Started on	Wednesday, 28 September 2022, 1:49 PM
State	Finished
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Time taken	2 days 4 hours

Question **1**
Correct
Marked out of 1.00

Let A and B be arbitrary nonempty events. Match the following events with their definitions.

$C = A \cup B$ — At least one of the two events (A or B) happens. ✓

$(A \cup B) \cup (A^c \cap B^c)$ — S ✓

$(A \cap B^c) \cup (A^c \cap B)$ — Event C that only A or only B occur but not both. ✓

Your answer is correct.

Watch lecture 2 for the "everyday language" definition of events.

Section 2.5 in the textbook and examples in that section also have examples similar to the questions asked here.

The correct answer is:

$$C = A \cup B$$

→ At least one of the two events (A or B) happens.,

$$(A \cup B) \cup (A^c \cap B^c)$$

→ S,

$$(A \cap B^c) \cup (A^c \cap B)$$

→ Event C that only A or only B occur but not both.

Question **2**
Correct
Marked out of 1.00

Two voters, Al and Bill, are each choosing between one of three candidates-1, 2, and 3-who are running for city council. An experimental outcome specifies both Al's choice and Bill's choice, e.g., the pair (3,2), which says that Al chooses candidate 3 and Bill chooses candidate 2. Match the following.

The event that Al and Bill make the same choice is ✔	{(1,1),(2,2),(3,3)}
The sample space S of this experiment is ✔	{(1,1),(1,2),(1,3), (2,1),(2,2),(2,3), (3,1), (3,2),(3,3)}
The event that neither of them votes for candidate 2 is ✔	{(1,1),(1,3),(3,1),(3,3)}

Your answer is correct.

You may use a tree, with the numbers 1, 2, 3, in the first stem for the candidates that Al chooses, and the numbers 1,2,3 in a second stem for the numbers that Bill chooses. Alternatively, you can do like we did with the two six sided dice in lecture 1, create a table and put together all the possible pairs.

The correct answer is: The event that Al and Bill make the same choice is → {(1,1),(2,2),(3,3)}, The sample space S of this experiment is → {(1,1),(1,2),(1,3), (2,1),(2,2),(2,3), (3,1), (3,2),(3,3)}, The event that neither of them votes for candidate 2 is → {(1,1),(1,3),(3,1),(3,3)}

Question **3**
Correct
Marked out of 1.00

Chapter 2, End of Chapter exercise 12

--------This is the question asked in the book

A tract of land in the Alabama Piedmont contains a number of dead shortleaf pine trees, some of which had been killed by the littleleaf disease, some by the southern pine beetle, and some by fire. Suppose that out of 500 trees,

70 have (were killed) by littleleaf disease alone
50 have (were killed) by Southernpine beetle alone
10 were killed by fire alone
100 were killed littleleaf disease and southern pine beetle
160 were killed by littleleaf disease and fire
90 were killed by pine beetle and fire
20 were killed by all three factors

if I draw a dead tree at random, what is the probability that the tree was killed by littleleaf disease? This is the same question as asking: "what proportion of trees were killed by littleleaf disease?"

Draw for yourself a Venn diagram to illustrate your answer, like we did in the Partitions lecture, part 2.

Notice: The fact that there are 500 trees and that all those numbers listed is 500 is a coincidence.

-------This is how we answered it

First we define our notation

D = event that trees were killed by littleleaf disease

E = Event that trees were killed by southern pine beetle

F = Event that trees were killed by fire

We use the Venn diagram below to guide our answer, given that we have not studied yet rules of probability (Coming in Ch.3).

We put the number of trees belonging in each part of the partition of the sample space seen in the image. See the second partitions lecture to recognize how we did that.

Then we look at how many trees fall under the following subevents in the partition:

$(D(E \cup F)^c), (DEF^c), (DFE^c), (DEF)$

In total, we have 70+80+140+20= 310 trees in total in those subevents combined.

