are the same size?

- (a) 0.25
- (b) 0.2758
- (c) 0.0030
- (d) 0.3215
- (e) none of these

9. A counter has cups of beverages on it. 15 are Cokes and 1 is a Pepsi. Two people come along and take a cup. Define the following events:

A = the first person chooses a Pepsi

B = the second person chooses a Pepsi

The events A and B are

- (a) independent
- (b) disjoint
- (c) complementary
- (d) conditional
- (e) none of these

10. Three cards show the numbers 1, 2, and 3, one number per card. The cards are shuffled and a card chosen. It is replaced, reshuffled, and another card is chosen. What is the probability that at least one of the cards is odd?

- (a) $\frac{1}{3}$
- (b) $\frac{4}{9}$
- (c) $\frac{5}{9}$
- (d) $\frac{1}{9}$
- (e) $\frac{8}{9}$

11. An experiment consists of choosing a card from a standard deck of cards and replacing it. If I perform the experiment 900 times, about how many times would you expect to choose a face card (Jack, Queen, King)?

- (a) 208
- (b) 415
- (c) 450
- (d) 188
- (e) cannot be determined

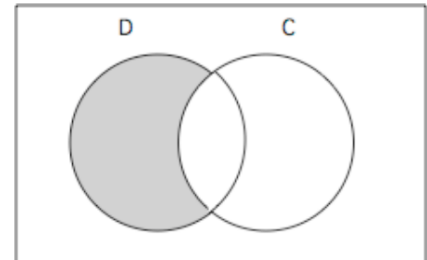
12. I roll 3 dice. If I rolled a 6 on the first two dice, what is the probability that the 3rd die is also a 6.

- (a) $\frac{1}{6}$
- (b) $\frac{1}{36}$
- (c) $\frac{1}{216}$
- (d) $\frac{25}{36}$
- (e) 0

13. Let A be the event: eating all of your vegetables. Define A^c .

- (a) Eating none of your vegetables
- (b) There is at least one vegetable left
- (c) Eating some of your vegetables
- (d) Not eating some of your vegetables
- (e) Eating only one of your vegetables

14. The following Venn diagram uses the following definition. D = people with dogs. C = people with cats. What does the shaded region represent?



- (a) people with dogs
- (b) people with dogs and no cats
- (c) people with both dogs and cats
- (d) people with dogs or no cats
- (e) people not having cats

Part II - Free Response

15. A fair coin is tossed seven times. Find the following probabilities.

- (a) getting all heads

- (b) the tosses are the same

16. Two dice are rolled. Find the following probabilities (It would be good to list the sample space).

(a) the sum is 6

(b) the sum is greater than 10 or less than 5

(c) the sum is a perfect cube

(d) the sum is odd or divisible by 3

(e) if the sum is odd, it is also divisible by 3

(f) if the sum is divisible by 3, it is also odd

17. Suppose you are given a standard 6-sided die and told that the die is “loaded” in such a way that the numbers 1, 2, 3, 4, 5, 6 will come up with the following probabilities:

Outcome	1	2	3	4	5	6
Probability	0.2	0.3	0.2	0.1	0.1	0.1

(a) Let A be the event: the number rolled is divisible by 2. List the outcomes in A and then find $P(A)$.

(b) Let B be the event: the number rolled is divisible by 3. List the outcomes in B and then find $P(B)$.

(c) Find $P(A|B)$

(d) Find $P(B|A)$

(e) Are A and B disjoint? Explain briefly.

(f) Are A and B independent? Explain or prove.

18. A survey was taken among a group of people. The probability that a person chosen speaks Spanish (event A) is 0.74, the probability that a person chosen speaks French (event B) is 0.32, and the probability of that a person speaks both languages is 0.18.

(a) Draw a Venn diagram that shows the relation between the events A and B.

Use your Venn diagram to find the probability that:

- (b) a person speaks Spanish but not French
- (c) a person speaks at least one of the two languages
- (d) a person speaks at most one of these languages
- (e) If a person speaks Spanish, he also speaks French
- (f) If a person speaks French, he also speaks Spanish

19. The chance of contracting strep throat when coming into contact with an infected person is estimated as 0.15. Suppose the four children of a family come into contact with an infected person. Conduct a simulation to answer the following questions. Use the random number table below and conduct 10 trials. Clearly identify each trial on the table.

- (a) Using your results, estimate the average number of children who will get the disease.
- (b) What is the probability of one of the children getting the disease?
- (c) What is the probability of at least one of the children getting the disease?

3 1 1 5 1	4 4 7 2 7	8 8 7 9 5	9 3 7 3 6	2 2 1 8 9	4 7 0 0 4
4 8 3 0 4	7 7 4 1 0	7 8 8 7 1	9 8 3 8 7	4 4 6 4 7	1 8 0 7 2
6 5 1 9 4	5 8 5 8 6	7 8 2 3 2	5 7 0 9 7	0 1 4 3 0	0 0 3 0 4