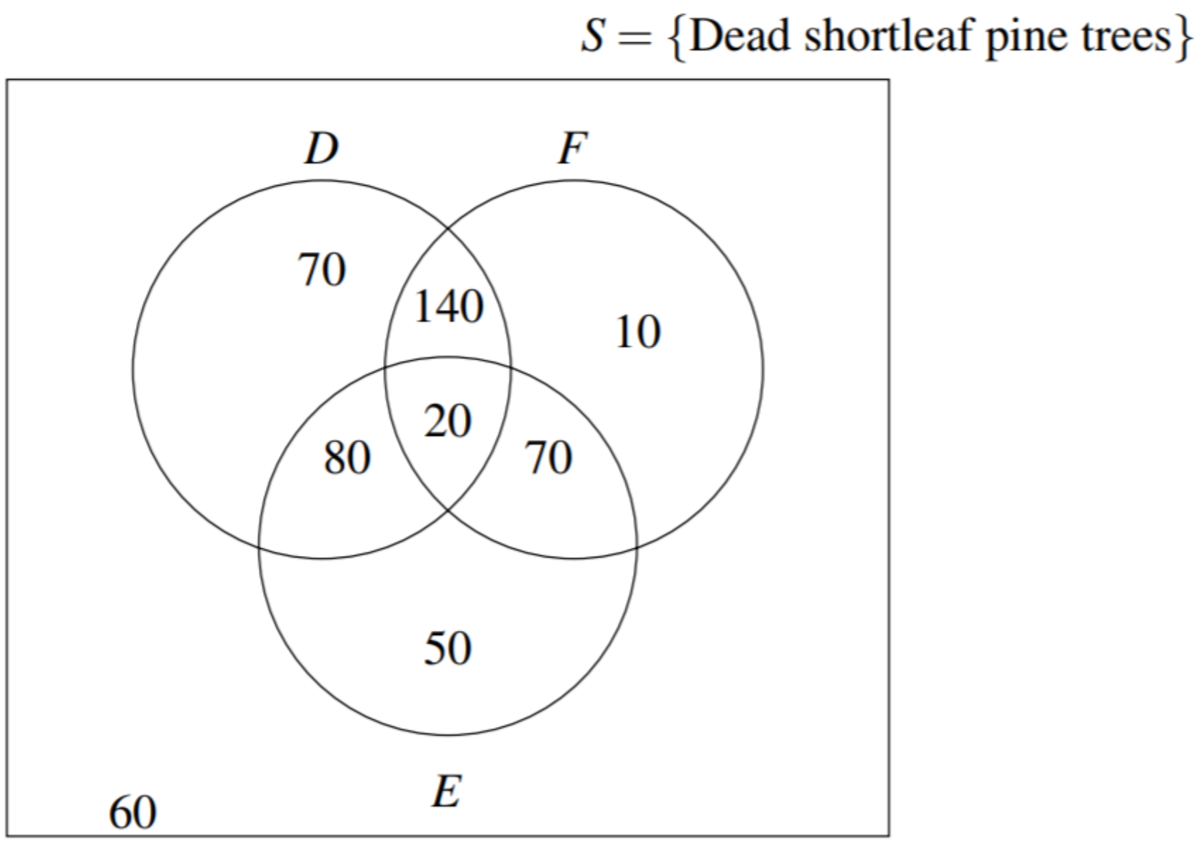
There is a total of 500 dead trees.

So the proportion of trees killed by littleleaf disease is

310/500 =0.62

Since D is the event of interest, then

$$P(D) = \frac{70 + 80 + 140 + 20}{500} = \frac{310}{500} = 0.62$$



---------Now you will answer the following question

What is the probability that a randomly chosen tree was killed by fire?

- a. 50%
- b. 48%
- c. 62%
- d. 35%

Your answer is correct.

We use the Venn diagram below to guide our answer, given that we have not studied yet rules of probability (Coming in Ch.3).

We put the number of trees belonging in each part of the partition of the sample space seen in the image. See the second partitions lecture to recognize how we did that.

Then we look at how many trees fall under the following subevents in the partition:

$(F(E \cup D)^c), (DFE^c), (EFD^c), (DEF)$

In total, we have 10+140+70+20= 240 trees in total in those subevents combined.

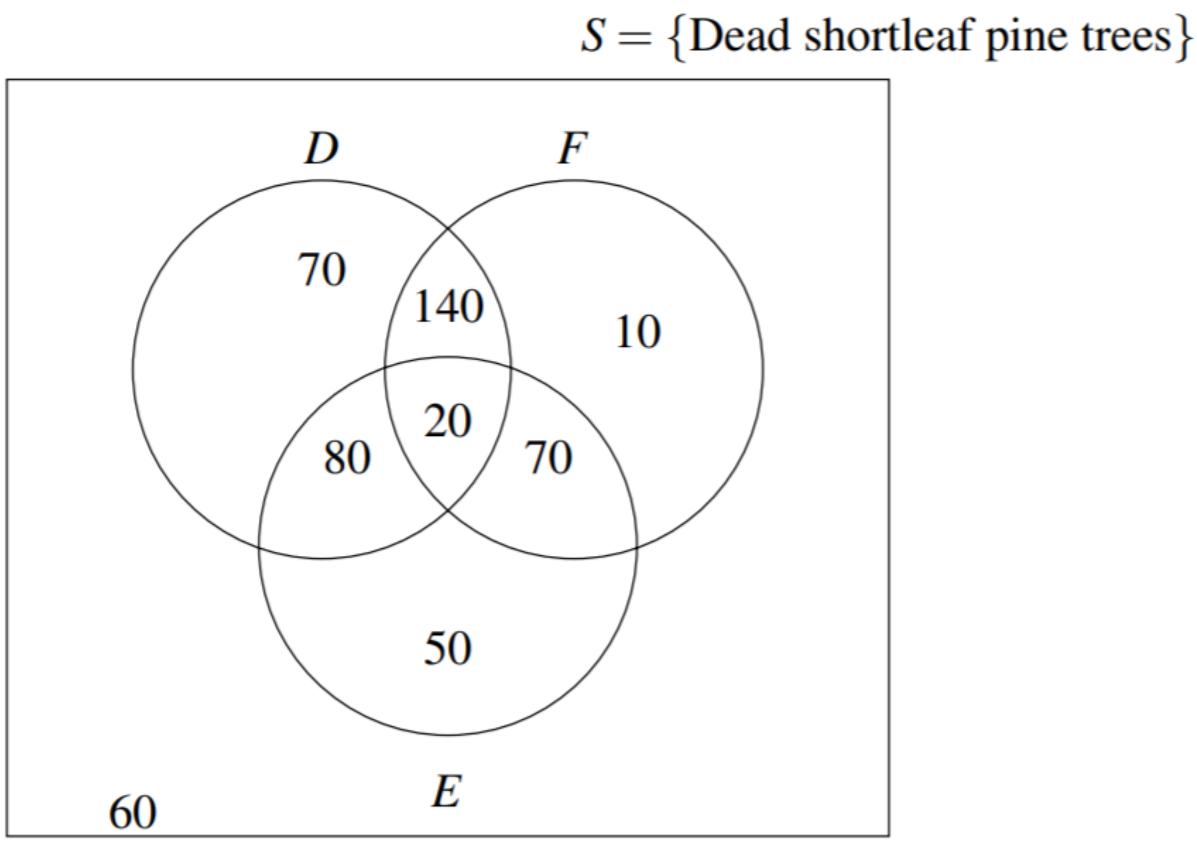
There is a total of 500 dead trees.

So the proportion of trees killed by littleleaf disease is

240/500 =0.48

Since D is the event of interest, then

$\Rightarrow P(D) = \frac{10+140+70+20=}{500} = \frac{240}{500} = 0.48$



The correct answer is:
48%

Question 4
Correct
Marked out of 1.00

Chapter 2, Section 2.6.1, exercise 3.

---------We first do an example

If you review the lecture "Building blocks of modern probability. Par 1" you will see that there is a similar example there.

Four components are connected to form a system as shown in Figure 2.8 in the textbook. The subsystem 1-2 will function if both of the individual components functions. The subsystem 3-4 functions if both of the individual 3-4 components functions. For the entire system to function, at least one of the two subsystems must function. We conduct an experiment that consists of observing the status of each and every component of this system.

Let A be the event that the system does not work. How many outcomes of the sample space are there in this event?

-------We now present a solution to the example, showing a justification for the answer, the way we want you to write your work, like a professional.

We first list the outcomes in the sample space to helps us see what it is that we must choose from it. But that requires that we define our notation.

Let 1= "a component work" and 0="a component does not work."

S={1111, 1110, 1101, 1100, 1011, 1010, 1001, 1000, 0111, 0110, 0101, 0100, 0011, 0010, 0001, 0000 }

where for example, 1011 means component 1 works, component 2 does not work, component 3 works and component 4 works.

(notice that we must then define what the outcomes in S mean by providing an example; otherwise we do not know the order in which we are looking at the components)

Let A be the event that the system does not work. List the elements of A.

A={ 1010, 1001, 1000, 0110, 0101, 0100, 0010, 0001, 0000 }

Notice that we label the event as A and we list the outcomes in it properly, by including them between the {}

Therefore, there are 9 outcomes in the event that the system does not work.

===========Now we give you a question similar to that in the example.

Let B be the event that the system works. How many outcomes of the sample space are there in this event?

- a. 10
- b. 5
- c. 9
- d. 7 ✔

Your answer is correct.

We list the outcomes in the sample space.

Let 1= "a component work" and 0="a component does not work."

S={1111, 1110, 1101, 1100, 1011, 1010, 1001, 1000, 0111, 0110, 0101, 0100, 0011, 0010, 0001, 0000 }

where for example, 1011 means component 1 works, component 2 does not work, component 3 works and component 4 works.

Let B be the event that the system works. List the elements of B.

B={ 1111,1110,1101,1100,1011,0111,0011 }

So we see that there are 7 outcomes in which the system will work. And we notice that the event B is the complement of event A.

The correct answer is:
7

Question 5
Correct

Chapter 2, End of Chapter Exercises, Exercise 8.

Lecture 3, Partitions (video 1 and video 2) explain how to do a problem like this.

Marked out of 1.00

----------We do this exercise 1st.

It is possible to derive formulas for the number of elements in a set which is the union of more than two sets, but usually it is easier to work with Venn diagrams. For example, suppose that the Data Science club reports the following information about 30 of its members: 19 work part time, 17 take stats, 11 volunteer on Volunteer day, 12 work part time and take stats, 7 volunteer and work part time, 5 take stats and volunteer and 2 volunteer, take stats and work part time. Using Figure 2.10, fill in the number of elements in each subset, working from the bottom of the list given in this problem to the top.

------ We solve this exercise explaining how again

We first label the events and draw a Venn Diagram. We used the template for three evens that shows in Figure 2.10 in the textbook, as requested. There the events are labeled A, B, C. You do not have to use A, B, C, all the time. You can use labels that denote the event more clearly. For example,

Let T=work part time (instead of A)

D= take stats (for data science, instead of C)

V: work on volunteers day (instead of B).

You may ignore the A, B, C letters in the image below and decide to go with T, D, V.

We start by entering the number 2. Then we read that 5 take stats and volunteer. So we would be tempted to enter the number 5 where D and V intersect. But notice that of those 5 there are 2 already accounted for. So using the partition technique learned in lecture 3, we split the 5 in the intersection. That is why you see the numbers 2 and 3 in $(D \cap V)$. Proceeding as indicated in the lecture 2 videos, we then obtain the following diagram, which has the number of members in each part of the partition of S.

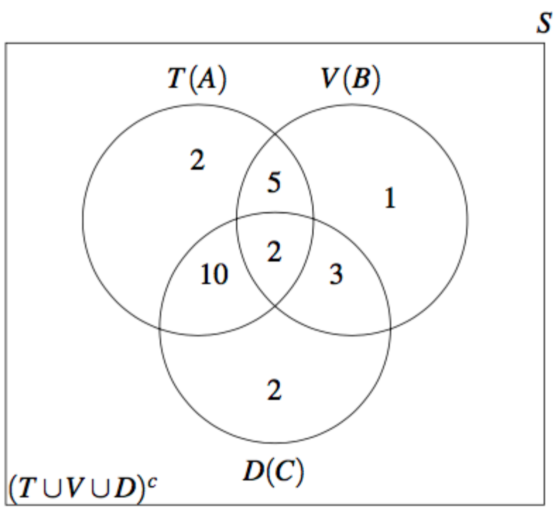


Figure 2.10

Notice that there are 30 members but we have accounted only for 25 inside the Venn diagrams. So it must be that $(T \cup V \cup D)^c$ contains 5 members. That number 5 is not showing in the diagram.

----------Now we ask you a question.

What proportion of students do not work part time and do not volunteer on Volunteer day?

- a. 0.23333✔
- b. 0.55
- c. 0.167

d. 0.99

Your answer is correct.

The event being asked about is $(T^c \cap V^c)$. By DeMorgan's laws

$(T^c \cap V^c) = (T \cup V)^c$

We can see that there are 2 in the "only in stats" event and 5 in the $(T \cup V \cup D)^c$ event. So there are 7 out of 30 members that do not work part time and do not volunteer, or 23.3333 % (0.2333 proportion)

Notice that you get the same answer as if you had been asked about the proportion of members in $(T \cap V)$. But if you had to show the work, indicating the symbolic event, your work would be incorrect if you had said that the event is $(T \cap V)$.

As a challenge question, can you write $(T \cup V)^c$, symbolically, in an alternative way as the union of "only in stats" -write this symbolically- and "not in stats, not volunteering and not working part time" ?

The correct answer is:
0.23333

Question 6
Partially correct
Marked out of 1.00

Chapter 2, end of chapter exercise 9.

---This is the exercise in the book

(Based on Khilyuk, Chilingar, and Rieke 2005, page 37). A protect-the-bay program is trying to prevent eutrophication (excessive nutrient enrichment that produces an increasing biomass of phytoplankton and causes significant impact on water quality and marine life). To measure biologic water quality the protect-the-bay program uses mean chlorophyll concentration on the surface, mean chlorophyll concentration on the photic layer, and mean chlorophyll concentration of the water column. If each of these are ranked as high or normal, the number of possible outcomes in the sample space of biological water quality is the same as the number of outcomes in which of the following experiments described in pre-recorded lecture "Building blocks of modern probability (I)"? Select all that applies.

----And this is the solution to the question

Define your notation first

Let

H= high mean chlorophyll concentration

N= Normal mean chlorophyll concentration

An outcome in the sample space will be a 3-tuple that tells us the concentration in the surface first, in the photic layer second, and the water column third, in this order.

S={HHH, HHN, HNH, HNN, NHH, NHN, NNH, NNN},

where, for example, HNH means that mean chlorophyll concentration on the surface is high, mean chlorophyll concentration on the photic layer is normal, and mean chlorophyll concentration of the water column is high.

So we see that there are 8 outcomes in S. This is the same number of outcomes as the (i) capoeira example and (ii) the tossing three coin experiment described in the lecture and the textbook (Chapter 2).

---- Now you answer the following question

Suppose biological water quality is considered dangerous if mean chlorophyll concentration is high in two of the locations where it is measured. The outcomes of the event "dangerous water quality" have the property of being .... (choose all that applies)

a. screening people entering the mobile clinic to see if they are O blood

- b. empty
- c. complement of each other
- d. mutually exclusive
- e. Disjoint ✔

Your answer is partially correct.

You have correctly selected 1.

Define your notation first

Let

H= high mean chlorophyll concentration

N= Normal mean chlorophyll concentration

An outcome in the sample space will be a 3-tuple that tells us the concentration in the surface first, in the photic layer second, and the water column third, in this order.

S={HHH, HHN, HNH, HNN, NHH, NHN, NNH, NNN},

where, for example, HNH means that mean chlorophyll concentration on the surface is high, mean chlorophyll concentration on the photic layer is normal, and mean chlorophyll concentration of the water column is high.

Let D denote the event "dangerous water quality"

Then

D= {HHN, HNH, NHH}

The outcomes in D are mutually exclusive, or equivalently, disjoint. Their intersection is mutually empty.

The correct answers are:
mutually exclusive,

Disjoint

Question 7
Correct
Marked out of 1.00

Chapter 2, miniquiz question 3

Consider two events, A and B, in a sample space. The event $(A \cap B^c) \cup (B \cap A^c)$ represents the events

Select one:

a. Neither event A nor event B happens

b. Event A or event B happens

c. only event A or only event B happens, but not both

d. Both events A and B happen

Your answer is correct.

See example 2.5.5 in the Textbook, page 45 and Box 2.5 on the same page.

The correct answer is:
only event A or only event B happens, but not both

Question 8
Correct
Marked out of 1.00

Chapter 2, miniquiz question 6.

Two six-sided dice are rolled. Let A be the event that the sum is less than nine, and let B be the event that the first number rolled is five. Events A and B are

Select one or more:

a. mutually exclusive

b. equal

c. independent

d. not mutually exclusive

e. complements of each other

Your answer is correct.

Draw a Venn Diagram like that in Figure 2.4 in the textbook and label the events A, B. place in each part of the diagram the outcomes of the roll of the two dice corresponding to that part. For example, in the intersection, you will put outcomes that result in a sum of less than 9 and also start in 5, for example (5,3) will be in the intersection.

The correct answer is: not mutually exclusive

Question 9
Correct
Marked out of

Apps and articles and other resources referenced in the textbook are intended to be used to facilitate your learning. The app in this exercise is referenced in Example 1.2.1 of the textbook, page 12 and is linked to in the Lectures page of

1.00

week 1 module.

Exercise

Use the dice applet posted after Lecture 1 and watch the video posted right below the lecture. The video demonstrates how to use the app. Select the 1-6 flat unfair dice option and roll of two dice. Simulate 1000 rolls of the two dice. *Under the assumption that each die is 1-6 flat, which sum is more likely to come up, a 7 or an 8? Use the model probability to answer. Compare with the result that we got in Lecture 1 and in the Textbook's chapter 1 and the result you get with the simulation.*

Note: Because the 1-6 flat is an unfair die, you can not use the definition of classical probability to calculate the probabilities.We will learn in Chapter 3 how to calculate it using the product rule. But do not worry about where the probability comes from for now. The app will tell you the model probability under the Dist column, which could differ from the empirical probability that you get with the simulation in the Data column. To answer this question, used the Dist.

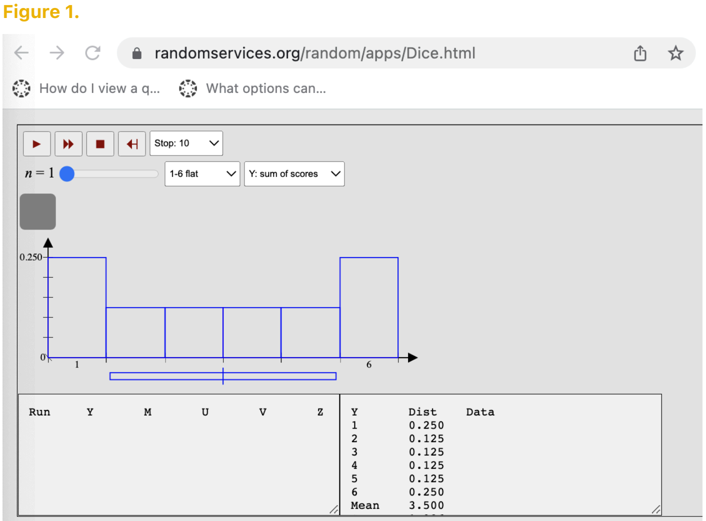
Watch Dr. Sanchez's video explaining how the app works and where in it you find the probability. That video is right below the app.

- a. 8, the same as under the fair dice assumption, and the simulation supports this answer.
- b. 7 and 8 are equally likely, as in the fair dice assumption and the simulation supports this answer.
- c. 7, as under the assumption that each dice is fair, and the simulation supports this answer. ✔
- d. 8, as under the assumption that each dice is fair, but the simulation supports this answer.
- e. 7 and 8 are equally likely, as in the fair dice assumption and the simulation does not support this answer.
- f. 7, as under the assumption that each dice is fair, and the simulation does not support this answer.

Your answer is correct.

A 1-6 flat has the distribution (probabilities for the numbers in the dice) illustrated by the app setting n=1 and selecting 1-6 flat (see Figure 1). The Y=sum, when n=1 is just the number in the dice. The distribution of Y can be seen in the image in Figure 1. There should be a label Y in the horizontal axis and Probability on the vertical axis. Apps sometimes are sloppy and incomplete, to allow for a wide array of functionalities. You can see the probabilities on the table. Y is the number in the dice and Dist is referring to the probability of that number under the assumption. Notice that the numbers are not equally likely.

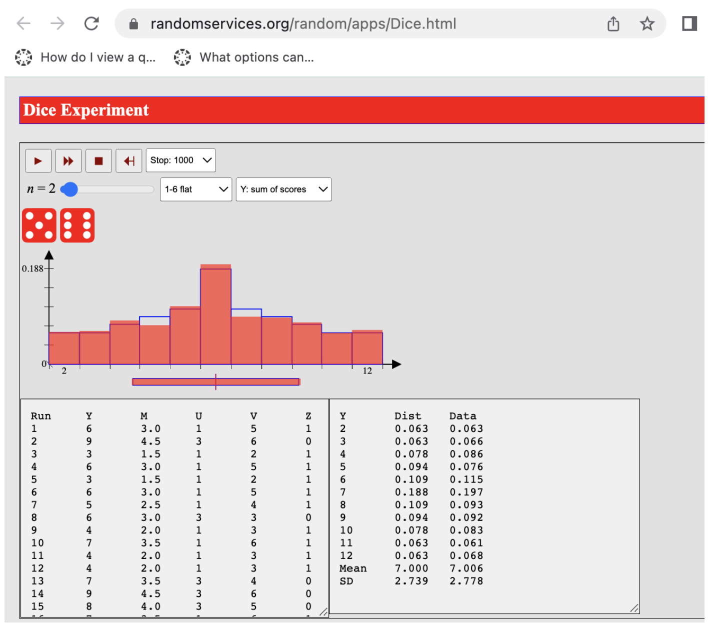
Figure 1.



So when you roll two of those dice and are interested in the sum, the distribution of Y, the sum, is as illustrated in the image in Figure 2. There should be a label Y in the horizontal axis and Probability on the vertical axis. Apps sometimes are sloppy and incomplete, to allow for a wide array of functionalities. You can see the probabilities for the sums on the table. Y is now the sum of the two dice and Dist is referring to the probability of that sum under the assumption that each dice is 1-6 flat. As we can see in Figure 2, a 7 is more likely than an 8, which is the same result we got with fair dice.

Notice that a simulation with 1000 trials (a large enough number of repetitions of the roll of two 1-6 flat dice and corresponding recording of the sum) gives us 1000 sums. That should give a pretty close approximation to the true probabilities. We see that in the Data distribution, which supports that a sum of 7 has higher probability than a sum of 8 (the empirical probability of 7 is larger than the empirical probability of 8).

Figure 2.



The correct answer is:
 7, as under the assumption that each dice is fair, and the simulation supports this answer.

Question **10**

Partially correct

Marked out of 1.00

Chapter 1, Section 1.1.2, question 4.

An individual 45 years old chooses to live in a neighborhood that has cheap housing but not a good safety and hygienic record. The individual is perfectly healthy, works hard, has a new car, has a very clean house, and has never been harmed or inconvenienced by anybody in the neighborhood. This individual is pretty much a mirror image of another individual of the same age who lives in a very fancy gated neighborhood with lots of security surveillance, who has the same health, the same car, the same job, and the same safety record. An insurance company offers a life insurance to both. But the premium of the first individual is much higher than that of the second individual. What explains that? Try to tie your response to what we have discussed in this Section 1.1.

Select one or more:

- [ ] a. Someone in the insurance company probably knows the individual with the higher premium personally and knows that the individual hides a risky behavior that nobody knows about.
- [ ] b. The insurance company chose the premium to charge at random
- [x] c. The insurance company is thinking the same way that Jaron Lanier thinks in the passage at teh bottom of page 7 in the Textbook. ✔
- [ ] d. The insurance company guides itself by the law of large numbers.

Your answer is partially correct.

You have correctly selected 1.
Insurance companies guide their policies by what happens to a large number of individuals in both neighborhoods and compares. If long observation indicates that the proportion of deaths for individuals of that type are higher in the neighborhood of the first individual, the premium will be higher for that individual than for the second. The insurance companies, likeVenn's example about the cows that ruminate, know less about the single individual than about a lot of individuals. For a lot of individuals it knows the average, the proportions.

If the insurance company hired only a few persons, it would not know what the revenue in the long run would be. By insuring a lot of people the expected proportion of accidents from the observed data can be used to predict the future expected costs.

The correct answers are: The insurance company guides itself by the law of large numbers., The insurance company is thinking the same way that Jaron Lanier thinks in the passage at teh bottom of page 7 in the Textbook.

Question **11**
Correct
Marked out of 1.00

Chapter 1, mini quiz, question 6.

In the context of rolling 3 fair six-sided dice, what is the most important factor contributing to obtaining the correct answer to the probability of the sum being 14, for example, without having to do long observations (i.e., without having to roll the dice endless number of times)?

Hint: a careful reading of Chapter 1 and studying of lecture 1 will give you the answer quickly. The answer to this question is the main point in the explanation of why the gamblers got their math wrong.

Note: You can test your intuitions about probabilities of sums of dice using the dice app. Very likely, if you get the probabilities wrong it is because you have failed to account for what we say in lecture 1 and chapter 1.

Select one:

a. use your subjective opinion

b. counting not only the favorable partitions but also the number of permutations of each partition. ✔

c. Taking into account that the number of possible outcomes is: any of the numbers from 3 to 18, that is, there are 16 outcomes. One of those outcomes is favorable, 14. So the probability 1/16 will be the correct probability.

d. using the law of large numbers

Your answer is correct.

See Section 1.3 in the textbook and watch *Lecture 1.*

Think how many partitions give a sum of 14:(6,6,2), (5,3,6), (4,4,6),(5,5,4).

The gamblers of the 17th century would have said that there are only 4 favorable outcomes. But they were not counting the permutations. The way they put together their sample spaces did not write the permutations like we did in the lecture and the textbook.

The number of permutations of (6,6,2) is 3; the number of permutations of (4,4,6) is 3; the number of permutations of (5,5,4) is 3; and the number of permutations of (5,3,6) is 6. There are therefore 15 possible outcomes where the sum is 14.

P("sum is 14") =15/216

The correct answer is:
counting not only the favorable partitions but also the number of permutations of each partition.

Question **12**
Correct
Marked out of 1.00

Chapter 1, mini quiz question 8

------------This is the question

Calculate the probability that in two rolls of a **fair four-sided** die the sum is 5.

-----------This is the answer

We learned a methodology to answer this type of questions in the textbook, chapter 1, and in Lecture 1.

As with the 6-sided die we can do a table where we reflect the number of the first and the second die.

Outcomes

	1	**2**	**3**	**4**
1	1,1	1,2	1,3	1,4
2	2,1	2,2	2,3	2,4
3	3,1	3,2	3,3	3,4
4	4,1	4,2	4,3	4,4

Sum for

each

outcome

	1	**2**	**3**	**4**
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8

Since the die is fair, we can use the classical definition of probability. Let A be the event that the sum is equal to 5.

P(A) = 4/16   four out of 16 equally likely outcomes are in the event, so the probability is as given for P(A).

----Now you answer a question

Suppose you are playing a game in which you would get your tuition, room an board plus a trip to HAwai paid if you get the answer right. Which sum would you bet on: a sum of 4 or a sum of 5?

Select one:

- a. none of the options given is a good option
- b. 4
- c. 5 ✔
- d. they are the same

Your answer is correct.

Let A be the event that the sum is 5

P(A) = 4/16

Let B be the event that the sum is 4

P(B) = 3/14

I would bet on a sum of 5 because it has higher probability of happening. Of course, the outcome could be 4, but in the face of uncertainty, when we make decisions, we have to use probabilities to make a decision. We will do better, in the long run, if we do that.

The correct answer is: 5

Question **13**

Complete

Marked out of 1.00

CHAPTER 2, Section 2.1.1 Exercises 3 and 4

-----This is what the questions ask:

Exercise 3. Consider the following experiment and list the outcomes of the sample space: observing wolves in the wilderness until the first wounded wolf appears.

Exercise 4. Consider the following experiment and list the outcomes of the sample space: screening people for malaria until the first 3 persons with malaria are found.

-------This is what we would answer.

For exercise 3: S= {1, 01, 001, 0001, ... ,000000000001,.........} where "1" denotes a wounded wolf, and "0" denotes an unwounded wolf and where, for example, 0001 indicates that it took 4 wolves to find the first wounded one.

For exercise 4: S={111, 0111, 01011, ..., 1001001, ...} where "1" denotes a person with malaria, and "0" denotes a person without malaria and, for example, 01011,is an outcome where it took 5 persons to find three with malaria, and the first and the second did not have it.

The two sample spaces are certainly infinitely countable. As we say in lectures and the textbook, it is mathematically convenient to consider them so even if the populations we are observing are not infinite.

---A question for you now.

In Section 2.3.2, exercise 4, the problem reads.

Sometimes, companies downsize by laying off older workers. Consider an experiment (often done by investigators) that consists of keeping track of layoffs in a major company that is under the radar of the [Equal Employment Opportunity Commission] until three employees older than 40 are laid off. List at least 6 outcomes of this experiment, defining your notation. Does the sample space of this experiment have anything in common with those of Exercise 3 and 4 above?

S = {111, 0111, 01011,010011.....} where 1 denote a person who over 40 are laid off.

The common between exercise 3 and 4 is they are all infinitely countable.

S={111, 0111, 01011, ...100011.., 1001001, ...00010101, } where "1" denotes a laid off person older than 40, and "0" denotes a laid off person not older than 40 and, for example, 01011,is an outcome where it took 5 layoffs to observe three of people older than 40, and the first and the second layoff were not of people older than 40.

This experiment would have the same sample space as that of exercise 4.

Comment:

This experiment is more like exercise 4 due to sample space. not similar to 3

Question **14**

Complete

Marked out of 1.00

Chapter 2, Example 2.5.2.

You must have run into Example 2.5.2, in section 2.5 of the textbook.

As you will hear from us repeatedly, there are a few methodologically tools and endless contexts in which they are used. A good way to convince yourself of that is by creating your own exercises. So in this question, you are being asked to review again example 2.5.2, and come up with a problem like that in example 2.5.2 but for a different context. The context can not be elections or political.

(a) Write the question,

(b) Define and label your events. Use the notation we have used for the algebra of sets, i.e., in addition to defining your events with some meaningful property in plain words, e.g., "the event that a person is tall.", use labels A, B, ... and use the algebra symbols U, ∩, etc..

(c) Using the algebra of events, define new events such as complements, unions, intersections, only one event, etc..

(d) Prepare a question for the class that you think could be a good question to test that the class has studied Chapter 2 and gone over the materials posted in module 1 for this week. The question must be about a subject in your major. If you are a Stats major or data theory major or specializing in the theoretical part of your major, do not just say that you are a methodologist and have no subject, choose some topic then that represents the industry for which you would like to work when you graduate-you will not be doing data analysis in a vacuum, you will be working for some place that has a purpose of some kind. You could end up just programming, but for whom and for what purpose? Choose the topic of that purpose as your context.

Write your answer in the space provided.

A)Guitar center is raising an activity about the best guitar player. There are three different skills that they need to compete, style, creativity and rhythm. The winner has to have won the majority of votes in two of the three skills. Assume that there are two candidates, S(Slash) and B(BB King).

B)The event that Slash won will represent be the letter "L": L={SSS,SSB,BSS,SBS}.

The event that BB King won will represent be the letter "W": W={BBB,BBS,SBB,BSB}.

C)

L^c represent the complementary of L, which Slash lost in the event. L^c=(BBB,BBS,SBB,BSB)=W.

T represent that Slash won, but only two votes. T = {SSB,BSS,SBS}

F represent that Slash lost, but has one vote. T = {BBS,BSB,SBB}

D) UCLA Admission office is currently making an survey about the career trend of data theory student. Admission will send out a survey to all of the freshmen in the university and give them three choices and let them choose two of it. The three choices are, Data Analysis, Business Development, and Medical. Please provide the sample space of this experiment.

Answers will vary but we will share some of them in a future class discussion.

Comment:

Question **15**

Complete

Marked out of 1.00

Chapter 2, exercise 3, section 2.10

Exercise

Consider the Venn diagrams and events A, B, associated with Figure 2.7.

(1) List the elements in the following events:

a. $A^c \cap B^c$

A good answer for this, since the exercise asks for a listing is:

$A^c \cap B^c = \{1, 2, 4, 7, 8, 11, 13, 14, 16, 17, 19\}$

Now you do the rest.

b. $(A \cap B^c) \cup (B \cap A^c)$

c. $A^c \cup B^c$

b. $B \cup A^c$

(2) Let's add one more. What would be the elements in the event T where T is

$T = (A \cap B^c) \cap (A^c \cap B^c)$

1)

b {3,5,6,9,10,12,18,20}

c. {1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20}

d. {1,2,4,5,7,8,10,11,13,14,15,16,17,19,20}

2)

T = θ

(1)

a.

$$A^c \cap B^c = \{1, 2, 4, 7, 8, 11, 13, 14, 16, 17, 19\}$$

b.

$$(A \cap B^c) \cup (B \cap A^c) = \{3, 6, 9, 12, 18, 5, 10, 20\}$$

c.

$$A^c \cup B^c = \{\text{“}AllelementsinSexcept15\text{”}\}$$

b.

$$B \cup A^c = \{5, 10, 15, 20, 1, 2, 4, 7, 8, 11, 13, 14, 16, 17, 19\}$$

(2)

$T = \emptyset$

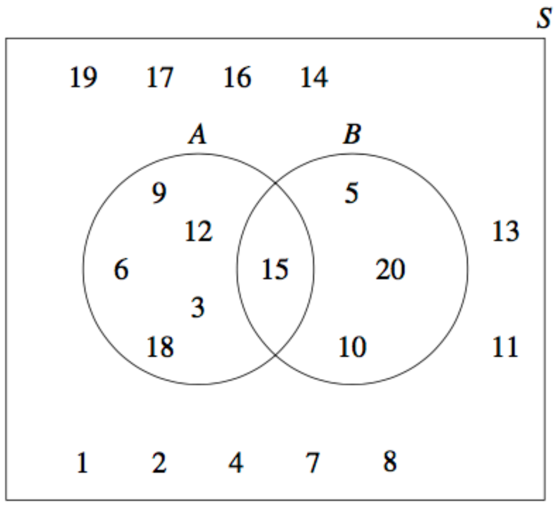


Figure 2.7: Venn diagrams events A, B

Comment: